

NOVEMBER

25 CENTS

POPULAR MECHANICS MAGAZINE

REG'D. TRADE MARK



SEE PAGE 732

1070 TURNS COLD WATER INTO HOT WATER INSTANTLY!



ONLY \$3.95 COMPLETE

SNAP WATER-MATIC on Cold Water faucet, plug into electric socket and zip—Running **HOT Water!** Attaches quick as a wink—NO fuss or plumber bill. \$3.95 pays everything. *Nothing else to buy!* Works instantly AC or DC current. Made of strong

SHOCK-PROOF PORCELAIN

insulated against short circuits and burn-outs; **SAFE!** Gleaming white finish matches your sink; equipped with famous Belden electric plug and cord. **WATER-MATIC** is the original big capacity **HALF-GALLON-A-MINUTE** detachable electric water heater based on a new discovery by America's foremost engineers. Sold under a **POSITIVE GUARANTEE** against breakage or replacement of parts.

1,000 AGENTS NEEDED!

WATER-MATIC is sweeping the country. *Inquiries are pouring in from every section.* We need live men and women as active agents. If you live where homes, stores, offices, garages or farms are wired for electricity, and **WANT TO GET INTO BUSINESS FOR YOURSELF** with one of the fastest selling specialties, **SEND IN THIS COUPON TODAY!**

THIS COUPON IS WORTH \$1.20

WATER-MATIC HEATER CORP.,
1140 Broadway, Dept. 1110. New York, N. Y.

I wish to take advantage of your **SPECIAL AGENT'S OFFER** and enclose **MONEY ORDER** for \$2.75 (Canada \$3.75) for which kindly rush me your Official Agent's Outfit including Complete Sales Information, Order Blanks and One (1) \$3.95 **WATER-MATIC HEATER** (110 Volts AC or DC) ready for immediate use.

Upon receipt of Heater and Data, it is agreed that I am authorized to act as your Official Representative and collect my cash commissions of \$1.20 on every \$3.95 **WATER-MATIC** (110 Volts) and (\$1.75 on every \$5.75) **SUPER WATER-MATIC** (220 Volts) I sell. I promise to send you all orders immediately as received so that you can ship to my customers directly and collect the balance C.O.D. (*Outside of U. S. price is \$1.00 extra on each unit and remittance must accompany order.*)

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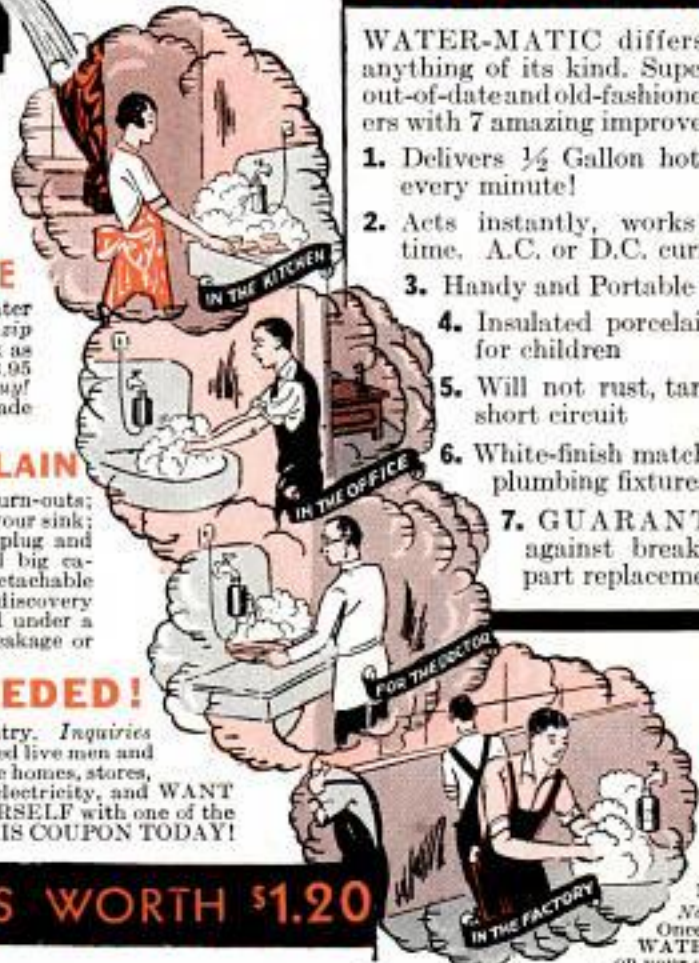
Earn \$30 TO \$40 DAILY

Trade-Mark Reg. U. S. Pat. Off. Pat. App. For.

7 EXCLUSIVE FEATURES

WATER-MATIC differs from anything of its kind. Superior to out-of-date and old-fashioned heaters with 7 amazing improvements.

1. Delivers 1/2 Gallon hot water every minute!
2. Acts instantly, works every time. A.C. or D.C. current
3. Handy and Portable
4. Insulated porcelain, safe for children
5. Will not rust, tarnish or short circuit
6. White-finish matches fine plumbing fixtures
7. **GUARANTEED** against breakage or part replacement.



GET INTO BIG MONEY

Why half-starve on a part-time job when you can get into the **BIG MONEY** with **WATER-MATIC!**

No experience needed. Once you see how **WATER-MATIC** works on your own faucet, you become so enthusiastic **NOTHING CAN STOP YOU!**

We show you everything—how to demonstrate, how to close sales, collect your **CASH.** Start in Spare Time—10 Sales, an Evening's Easy Work, nets you **\$12.00 CASH IN HAND.** Full time earnings averaging 25 Sales a Day net you **\$30.00 a Day, \$180.00 a Week, \$780.00 a Month.** More than \$9,000.00 a year! Territory is Going Fast. Tomorrow May Be Too Late.

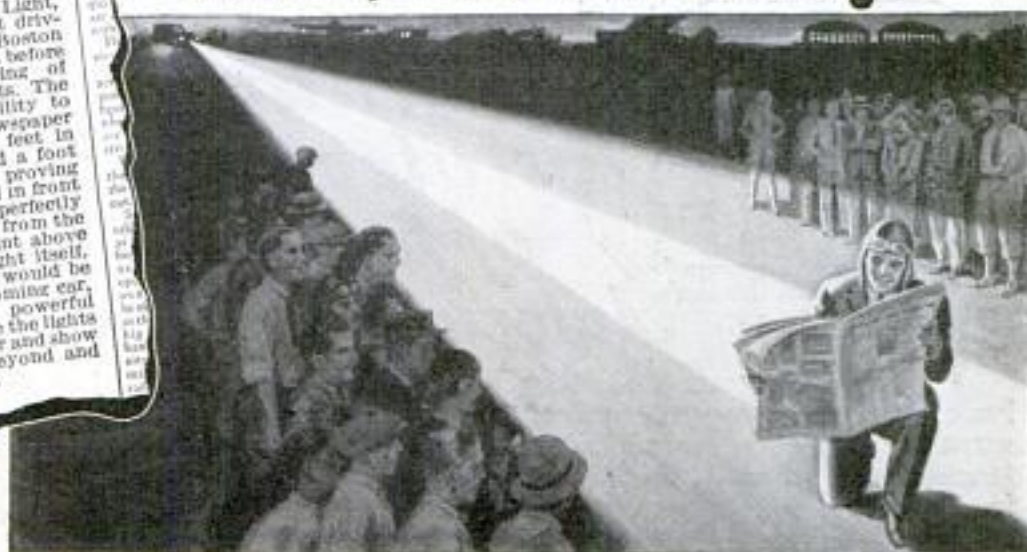
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WATER-MATIC

Mystery "TWIN-RAY" Light Tested— Reads Newspaper At 1,000 Feet!

SEVERE TEST GIVEN NEW SAFETY LIGHT

June 8th: A demonstration of the new Auto Safety Light, designed for safe night driving, was given at the Boston airport on Friday night before an interested gathering of pilots and automobilists. The first test was the ability to read any part of a newspaper at a point of 1,000 feet in front of the light and a foot above the ground, proving that while the ground in front of the light was perfectly illuminated, the rays from the light were at no point above the center of the light itself. Consequently there would be no glare in an on-coming car, showing the light powerful enough to penetrate the lights of the on-coming car and show clearly the road beyond and any obstacles in it.



Lights Highway Ahead With 67,000 Candle Power Beam

Reporters for the Boston Sunday Post witnessed a demonstration of this light and above is a reprint of their report.

Now—judge for yourself what you can do with a light like this on your automobile—a light that throws a 67,000 candle power beam for over 1,000 feet—lights up all road signs and curves long before you reach them. Makes the road ahead of you as bright as day yet absolutely can't glare in the eyes of approaching drivers. A road light that literally takes the light

out of the sky—all light on the highway. Fast night driving now safe with this amazing Speedlight—you can drive 50-60—even 70 miles an hour with perfect safety. On a road as brilliantly lighted at midnight as at mid-day. Cuts through fog, rain, and darkness. This "twin-ray" road light not only can't glare itself but it cuts through on-coming brights. No wonder it was awarded the grand prize and two gold medals in world competition.

AGENTS Cleaning Huge Profits

Agents and distributors from coast to coast are making big money equipping passenger cars, busses and trucks with this brand new road light. This is your opportunity to make up to \$10-\$20-\$30 per day. Some agents make even more. Kinney made \$96 in a few hours. Frost made \$150 in one day. Burroughs sold fifty lights to Richmond fire and police departments. Over 20 million cars need

this wonderful light to protect human lives and property against glaring lights, fog, rain and darkness. Hundreds of men have made big fortunes out of makeshift spot lights and painted bulbs that only did half the job. Send the coupon and find out how you can use this great device to build up a crew of your own—and double your earnings—earnings which by themselves will be bigger than you ever saw before. Do it now, before you turn this page.



Cuts Through London Fog and Darkness Like a Knife

Tests in England have proved this. With this light you need have no more fear of fog, rain or darkness. There is no light like it in the world. It is not a spot. It embodies an absolutely new principle in headlighting discovered by a famous light engineer. NOT A PAINTED BULB—but a real scientifically constructed road light with a concentrated 67,000 candle power beam of light on the road for over a thousand feet and no glare. Think of it! Over a fifth of a mile. Put one on your car and see for yourself what you can do with a light like this. Send the coupon today for our introductory offer.

SPEEDLIGHT COMPANY

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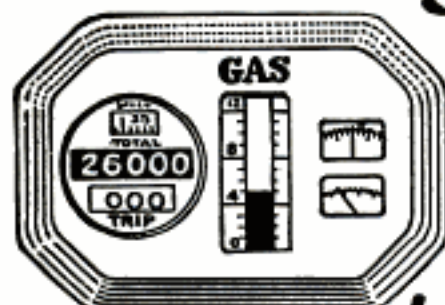
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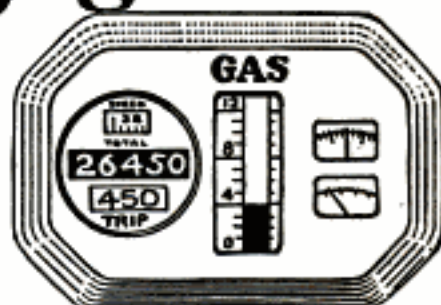


4J5L-8YJ-4D26

450 MILES in a gallon of gas



*startling
statement
of famous
Automotive Engineers*



How to increase gasoline mileage has been a problem that Automotive Engineers have been trying for years to solve. Recently a world famous engineer made the statement that the energy produced by burning a gallon of gasoline would run an auto a distance of 450 miles. Other well known authorities go on record as saying that eventually it may be possible to get over four times as much out of gasoline as in the past.

Amazing Whirlwind Device Saving Millions of Gallons of Gas for Auto Owners

The Whirlwind Carbureting device embodies scientific features which conserves part of the gasoline that formerly went to waste.

Letters coming into the office tell of record mileages resulting in amazing gas savings. Low gasoline mileage is reported on practically every make of car. Greater power and smoother running motors are also noticed by users. The cost of the Whirlwind is so little that, basing its gas saving features even on the most modest reports, it would pay for itself almost immediately and then save many, many dollars for its owner by reducing gasoline consumption.

Car owners all over the world are saving money every day with the Whirlwind, besides having better operating motors. Think what this means on your own car. Figure up your savings—enough for a radio—a bank account—added pleasures. Why let the Oil Companies profit by your waste? Find out about this amazing little device that will pay for itself every few weeks in gas saving alone.

FITS ALL CARS

In just a few minutes the Whirlwind can be installed on any make of car, truck or tractor. It's actually less work than changing your oil or putting water in the battery. No drilling, tapping or changes of any kind necessary. It is guaranteed to work perfectly on any make of car, truck or tractor, large or small, new model or old model. The more you drive the more you will save.

SALESMEN and DISTRIBUTORS WANTED To Make Up To \$100.00 a Week and More

Whirlwind men are making big profits supplying this fast-selling device that car owners cannot afford to be without. Good territory is still open. Free sample offer to workers. Full particulars sent on request. Just check the coupon.

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Dept. 729-A, Station C. Milwaukee, Wis.

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No matter what kind of a car you have—no matter how big a gas eater it is—the Whirlwind will save you money. We absolutely guarantee that the Whirlwind will more than save its cost in gasoline alone within thirty days, or the trial will cost you nothing. We invite you to test it at our risk and expense. You are to be the sole judge.

FREE OFFER COUPON

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Call's spread 713

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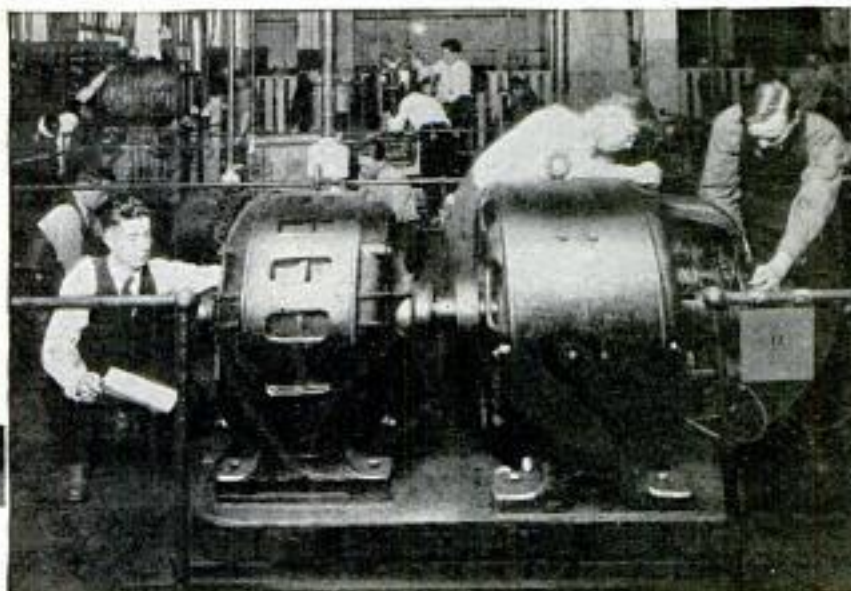
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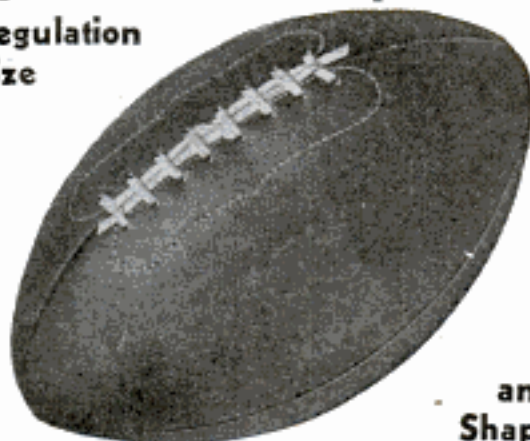
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"Huh!" said Luke Jones. "Does that book tell you how to become a salesman?"

"It sure does," replied Ed, enthusiastically.

"Don't waste your time," advised Luke. "You can't learn how to be a salesman. A fellow has to be 'born' that way to be a good salesman."

Ed just smiled at that, but he said nothing. Soon afterward he quit the shop and we forgot about him. And then last night, I met Ed again—driving a snappy new sedan and dressed like a million dollars.

"For Pete's sake," I said, "What are you doing nowadays, Ed?" He smiled. "City Salesmanager for the Steel Castings Company," he told me. "What are you doing?"

"Still at the shop," I replied. "But what I want to know is, how do you come to be salesmanager for Steel Castings? They're one of the biggest firms in the business."

Ed smiled again. "Remember that book on Salesmanship that Luke Jones was kidding me about one day? Well, when I finished my Salesmanship training the Association I took it from gave me a choice of a number of jobs through their Free Employment Department. I got a wonderful job, and I had wonderful training, so I've had a pretty successful time of it. They made me City Salesmanager three months ago at ten thousand dollars a year."

"Good night!" I said. "And Luke and I are still punching the old time clock!"

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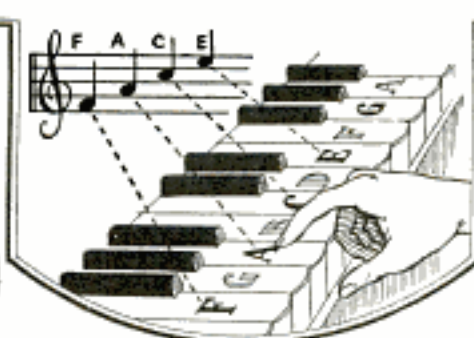
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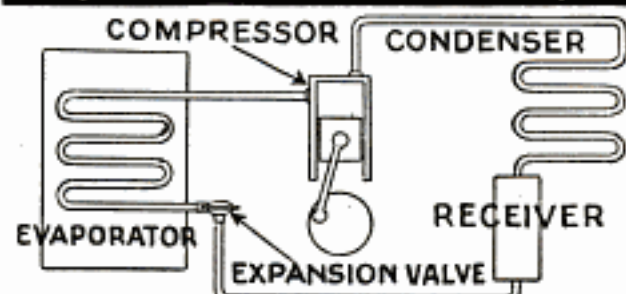
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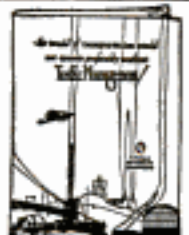


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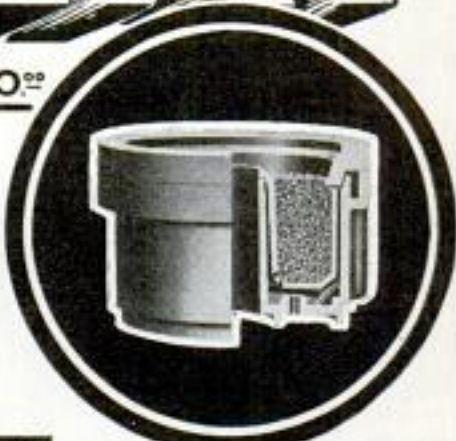
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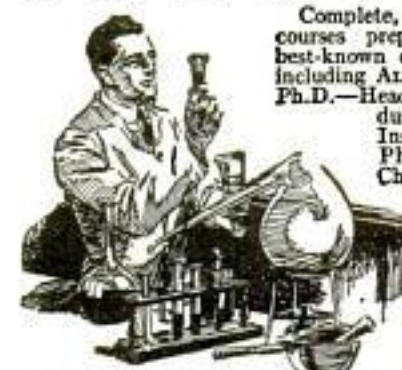
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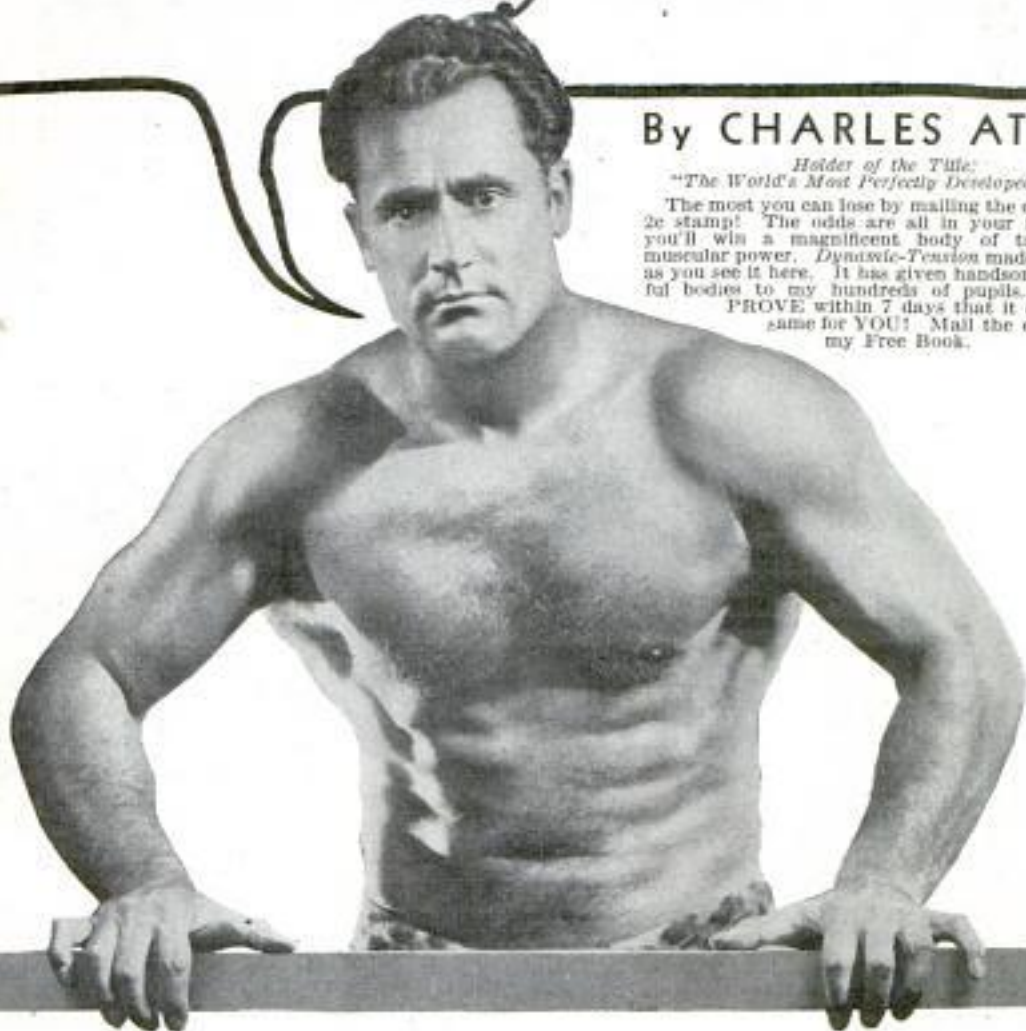


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The wonder-working little machine holds the can for you so you don't need to touch it. Then spins the can quickly around. Next the lid pops up so you can take hold of it. Entire top is cut out slick, smooth and clean. Opens round, square and oval cans. Approved by Good Housekeeping Inst. Guaranteed for five full years. If your present income is less than \$60 a week write quick for details of Territory Reservation, Sales Outfit, and FREE Test Offer.

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No more taking shoes to the repair man. No paying from \$1.00 to \$1.75 for leather soles and heels. Just spread SAVASOLE on the worn out soles with an old knife—as easily as you spread butter on bread. Let it dry overnight. In the morning you have a new wearing surface that is hard, smooth, and durable. Looks like leather. Wears like leather and is absolutely waterproof.

GUARANTEED! Do not confuse SAVASOLE with "cheap" imitations. SAVASOLE alone has the special Bollman Double-action Cement Process (patent applied for) that means SAVASOLE CANNOT COME OFF THE SHOE. SAVASOLE outwears the uppers.

My money back guarantee protects you and your customers.

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I gave up my former occupation where I ranged in earnings from \$115 to \$286 per month. I started out with three gross of Savasole. Since that time, my earnings have netted me over \$135 per week and I am sure that I will soon hit \$200 per week. Savasole has solved my financial problems, and you are the whitest bunch of people to work with. I offer you...

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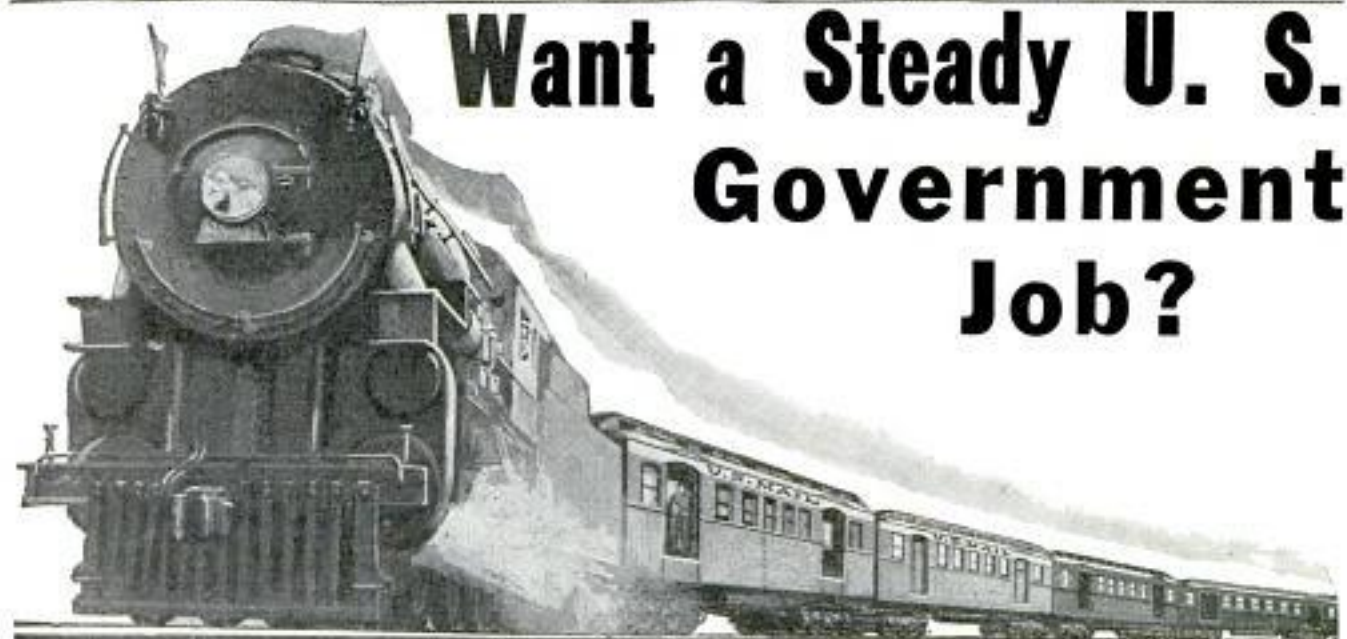
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I Am Doubling and Tripling Salaries

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Hold your job. There is no need for you to leave home. I will train you quickly and inexpensively during your spare time. You don't have to be a high school graduate. My course is written in a clear, interesting style that most anyone can grasp. I'll give you practical experience under my 50-50 method of training—one-half from lesson books and one-half from practical experiments. When you graduate you won't have to take any kind of a job to get experience—you will be trained and experienced ready to take a responsible job in the radio field of your choice.

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When you finish my course you won't be turned loose to shift for yourself. Then is when I will step in to help you find a job through my Employment Department. This Employment Service is free of extra charge both to you and the employer.

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Find Out What Radio Offers You—Get My Book at Once

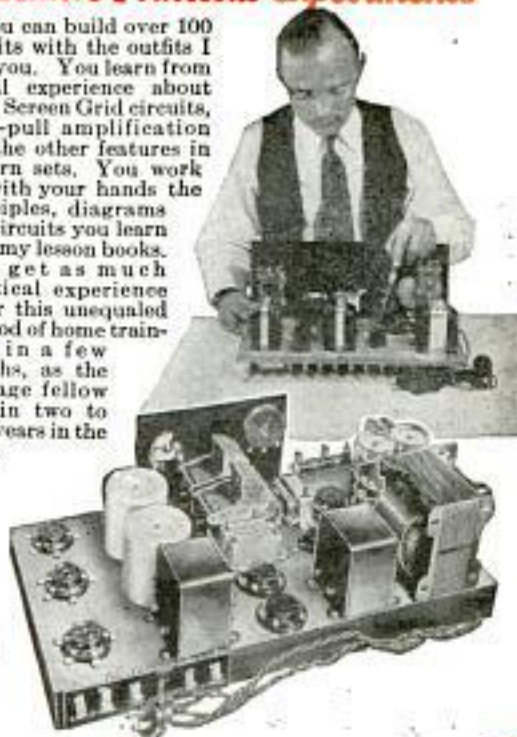
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28x4.40-21"	\$2.30	30x3.90-21"	\$2.20
28x4.50-21"	2.40	30x4.25-21"	2.25
28x4.75-19"	2.45	30x4.50-21"	2.30
28x4.90-21"	2.50	30x4.75-21"	2.35
29x3.00-19"	2.55	30x5.00-21"	2.40
29x3.00-20"	2.55	30x5.25-21"	2.45
29x3.50-18"	2.65	30x5.50-21"	2.50
29x3.50-19"	2.65	30x5.75-21"	2.55
29x3.50-20"	2.65	30x6.00-21"	2.60
29x3.50-21"	2.65	30x6.25-21"	2.65
29x4.00-19"	2.70	30x6.50-21"	2.70
29x4.00-20"	2.70	30x6.75-21"	2.75
29x4.00-21"	2.70	30x7.00-21"	2.80
29x4.50-19"	2.75	30x7.25-21"	2.85
29x4.50-20"	2.75	30x7.50-21"	2.90
29x4.50-21"	2.75	30x7.75-21"	2.95
29x5.00-19"	2.80	30x8.00-21"	3.00
29x5.00-20"	2.80	30x8.25-21"	3.05
29x5.00-21"	2.80	30x8.50-21"	3.10
29x5.50-19"	2.85	30x8.75-21"	3.15
29x5.50-20"	2.85	30x9.00-21"	3.20
29x5.50-21"	2.85	30x9.25-21"	3.25
29x6.00-19"	2.90	30x9.50-21"	3.30
29x6.00-20"	2.90	30x9.75-21"	3.35
29x6.00-21"	2.90	30x10.00-21"	3.40
29x6.50-19"	2.95	30x10.25-21"	3.45
29x6.50-20"	2.95	30x10.50-21"	3.50
29x6.50-21"	2.95	30x10.75-21"	3.55
29x7.00-19"	3.00	30x11.00-21"	3.60
29x7.00-20"	3.00	30x11.25-21"	3.65
29x7.00-21"	3.00	30x11.50-21"	3.70
29x7.50-19"	3.05	30x11.75-21"	3.75
29x7.50-20"	3.05	30x12.00-21"	3.80
29x7.50-21"	3.05	30x12.25-21"	3.85
29x8.00-19"	3.10	30x12.50-21"	3.90
29x8.00-20"	3.10	30x12.75-21"	3.95
29x8.00-21"	3.10	30x13.00-21"	4.00
29x8.50-19"	3.15	30x13.25-21"	4.05
29x8.50-20"	3.15	30x13.50-21"	4.10
29x8.50-21"	3.15	30x13.75-21"	4.15
29x9.00-19"	3.20	30x14.00-21"	4.20
29x9.00-20"	3.20	30x14.25-21"	4.25
29x9.00-21"	3.20	30x14.50-21"	4.30
29x9.50-19"	3.25	30x14.75-21"	4.35
29x9.50-20"	3.25	30x15.00-21"	4.40
29x9.50-21"	3.25	30x15.25-21"	4.45
29x10.00-19"	3.30	30x15.50-21"	4.50
29x10.00-20"	3.30	30x15.75-21"	4.55
29x10.00-21"	3.30	30x16.00-21"	4.60
29x10.50-19"	3.35	30x16.25-21"	4.65
29x10.50-20"	3.35	30x16.50-21"	4.70
29x10.50-21"	3.35	30x16.75-21"	4.75
29x11.00-19"	3.40	30x17.00-21"	4.80
29x11.00-20"	3.40	30x17.25-21"	4.85
29x11.00-21"	3.40	30x17.50-21"	4.90
29x11.50-19"	3.45	30x17.75-21"	4.95
29x11.50-20"	3.45	30x18.00-21"	5.00
29x11.50-21"	3.45	30x18.25-21"	5.05
29x12.00-19"	3.50	30x18.50-21"	5.10
29x12.00-20"	3.50	30x18.75-21"	5.15
29x12.00-21"	3.50	30x19.00-21"	5.20
29x12.50-19"	3.55	30x19.25-21"	5.25
29x12.50-20"	3.55	30x19.50-21"	5.30
29x12.50-21"	3.55	30x19.75-21"	5.35
29x13.00-19"	3.60	30x20.00-21"	5.40
29x13.00-20"	3.60	30x20.25-21"	5.45
29x13.00-21"	3.60	30x20.50-21"	5.50
29x13.50-19"	3.65	30x20.75-21"	5.55
29x13.50-20"	3.65	30x21.00-21"	5.60
29x13.50-21"	3.65	30x21.25-21"	5.65
29x14.00-19"	3.70	30x21.50-21"	5.70
29x14.00-20"	3.70	30x21.75-21"	5.75
29x14.00-21"	3.70	30x22.00-21"	5.80
29x14.50-19"	3.75	30x22.25-21"	5.85
29x14.50-20"	3.75	30x22.50-21"	5.90
29x14.50-21"	3.75	30x22.75-21"	5.95
29x15.00-19"	3.80	30x23.00-21"	6.00
29x15.00-20"	3.80	30x23.25-21"	6.05
29x15.00-21"	3.80	30x23.50-21"	6.10
29x15.50-19"	3.85	30x23.75-21"	6.15
29x15.50-20"	3.85	30x24.00-21"	6.20
29x15.50-21"	3.85	30x24.25-21"	6.25
29x16.00-19"	3.90	30x24.50-21"	6.30
29x16.00-20"	3.90	30x24.75-21"	6.35
29x16.00-21"	3.90	30x25.00-21"	6.40
29x16.50-19"	3.95	30x25.25-21"	6.45
29x16.50-20"	3.95	30x25.50-21"	6.50
29x16.50-21"	3.95	30x25.75-21"	6.55
29x17.00-19"	4.00	30x26.00-21"	6.60
29x17.00-20"	4.00	30x26.25-21"	6.65
29x17.00-21"	4.00	30x26.50-21"	6.70
29x17.50-19"	4.05	30x26.75-21"	6.75
29x17.50-20"	4.05	30x27.00-21"	6.80
29x17.50-21"	4.05	30x27.25-21"	6.85
29x18.00-19"	4.10	30x27.50-21"	6.90
29x18.00-20"	4.10	30x27.75-21"	6.95
29x18.00-21"	4.10	30x28.00-21"	7.00
29x18.50-19"	4.15	30x28.25-21"	7.05
29x18.50-20"	4.15	30x28.50-21"	7.10
29x18.50-21"	4.15	30x28.75-21"	7.15
29x19.00-19"	4.20	30x29.00-21"	7.20
29x19.00-20"	4.20	30x29.25-21"	7.25
29x19.00-21"	4.20	30x29.50-21"	7.30
29x19.50-19"	4.25	30x29.75-21"	7.35
29x19.50-20"	4.25	30x30.00-21"	7.40
29x19.50-21"	4.25	30x30.25-21"	7.45
29x20.00-19"	4.30	30x30.50-21"	7.50
29x20.00-20"	4.30	30x30.75-21"	7.55
29x20.00-21"	4.30	30x31.00-21"	7.60
29x20.50-19"	4.35	30x31.25-21"	7.65
29x20.50-20"	4.35	30x31.50-21"	7.70
29x20.50-21"	4.35	30x31.75-21"	7.75
29x21.00-19"	4.40	30x32.00-21"	7.80
29x21.00-20"	4.40	30x32.25-21"	7.85
29x21.00-21"	4.40	30x32.50-21"	7.90
29x21.50-19"	4.45	30x32.75-21"	7.95
29x21.50-20"	4.45	30x33.00-21"	8.00
29x21.50-21"	4.45	30x33.25-21"	8.05
29x22.00-19"	4.50	30x33.50-21"	8.10
29x22.00-20"	4.50	30x33.75-21"	8.15
29x22.00-21"	4.50	30x34.00-21"	8.20
29x22.50-19"	4.55	30x34.25-21"	8.25
29x22.50-20"	4.55	30x34.50-21"	8.30
29x22.50-21"	4.55	30x34.75-21"	8.35
29x23.00-19"	4.60	30x35.00-21"	8.40
29x23.00-20"	4.60	30x35.25-21"	8.45
29x23.00-21"	4.60	30x35.50-21"	8.50
29x23.50-19"	4.65	30x35.75-21"	8.55
29x23.50-20"	4.65	30x36.00-21"	8.60
29x23.50-21"	4.65	30x36.25-21"	8.65
29x24.00-19"	4.70	30x36.50-21"	8.70
29x24.00-20"	4.70	30x36.75-21"	8.75
29x24.00-21"	4.70	30x37.00-21"	8.80
29x24.50-19"	4.75	30x37.25-21"	8.85
29x24.50-20"	4.75	30x37.50-21"	8.90
29x24.50-21"	4.75	30x37.75-21"	8.95
29x25.00-19"	4.80	30x38.00-21"	9.00
29x25.00-20"	4.80	30x38.25-21"	9.05
29x25.00-21"	4.80	30x38.50-21"	9.10
29x25.50-19"	4.85	30x38.75-21"	9.15
29x25.50-20"	4.85	30x39.00-21"	9.20
29x25.50-21"	4.85	30x39.25-21"	9.25
29x26.00-19"	4.90	30x39.50-21"	9.30
29x26.00-20"	4.90	30x39.75-21"	9.35
29x26.00-21"	4.90	30x40.00-21"	9.40
29x26.50-19"	4.95	30x40.25-21"	9.45
29x26.50-20"	4.95	30x40.50-21"	9.50
29x26.50-21"	4.95	30x40.75-21"	9.55
29x27.00-19"	5.00	30x41.00-21"	9.60
29x27.00-20"	5.00	30x41.25-21"	9.65
29x27.00-21"	5.00	30x41.50-21"	9.70
29x27.50-19"	5.05	30x41.75-21"	9.75
29x27.50-20"	5.05	30x42.00-21"	9.80
29x27.50-21"	5.05	30x42.25-21"	9.85
29x28.00-19"	5.10	30x42.50-21"	9.90
29x28.00-20"	5.10	30x42.75-21"	9.95
29x28.00-21"	5.10	30x43.00-21"	10.00
29x28.50-19"	5.15	30x43.25-21"	10.05
29x28.50-20"	5.15	30x43.50-21"	10.10
29x28.50-21"	5.15	30x43.75-21"	10.15
29x29.00-19"	5.20	30x44.00-21"	10.20
29x29.00-20"	5.20	30x44.25-21"	10.25
29x29.00-21"	5.20	30x44.50-21"	10.30
29x29.50-19"	5.25	30x44.75-21"	10.35
29x29.50-20"	5.25	30x45.00-21"	10.40
29x29.50-21"	5.25	30x45.25-21"	10.45
29x30.00-19"	5.30	30x45.50-21"	10.50
29x30.00-20"	5.30	30x45.75-21"	10.55
29x30.00-21"	5.30	30x46.00-21"	10.60
29x30.50-19"	5.35	30x46.25-21"	10.65
29x30.50-20"	5.35	30x46.50-21"	10.70
29x30.50-21"	5.35	30x46.75-21"	10.75
29x31.00-19"	5.40	30x47.00-21"	10.80
29x31.00-20"	5.40	30x47.25-21"	10.85
29x31.00-21"	5.40	30x47.50-21"	10.90
29x31.50-19"	5.45	30x47.75-21"	10.95
29x31.50-20"	5.45	30x48.00-21"	11.00
29x31.50-21"	5.45	30x48.25-21"	11.05
29x32.00-19"	5.50	30x48.50-21"	11.10
29x32.00-20"	5.50	30x48.75-21"	11.15
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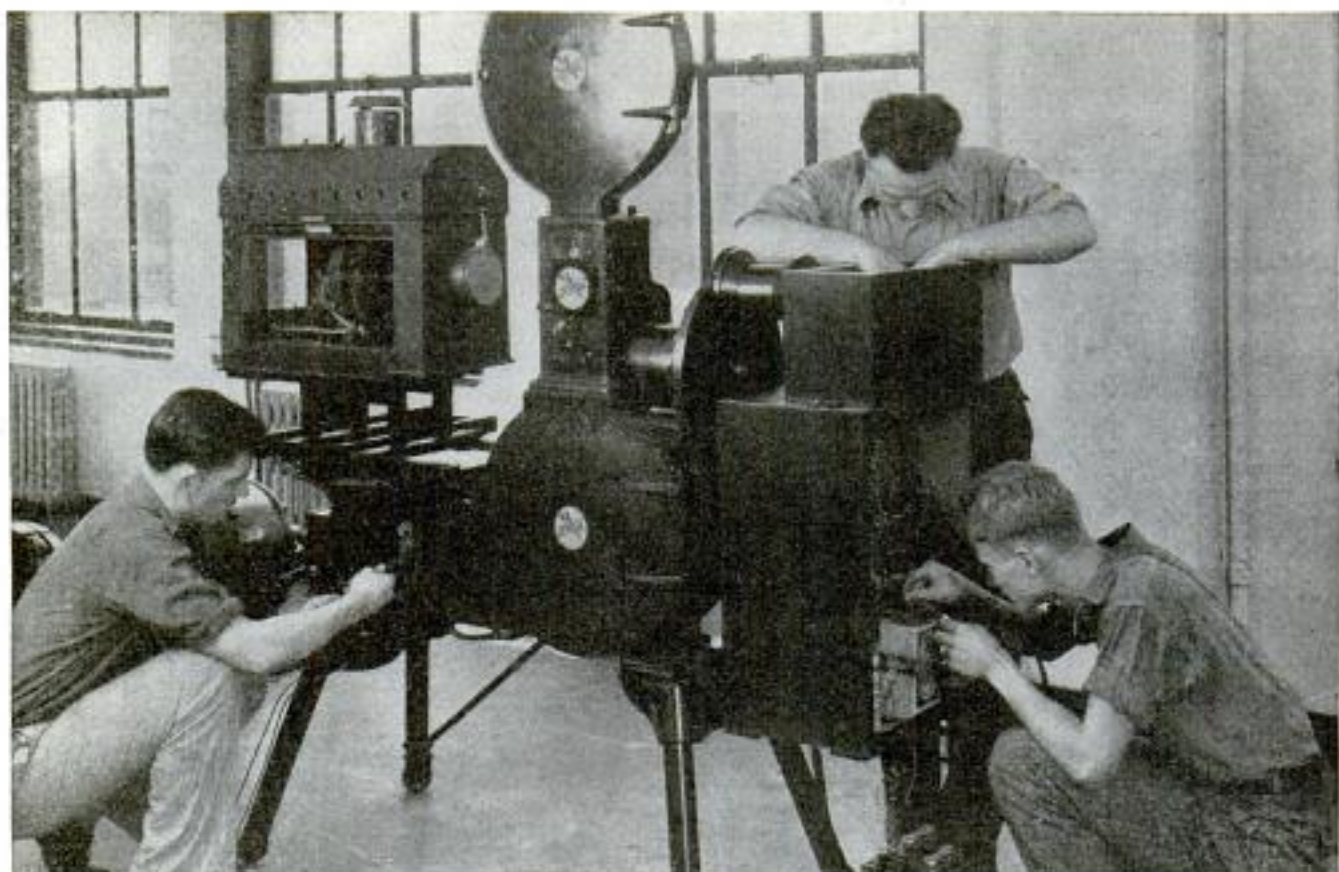
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TIME Counts in applying for patents. See pages 132 and 133. Clarence A. O'Brien, Registered Patent Attorney, Washington, D. C.

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SAMPLE \$5 Gem on approval to prove our marvelous Mexican Bio-Flash Gem positively matches finest blue-white diamond side-by-side. Guaranteed 20 years. Sells on sight; enormous profits. Write quick. Mexican Gem Co., Suite PM2, Monterrey, Calif.

SELL Old motor oil for 40c gallon. Particulars for stamp. Ralph Brooks, Arkansas, Wis.

MEXICAN Hand made feather pictures. Most artistic, beautiful, original. Great margin of profit. Details, Mexican Art, Apartado 1593, Mexico City.

\$1.00 PER Hour if you work. 15 fast sellers, including sample case. \$3.50. Stanley Co., 16376 Hamilton, Detroit, Mich.

PAST Seller—Automatic gas lighter, retails 25c. Free sample, Home Supply, 30 Irving Place, New York.

WOULD You like to make \$10 to \$15 a day selling our line of toilet preparations? We want agents in every town; men, women, students; whole or part time. Write for free sample outfit offer. Hindu Perfume Co., 515 E. 47th St., Chicago, Ill.

MAKE Your own products. Employ agents yourself. Toilet articles, soap, extracts. We furnish everything. Valuable book free. National Scientific Laboratories, 1950W Broad, Richmond, Va.

ELECTRIC Water heater—New. Heats water instantly. Pocket size—retails \$3.75. Two minute demonstration makes you \$1.95 profit. Lux-Viel, Dept. 117, Elkhart, Ind.

100% PROFIT in new mystery cigar lighter. No flint or friction. What makes it light? No wind can blow it out. Retailers 50c. Sample and sales plan 25c. New Method Manufacturing Co., Box PM-11, Bradford, Pa.

300% PROFIT Selling Mystery Gas Lighter. Retailers 25c. Costs you \$1.00 doz. Sample free. Square Deal Mfg., Desk PM-23, Bradford, Pa.

SO Good, it's foolish to call this selling. Men must buy shirts, ties, underwear, hosiery, other necessities. Roseliff's powerful year guarantee makes big money for you. Cash bonuses. Free shirt offer. Pin-set outfit free. Write today. Dept. K11, Roseliff, 1237 Broadway, New York.

STRANGE Ironing cord. Prevents scorching. Saves electricity. Abolishes kinks, snarls. Approved by Good Housekeeping. For telephones also. 200% profit. Samples furnished. Neverknot, Dept. 11-A, 4543 Racine, Chicago.

BEAUTIFUL \$1 Box, 21 Christmas cards, sells on sight. 100% profit. Sample box sent on approval. Patterson D-Co., 4111 University, Des Moines, Iowa.

LIQUID Extracts—Tremendous profits. Newport Sunny House, Newport, New York.

DOLLARS in "Fixit" service, depression killer. Particulars. Houkate's "Fixit" Service, 1955 N. El Molino, Pasadena, Calif.

SENSATIONAL Invention. Absolutely new. Indispensable to everybody. Presenting unlimited possibilities. Big profit for agents. Read the Pocket Store editorial description, October issue, page 630. Sells at \$2.50, sample \$1. Specialty Trading Co., Box No. Y, Popular Mechanics, 200 E. Ontario Street, Chicago.

SOMETHING New—Change old clocks to electric. We start you. Clock Converter Co., 1431 Broadway, Detroit, Mich.

BIG Pay giving away shirts, hosiery, underwear. Also Lumberjackets. Smashing free offers win orders. Every man buys. No experience needed. We teach you and supply complete sample equipment free. Write Today. Dept. N25, Albert Shirts, 860 Sixth Ave., New York.

AGENTS Make big money selling quality fountain pen sets. Keystone Pen Company, 467 Willoughby Ave., Brooklyn, N. Y.

300% PROFIT Selling new 20-in-1 kitchen utensil. Retailers 25c. Costs you \$1.00 doz. Sample 15c. Square Deal Mfg. Co., Desk PMM-2, Bradford, Pa.

SELL All latest specialties. Call only where demonstrations are requested. Darwin McFarlin, Delavan, Wisconsin.

IMPORT Your own goods. German export magazine published in English offers numerous bargains latest novelties; opportunity for obtaining profitable agencies. Copy 60c. Square Deal Supply, P-246, Fifth Ave., New York.

CHRISTMAS Card agents. Liberal commission. Special bonus. Beautiful personal greetings. Box assortments. Ten dollar sample book free. Write today. Direct Mail, 1906 Pine, St. Louis, Mo., Dept. B.

FRENCH Perfume counter runs. Write Louisa, 112 Glenbrook, Bethesda, Maryland.

AGENTS—Tremendous profits demonstrating new \$3.00 automatic engine driven tire pump. See Meiser & Company's advertisement page 143 this issue.

GRAPE Bricks, exclusive free territory granted. A brick makes a gallon. Sample brick postpaid \$1.00 with directions. C.F.S. Co., 589 Howard St., San Francisco, Cal.

SOMETHING New—You can't fail. Belts, ties, links, all 3 free, each shirt sale, \$13.50 value for \$3.99. Free kit. Royal Mills, L. I. City, New York.

AGENTS—"Forty Famous Business Plans." How to make and sell forty fast selling necessities \$1.00. Specialty Service, Box 638, Chicago.

AGENTS: Fifty fast sellers. Catalog free. Specialty Supply, Box 638-A, Chicago.

DON'T Choke me! Hot Shot new elec. wizard starts cars without choke; saves gas, oil. Delivers 11,000 volts. \$1.50 seller. Pays for self immediately. Hustlers gold mine. Reardon Mfg., Dept. 11-PM, Peoria, Ill.

300% PROFIT in new "20-in-1" kitchen necessity. Retail 25c. Costs you \$1.00 a dozen. Sample 15c to cover cost of mailing. New Method Co., Nu-Method Bldg., Desk PMM-11, Bradford, Pa.

MAIL Order house wants ambitious man each county to mail circulars, appoint agents, pack and ship merchandise. Experience unnecessary. Part or full time, good pay. International Laboratories, Dept. 9, 201 N. Wells St., Chicago, Illinois.

BIG Money easy. Simply showing New Polly Wrench, 10 wrenches in one. Guaranteed fast seller. Sample furnished. Gellman Manufacturing Co., Dept. 9-G, Rock Island, Ill.

MAKE Sell your own products. Formula catalog free. Clover Laboratories, (PM) Park Ridge, Ill.

HEMSTITCHER, New, different. Agents, demonstrators wanted everywhere. Money making line. Sample 10c, retails fifty and dollar. K. J. Manufacturing, 648 N. Vermont, Los Angeles, Calif.

"MAIL Order Selling" magazine, "Opportunity For You" booklet and "Big Twelve Proposition" 10c. Pruitt System-A, Brookfield, Ill.

MAN in each town to plate auto parts, reflectors, bathroom fixtures, refinish bells, mirrors, chandeliers; by new method. No capital or experience required. Simple plan of manufacturing at home starts you in big money-making business. Outfit furnished. Free particulars and proofs. Gun Metal Co., Ave. H, Decatur, Ill.

GUARANTEED Hosiery—Lowest mill prices. Men's latest fancy hose—doz. \$1.25-\$1.50, ladies' fashioned hosiery—doz. \$2.25-\$3.25. Catalogue free. Superior Knitting Company, Dept. 34, New Haven, Conn.

BIG Money and fast sales. Every owner buys gold initials for his auto. You charge \$1.50; make \$1.45. Ten orders daily easy. Write for particulars and free samples. American Monogram Co., Dept. 40, East Orange, N. J.

AGENTS: Stamping names on pocket-key protectors. Sample check with your name and address, 25c. Stamping outfits, Emblem checks, check-fobs, name plates, Hart Mfg. Co., Desk 2, 393 Degraw St., Brooklyn, N. Y.

MAKE Your own products. Employ agents yourself. Toilet articles, soap, extracts. We furnish everything. Valuable book free. National Scientific Laboratories, 1950W Broad, Richmond, Va.

BIG Proposition; no canvassing. Asco, Box 1081, Washington, D. C.

\$1.75 PROFIT, Each sale. Write Corum Chemical Co., Laurel, Miss.

REPLATE Brass worn-off automobile parts, reflectors, bath room fixtures, worn spoons, forks, etc., with pure silver. Looks like new. Use U-Kan-Plate Polish. Practically no mercury; \$1.00 half pints. Postpaid. Satisfaction guaranteed. Agents wanted. Dept. A, U-Kan-Plate Co., Philadelphia.

300% PROFIT. Whirlwind seller. Sensational Nulustre cloth, cleans, polishes, all metals without liquid, paste, powder. Good Housekeeping tested, approved. Free sample. Shof D Mfg. Co., Weehawken, N. J.

BIG Money selling shirts, ties, underwear, Sox, raincoats, lumberjacks, sweaters, leathersuits, overalls, pants, playsuits. Outfit free. Nimrod Co., Dept. 8, 4922-28 Lincoln Ave., Chicago.

NEW Invention makes any clock electric. Easily attached. Big Profit. Bestever Clock Co., 4319-P Irving Pk., Chicago.

SELL Goodyear raincoats, \$2.95 up. Goodyear Rainwear, 18 West 22nd, New York.

SOMETHING The housewives want. A sized guarantee to save money and time in cooking. No competition. 400% profit. No license required. Station C, Box 25E, San Diego, Calif.

THAXLY Formulas produce perfect products. All lines. Catalog free. B. Thaxly Co., Washington, D. C.

AGENTS For handkerchiefs; original powdered handsoap. Approved Good-Housekeeping. Everybody customer. Fine opportunity for hustler. Sample free. Solar Products, J-2144 So. Troy, Chicago.

SUCCEED With your own products. Make-sell them yourself. Formulas, processes, trade-secrets. Expert analytical service. Catalog free. B. Thaxly Co., Washington, D. C.

AGENTS—Engraved name plates, stems, number plates etc., easily sold with large profits. Breit Bros., Winthrop, Mass.

BIG Money applying gold initials on automobiles. Easiest thing today. No experience needed. \$1.45 profit every \$1.50 job. Free samples. "Balco," X-1043 Washington, Boston, Mass.

NEW Line Counter Displays, Aspirin, Filmit, Chewing Laxative, Breath Gum, Notarar, Silikone, etc. Steady Repeats. Over 100% Profit. Superba Co., W3, Baltimore, Md.

THIS Advertisement may make you thousands of dollars. If you write immediately for my "Eye-Opening" literature describing guaranteed formulas; valuable trade processes, money-making information how to easily make the world's best-selling specialties. All lines. Investment small. Profits immense! Start in your home, room or office. Make the good money you're entitled to. Dr. Liscombe Miller, Chemist, Tampa, Fla.

CHICAGO Expert valued \$3 stone at \$904. The diamond's only guaranteed rival. Greatest spare time, side-line article ever known! Amazing profits. \$5 pocket sample case free. Write quick. Mexican Gem Company, Dept. PM, Monterey, Calif.

FREE "Booklet of money making opportunities." new ideas, original plans, money making secrets and other valuable information. None require peddling or outfits. Elite Co., 81 Elizabeth St., New York.

WE Start you without a dollar. Soaps, extracts, perfumes, toilet goods. Experience unnecessary. Carnation Co., 641, St. Louis, Mo.

FLAVORING Extracts—Bottle yourself! Labels furnished. 600% profits! Whirlwind money-makers! Repeaters! Free offer. Thomas Manufacturing Company, Indianapolis, Ind.

CALIFORNIA Perfumed beads, selling like hot cakes. Agents coining money. Catalog free. Mission Factory, P. 2328W Pico Las Angeles, Calif.

\$60-200 A WEEK. Genuine gold letters for store windows. Easily applied. Free samples. Liberal offer to general agents. Metallic Letter Co., 438-B North Clark, Chicago.

A BUSINESS Of your own—Making sparkling glass name and number plates, checkboard signs. Big book and sample free. E. Palmer, 512, Wooster, Ohio.

SELL Stores 5c carded breathlets, etc. Lorraine Products, Albany, N. Y.

AGENTS—Clever Invention! Inkspoon makes every pen a fountain pen. Fast office seller; big profit, demand increasing everywhere. Exclusive territory offered. Sample free. H. Marul Company, Tribune Bldg., New York, N. Y.

AGENTS Everywhere making money with our line of kitchen specialties, demanded in all homes. Big earnings possible. Write today for details. P. Seed Filter Co., 353 Broadway, New York.

SELL Men's neckwear—wonderful proposition. Astor-M, 39 East 28th, N. Y.

10,000 MONEY-MAKING Formulas. Tells you how to make and sell almost everything under the sun; cosmetics, muckage, anti-freeze solutions, battery solutions, beverages, cheese, chewing gum, cleaning preparations, extracts, hair preparations, inks, bluing, leather polish, mirrors, perfumes, polishes, typewriter ribbons, carbon paper, washing powders, liquid soap, and hundreds of other profitable articles. Send no money. Just write a postal for "Hensley's 28th Century Book of Formulas." Pay postman postage and \$1. Popular Mechanics Press, 200 E. Ontario St., Room 802, Chicago.

HIGH-GRADE SALESMEN WANTED

\$18 To \$25 Daily; blazest selling line of men's suits. Meets present day conditions. Amazing values, at \$11.95, \$14.50, \$16.95, \$18.95. Also raincoats, slickers, topcoats and boys' suits. Biggest commission paid in advance. Liberal bonus. Free outfit. State age and selling experience. "Jim" Foster, Inc., Dept. 211, 2250 South Spaulding Ave., Chicago.

SALESMAN For Hump-O, only dust mop and brush broom cleaner on market, \$2,000-600 homes need them. Sand Mon & Brown Cleaner Co., Santa Rosa, California.

SELLING Like blazes! 11 piece beautiful toilet goods assortment at \$1.75 with 24-inch pearl necklace free to your customer. 100% profit. E. M. Davis Co., 238 North Ave., Dept. 960, Chicago.

NEW Legal punchboard plan! We furnish everything! No investment for you or your customer! Nothing to sell or carry! 50% profit! Unsuitable merchandise returnable! Full commissions on repeats! A3 Novelty Company, 161 Washington, Chicago.

COMIC-Snappy greeting cards. New, unusual. Good with any present line. Quick sales. Big profits. Repeats. \$1 for complete outfit. Satisfaction or money back guaranteed. Pierce Company, 421 Second Avenue Co., Minneapolis, Minn.

SALESMEN: Wonderful sideline, 40% commission paid daily. Sells all merchants. Attractive outfit free. Willens Co., Dept. 509, 2136 Gladys, Chicago.

NEW Different, improved, business stationery line. Biggest commissions—bonuses. Quickest delivery. Free copyrighted cuts. Experience unnecessary. Attractive outfit free. David Lionel Press, 312 So. Hamilton, Dept. 505, Chicago.

GRAPE Bricks, Grape concentrates—Port, sherry, champagne, claret, etc., in solid brick form. One brick makes one gallon juice; legality established twice in Federal courts. Government financing industry. Every home, drug and grocery store, church, hospital, a prospect. State and county rights available. Apply V. S. Co., Dept. 8-217, 395 - 9th St., San Francisco, Calif.

PREMIUM Salesmen—Brand new trade stimulator—appeals instantly all lines retail business. Just what you always wanted. Big commissions. Well rated company. Outfit free. National Advertisers, 308 No. Michigan, Chicago.

APLENTY New—Different—Fast selling 5c-10c merchandise on attractive counter racks. 100% comm. for you and dealers. Advertised over WLW 3 nights weekly. No investment. Catalog free. (Estab. 1921.) World's Products, 170 Central, Spencer, Ind.

\$136.00 COMMISSION From \$6.93 sale! You can make 3 sales daily. Our salesmen do it. Free kit. Sales Stimulators, Dept. 8H, 4311 Havenwood, Chicago.

RUN My oil agency. No investment required. I divide profits 50-50 every week. \$50 to \$200 weekly your share. Products nationally known. My partners made \$187,000 last year taking orders direct from farmers, auto owners, etc. All or spare time. Free selling equipment. Write quick. Central Petroleum Co., 702 Century Bldg., Cleveland, Ohio.

FOR Big income, sell garages, gas stations, marshlands, R. R. men, amazing safety non-slip shoes. Exp. unnecessary. Sample free. Atlas Shoes, 72, Waltham, Mass.

WANTED—County salesman with car, to demonstrate for large Ohio manufacturer. First class job. Fyr-Fyter Co., 2209 Fyr-Fyter Building, Dayton, Ohio.

SALESMEN—At last! New feature sells punchboards everywhere. Dealers wild with joy—prosperity back again. Profits enormous. Samples free. Puritan No. 6ty, 1407 Jackson Blvd., Chicago.

CALL On schools with megaphones and novelties in school colors. Megaphone Novelties, Wade and Demman, Cincinnati, O.

SO Good. It's foolish to call this selling. Men must buy Shirts, Ties, Underwear, Hosiery, other necessities. Rosecliff's powerful rear guarantee makes big money for you. Cash bonuses, Free shirt offer. Finest outfit free. Write today. Dept. L11, Rosecliff, 1237 Broadway, New York.

BIG Pay giving away Shirts, Hosiery, Underwear. Also Lumberjackets. Sunshining free offers win orders. Every man buys. No experience needed. We teach you and supply complete sample equipment free. Write Today. Dept. N26, Albert Shirts, 800 Sixth Ave., New York.

\$25 DAILY Possible selling merchants printing novelties, specialty items at half price. Quick delivery. Union label. 40% commissions advanced. Experience unnecessary. Elaborate outfit free. Northwestern, 625-DB, Jackson, Chicago.

NEW! New! Amazing Pocket Towline, a sensation. Mere handful of steel unwinds into 12 foot towline. Weighs 26 ounces. Tows 15 tons. Occupies no more room than wrench. Handles bulky, costly ropes, cables. Sells on sight. \$20 daily easy. Sell 1 every 5 minutes. Territories going. Details sent free. Pocket Towline Corp., Dept. K13, Rochester, Pa.

SALESMEN—\$72 Worth of soap for \$3. f.o.b. Baltimore. The prettiest packages you ever laid your eyes on. Merchants will pay \$18 a gross. The enormous output enables us to make this attractive offer. Earle Soap Mfg. Co., 393 No. Eutaw St., Baltimore, Md.

PUNCH Board sensation! Free deal brings merchant \$25.50 without cost. Get orders quick. Top commissions in advance—\$2.00 bonus every order. Get free outfit. DePaul Sales, 66-F East Lake, Chicago.

BIG Money steady. High grade coveralls, shopcoats, pants, shirts. Advertising on back. Fast sellers. Great demand. Prospects everywhere. Free outfit. Strong Mfg. Company, 911 West Jackson, Chicago.

SALESMEN. 2 Whirlwind commission items: Coney Cooker and Counter Chef, red hot steamer and sandwich grill, \$22.55 each; \$8 commission; best and cheapest on market; for lunch stands, barbecues, soda fountains, etc. Write quick. Advance Mfg. Co., 1218 S. Kingshighway, St. Louis, Mo.

DRAPERY Hardware salesman wanted for lowest priced ornamental line, also novelty picture line, excellent chain and department store sellers. Write Bar-Hi Artcraft Corp., Middleton, Wis.

ALL Year repeat seller to drug stores everywhere. Samples, information \$5. "H. C. T." Service, 325 1/2 S. Broadway, Rochester, Minn.

ARE You old at forty? See our advertisement on page 144 of this issue. The Electro Thermal Company, 2147 Morris Ave., Steubenville, Ohio.

DISTRIBUTORS And agents—Exclusive territory for Soderlite. See display ad bottom page 143 this issue.

SELL Nothing! \$170 weekly empty handed. \$700,000 punchboard firm announces new plan. No investment for anyone. Season starting. Hurry! K&S Sales, 4320 Ravenswood, Chicago.

BIG Money selling shirts, ties, underwear, Sox, raincoats, lumberjacks, sweaters, leathersuits, overalls, pants, playsuits. Outfit free. Nimrod Co., Dept. 65, 4922-28 Lincoln Ave., Chicago.

NEW Polish for silver, pewter, brass, etc. Big profit, easy sales. Modern Polish Co., Trenton, N. J.

SALESMEN Wanted to call on fish dealers. Snow & Parker, Inc., 41 Fish Pier, Boston, Mass.

SALESMEN—Become independent. Own your business; experience unnecessary, selling our \$10,000 accidental death; \$50 accident; \$25 sick weekly benefits—\$10.00 yearly. Other amounts proportionate. Guaranteed steady income from renewals. \$250,000 deposited insurance department. Universal Policy, Dept. A, 716 Lefcourt Bldg., Newark, N. J.

WONDERFUL Opportunity. Twenty dollars per day can be earned. Experience unnecessary. Home protection at cost. Ages one to eighty. \$250 to \$1000 at death. No insurance. You make \$5 for each member secured. Childless of Virginia, sent in 54 one day. National Aid Society, Myers Building, Springfield, Illinois.

PENNY Gopher, new fascinating coin-controlled game. Legal. Exciting. Merchants everywhere buy. Splendid commission. Specialty Mfg., 617 Division, Chicago.

SELL Egg Cartons! Dandy repeat side line. Everyone who sells eggs needs cartons—grocers, poultry farms, dairies. Send for information and samples. Pick up the extra commissions. Self-Linking Carton Company, 575 E. Illinois Street, Chicago, Ill.

GREAT Sideline for any salesman! Pocket outfit free. New cash customer Building Campaigns for merchants. D&H Premium Co., Dept. 538, 116 So. Wells, Chicago.

NEW Specialty—Sells every business and professional man. Four \$15 sales daily pay \$280 weekly. Foyer cleared \$4920 in three months. Write, F. E. Armstrong, President, Dept. PM, Mobile, Ala.

PUNCHBOARD Salesmen—Most gigantic line ever featured. Vending machines—all kinds. Make as high as \$28.00 on single order. Repeat commissions. Beautiful colored catalog free. Lion Mfg., Dept. 8, 308 W. Erie, Chicago.

NEW, Largest color catalogue, punchboards, vending machines, produces quicker orders, big commissions. Free outfit. Lincoln Sales, 116 So. Wells, Chicago, Dept. D. Established 20 years.

HELP WANTED

IF You want to make money quickly in a pleasant business of your own, send me your name immediately. Wonderful opportunity to make \$15 a day without risking a cent. Particulars free. Albert Mills, 9291 Monmouth, Cincinnati, O.

EARN Up to \$25 weekly or more growing mushrooms in your cellar or shed. Illustrated booklet free. American Mushroom Industries, Dept. 562, Toronto, Ont.

AGENTS—Mosco corn and callous remover will build you a steady repeat business. Send today for pocket-size trial outfit. The Moss Company, 104 Searle Bldg., Rochester, N. Y.

GO into business—Make big money. We start you furnishing everything. Experience unnecessary. Federal Pure Food Co., X3307 Archer, Chicago.

EDUCATIONAL AND INSTRUCTION

MATHEMATICS—Strength of Materials—Applied Mechanics. 3 books in one, with all answers given, examples worked out, simplified and very easy for anybody to learn and understand. You can advance faster, easier, better, you can get ahead of others and be a leader. This book by a practical engineer contains 375 working diagrams, 183 pages, 5½x8½ inches in full cloth binding. Postpaid \$2.50 at your book store or Dobe Engineering Service, 1949 Lawrence Ave., Chicago.

WORK For "Uncle Sam." \$105.00-\$280.00 month. Life jobs. Steady work. Paid vacation. Men-women, 18-50. Many examinations coming. Common education usually sufficient. Experience unnecessary. List positions and full particulars—free. Write today sure. Franklin Institute, Dept. J3, Rochester, N. Y.

LEARN To repair and rewind electric motors. Send for free information. Bandle Bros. Armature Shop, 520 4th St., Waukegan, Ill.

WHAT'S Your future. Develop winning personality, be popular, which promotes friendship and business success. Also business information for personal use. Write for particulars. Business Service, Box 262, West Palm Beach, Fla.

LEARN Bookkeeping at home. I can teach you by mail. Prof. W. F. Grotts, Butler, Illinois.

BECOME A landscape architect. Uncrowded profession; wonderful opportunity for money-making. Easily mastered by mail. Earn while you learn. Est. 1916. Write for details. American Landscape School, 7 Plymouth Bldg., Des Moines, Ia. Iowa.

PHOTOPLAY Talking picture and magazine stories wanted for revision, development and copyright. Sell on commission. Established 1917. Booklet free. Universal Scenario Company, 406 Meyer Bldg., Western and Sierra Vista, Hollywood, Calif.

WANTED, Men-Women, 18-50, qualify for steady Government Jobs. Salary range, \$105-\$250 month. No Government experience required. Paid vacations. Common education. Thousands appointed yearly. Write Ozment Institute, 101, St. Louis, Mo., immediately.

LEARN Photo-Engraving at home by experience. We supply without extra cost all necessary equipment. Make money while learning. Aurora School of Photo-Engraving, Aurora, Missouri.

U. S. GOVERNMENT Wants men, \$1,700-\$1,900 and up at start. Railway mail clerk examination coming. Let our expert (former government examiner) prepare you for this and also rural carrier, post office, customs, internal revenue, and other branches. Write today for free booklet. Dept. 8, Patterson School, Rochester, N. Y.

DON'T Prepare for any civil service examination without seeing our catalog. Free, Columbia Correspondence College, Washington, D. C.

SHORT STORIES

SHORT Stories revised, typewritten and marketed. Details free. Hursh Service, Box P-1913, Harrisburg, Penna.

TYPEWRITERS

TYPEWRITERS—All makes, \$1 to \$32. Fully guaranteed. Catalog free. Typewriter Works, Ada, Okla.

ADDING MACHINES

NEW \$4.75 Automatic Adding Machine. Fully guaranteed. Bassett 1458-B, Hollywood Avenue, Chicago.

PRINTING, MULTIGRAPHING AND MIMEOGRAPHING

5000 ATTRACTIVE Folders, \$11.50; 6x9 circulars, \$7.50; envelope slips, \$5.00. All printing low prices. Samples. Goodprint, Harrisburg, Va.

1000 BUSINESS Cards \$1.75; letterheads, envelopes, statements \$3.25, postpaid. Samples. Dept. PM2, 2311 Lidstone, Houston, Texas.

1000 VELLUM Finish business cards \$1.35. Pitch, 419 E. 113th, Chicago.

QUALITY Printing, mimeographing. Depression prices. Samples, Fields, 1562 Glenmont Road, Cleveland, Ohio.

AGENTS, Three-color business cards, \$2.95 thousand. Crescent, 1715½ Wood, Dallas, Texas.

250 TWO-COLOR Envelopes \$1.25; 5,000 \$9.50. Samples. Rapid Service, Edwardsville, Ill.

200 LETTERHEADS, 100 Envelopes, \$1.00. Prompt service. W-Ine Press, 226 West Ave., South Norwalk, Conn.

COLORED Business cards \$1.00. Samples distinctive printing free. Price, 3435 VanBuren, Chicago.

NAME Cards. Very neat. Send 20c for 2 doz. Pennco Sales Co., Williamsport, Pa.

200 LETTERHEADS 8½x11, Envelopes, cards, blotters, statements, labels, \$1.00 each. Race Printery, Hudson, N. Y.

QUALITY Printing postpaid, unbelievable prices. Battlefield Press, Gettysburg, Pa.

NEW Depression lowestever price!—1000 circulars \$2.00. Big plant. Webb-Print-Press, Gettysburg, Penna.

200 LETTERHEADS, 100 Envelopes, prepaid \$1.00. Abbott Printery, Owego, Kans.

200 LETTERHEADS And 100 envelopes, \$1.00; 200 letterheads, 8½x11, 150 envelopes, \$2.00; 250 cards, \$1.00. Hoosier Print Shop, Portland, Ind.

500 LETTERHEADS, 500 Envelopes \$2.95. Ware, Box 257, Ft. Madison, Ia.

15 PERSONAL Printed Christmas cards —\$1.00. Applebaum-P, 1278 Brook, New York—200 sheets, 100 envelopes, 60c.

WE Print stationery, booklets, catalogs, circulars. Samples. Commercial Press, Batavia, Ohio.

LETTERHEADS, Envelopes, 500, \$1.10; 1,000, \$2.00; \$5,000, \$8.00, plus postage. Samples. Coyle & Kimballs, Newport, N. Y.

250 BOND Letterheads, envelopes, billheads, cards, \$1.35 each. Economic Press, Leonia, N. J.

CHOICE Of letterheads, envelopes, cards, 250, \$1.35; 500, \$2.00. Press, 705 Ridge Road, Hobart, Ind.

200 SHEETS, 100 Envelopes, 90c. T. Vachovetz, Elmsford, N. Y.

1000 BUSINESS Cards, card case, \$1.50. Miller, Printer, Narberth, Pa.

PRINTING OUTFITS AND SUPPLIES

COMPLETE Printing outfits, presses, type, ink, paper, supplies. Write for free catalog. Kelsey Co., B-11, Meriden, Conn.

PRINTING Outfits—Presses, type supplies, type novelties. Send stamp for catalog. Model Press, York, Penna.

MAKE A wooden printing press for \$1.00. Instructions complete only 50 cents. K. Wise, 109 E. Broadway, Red Lion, Pa.

PRESSED Printing presses and supplies. Lists 2c stamp. Popular Bargains, Richland, Pa.

GUNNED LABELS

TRIAL Thousand stickers in color, 60c. 15 words. Harvey Wolf, 6618F Quimby, Cleveland, Ohio.

LABELS: Any kind printed labels. Cake labels, candy wrappers, stickers. Send copy or samples for prices. Old Dominion Label Co., Bridgewater, Virginia.

DUPLICATORS AND DEVICES

"EXCELLOGRAPH" Rotary stencil duplicator \$39.00. "Two-Faced" film duplicator \$6.00. Booklet free. Pittsburgh Typewriter Supply, Dept. 601, Pittsburgh, Pa.

RUBBER STAMPS

NAME, Address, 2 lines 25c; 3 lines 35c. Stamp Works, Auburn, Nebr.

FOR THE HOME

KEEP Your walls clean. Beautiful radiator shields, priced to sell. Write Leader Metal Prod. Co., D-4, St. Louis, Mo.

ELECTRICAL REFRIGERATORS

BUILD Your own automatic electric refrigerator; use present icebox; costs only \$31.50 complete as per our prints. No special tools required; we supply special parts. Complete instructions with blue prints and text \$1.00. B. & L. Engineering Co., 706 Bergen Ave., Jersey City, N. J.

FOR SMOKERS

HOME Cigarette machine! Illustrated circular, \$3.75 postpaid. Automatic Cigarette Machine Wks., 1035 Sheridan, Chicago.

CUT Your cigarette cost—Green Rivers, mildest, tastiest, natural tobacco cigarettes, fresh from factory, \$1.25 carton, 200, postpaid. Order a carton. Smoke 5 packs. If you are not more than pleased, return 5 packs, and we'll refund \$1.25. Green River Tobacco Co., Box 779, Owensboro, Ky.

FOR MECHANICS

CRAFTSMEN: Build bench bandsaw. Simple, cheap, frame or pipe blue prints 90c. Don't miss this. H. Behner, La Grange, Ohio.

AVIATION—Every person interested in this subject should make full use of the opportunity to learn aerodynamics with Alexander Klemm as his instructor, through his timely new book, "Simplified Aerodynamics." Heretofore this subject has been rather difficult for the thousands who need it but Klemm's method enables all to master it. Every pilot, mechanic, student needs this book. Pay postman price, \$3.50, and few cents postage when he delivers it. Order from Popular Mechanics Press, Room 802, 200 E. Ontario St., Chicago.

GUNS, FISHING TACKLE AND SPORTING GOODS

FOR Sale. Firearms—matchlock to cartridge. Also miscellaneous articles. Send 6 cents for list eight. Wanted firearms, marked Patent Arms Mfg. Co., Paterson, N. J. Also large pistols and revolvers with ivory stocks. The Spencers, 111 East Patterson Ave., Columbus, Ohio.

FIELD GLASSES, TELESCOPES AND MICROSCOPES

\$3.00 GOVERNMENT Field glasses, powerful, with carrying case. Large selection binoculars, telescopes, field glasses, microscopes, cameras, lenses, musical instruments, guns, rifles. We buy, sell and exchange. Send free bargain list. Well's Curiosity Shop, 20 South Second Street, Philadelphia, Pa.

WATCH REPAIRING

DEAD Watches brought to life. Have repaired thousands, \$3.50 highest price. Strain, Brookfield, Mo.

RAZORS AND BLADES

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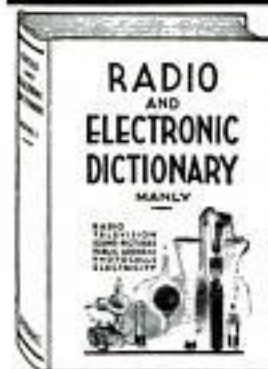
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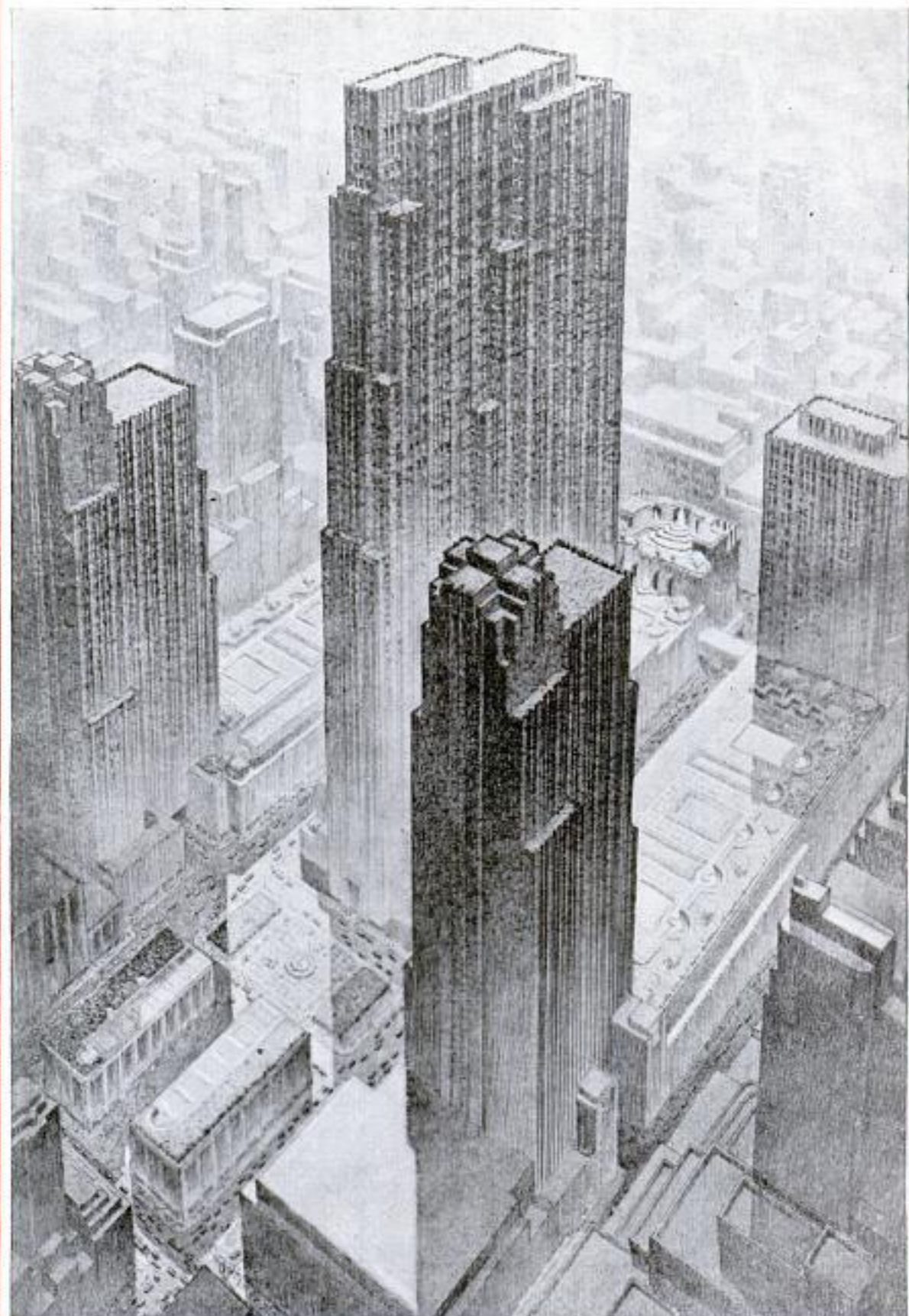
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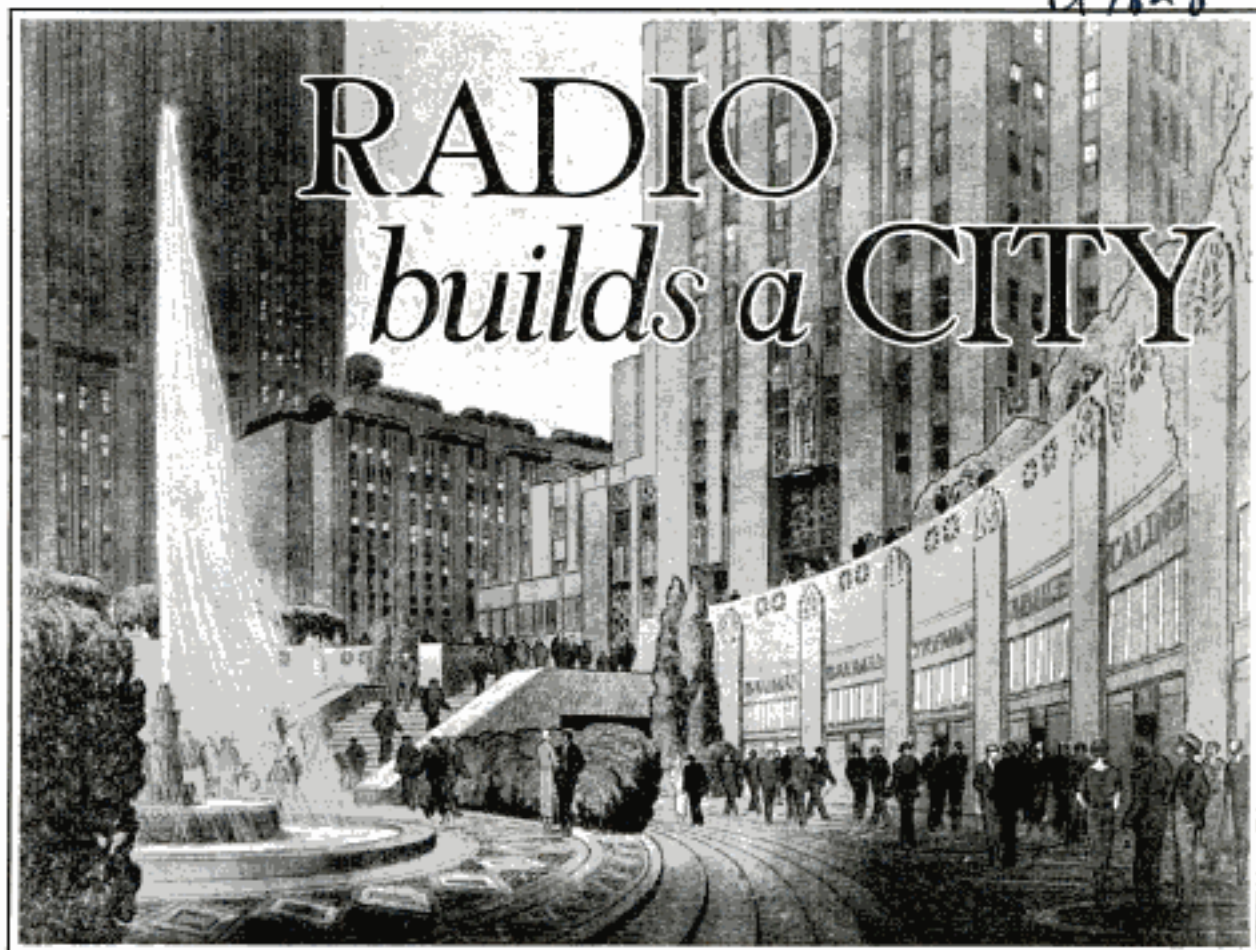
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Vol. 56

NOVEMBER, 1931

No. 5



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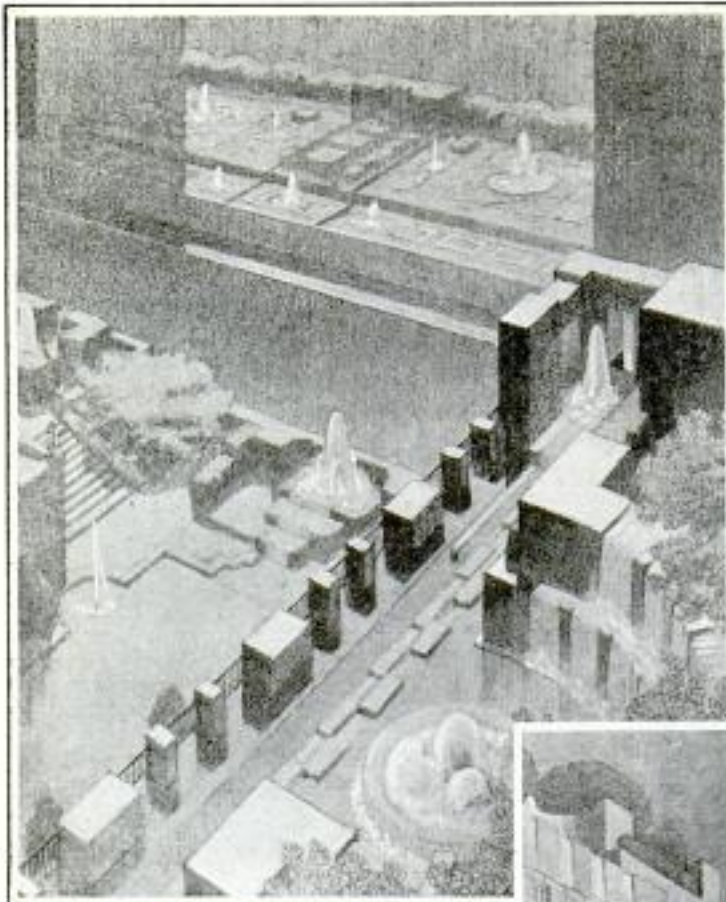
Such a miracle crystallizes in the heart of New York. Architects and engineers have revised their original plans and now announce a group of ten buildings to embody a new conception of time, space, art, science and the universe of man.

Thousands labor on this \$250,000,000 project, the largest single construction unit in the history of man, surpassing the fabled tower of ancient Babylon and exceeding all other engineering performances, with the possible exception of the

Panama canal. Listen to the voice of Radio City as it rises triumphantly out of the earth. The whole site reverberates with snarling, biting, clawing, shrieking engines. The metallic staccato of the air drills boring into the igneous rock mingles with the muffled roar of dynamite. Radio City will be anchored to the solid bones of the earth.

The principal building, a sixty-six-story skyscraper, will have no less than 37,952 square feet of roof gardens. The other buildings will have more, aggregating 246,010 square feet of garden space above the street level. Counting 44,000 square feet of garden space in the plaza and around the buildings, there will be, in all, seven acres of landscaping.

Cont. Don Islassman 705
55 W. 86 St. St. Neufel
Copyrighted Material



placed, are necessary to fill the 28,000 windows and 10,000 doors in Radio City. If spread out flat, this glass would cover nearly twenty-three acres.

Brick, a material known to the Babylonians, will be used extensively. Thirty million common bricks and 15,000,000 face bricks will be delivered to the site. Another important item consists of about 20,000,000 square feet of hollow tile designed for interior partitions. Five thousand men are necessary to fashion these materials into their proper forms on the building site; 20,000 men are given employment in mines, forests, mills, factories and electrical plants where building sup-

Now the 44,000 square feet of ground space devoted to landscaping represents a major investment. At \$400 per square foot, the Rockefeller interests are contributing \$17,600,000 worth of real estate from which they will derive no direct revenue.

A better understanding of land values may be realized from the carrying charges during construction. Counting the sums paid to lessors, taxes on the investment and lawyers' fees, the rental for this land during its unproductive period of construction runs close to \$6,000,000 per year.

The quantities of materials necessary for the ten structures shatter all previous records in the building industry. The order of 125,000 tons of steel exceeds the quantity used in the Panama canal, the Empire State building or the new Hudson bridge. The price for this one item is about \$15,000,000.

One million square feet of glass, the largest order for building purposes ever



Part of the Roof Terrace, Above, and Garden under Which Broadcasting Studios Will Be Located

plies are produced. The west end of the main building will be bounded by a spacious forum, which will be a connecting link between two great theaters, one the International Music Hall, seating 6,500, and the other a sound-picture theater accommodating 3,500. The forum will be

a 1825

open to theater patrons and will have its own orchestra in addition to special entertainment by the National Broadcasting company.

The third to eleventh floors will contain twenty-four studios of that company. These will be "air-padded," fireproofed and air-conditioned. The large studios will be three stories high. The ground floor will be devoted to shops, arcades and lobbies.

Office space in the entire building will have a uniform depth of twenty-seven feet, made possible by the central location of the elevator shafts and the fact that the building setbacks occur where the elevator shafts end.

The main building will be totally different from all skyscrapers which soar above 600 feet. The size of the building site makes it possible to eliminate the tower construction, which is placed on most high buildings, not because of their peculiar beauty but because city ordinances forbid any other construction.

However, the base is so broad that at the twentieth floor it will have an area of 24,374 square feet which will decrease only to 22,423 square feet at the sixtieth.

TABLE LAMP THAT KILLS FLIES BY ELECTROCUTING THEM

Flying insects are killed by a table lamp that greatly resembles the ordinary electric desk unit. The distinguishing feature is a coil of charged wires encircling it like a shade. Insects flying against it are electrocuted by the electricity with which the wires are charged.



Fire Engine That Extinguishes Flames by Spraying Powder on Them; the Powder, Unlike Water or Other Liquids, Does No Damage to Goods

FIRE ENGINE SPREADS POWDER TO EXTINGUISH FLAMES

Powder, instead of water, is used to extinguish flames by a German fire engine that carries a large supply of this dust which is played on a blaze through large tubes under heavy pressure. The powder smothers the flames and is employed particularly where valuable stocks of goods might be ruined if soaked with water or any other liquid that would be used.

TREADMILL FOR OCEAN WAVES TO HARNESS POWER

To harness the energy of sea waves pound the coast lines of America, experiments now are going forward on a machine of the treadmill type that at first glance looks like the cleated track of a tractor. The cleats are curved paddles on a steel belt, mounted beyond the surf line so that the incoming waves will move them along. The inner surface of the belt is lined with teeth and enmeshed with gears connected to individual shafts, which in turn propel the main power shaft. This shaft operates a battery of air compressors housed above the beach line, and the compressed air runs dynamos. Hydraulic-control apparatus "sets" the paddles in a rigid position only when definite pressure is exerted, while they trail in backwash. The same control keeps the paddles traveling on top of the belt in a position that will provide the least resistance from the wind.



Chicago - a Christmas

145 Valley St. 181813

Herd Electric Park

Mr. Charles Leatey
My Lamin Route
Santa Paula, Calif.

Dressman Supply Co.
2538 W. University St.
St. Louis, Mo

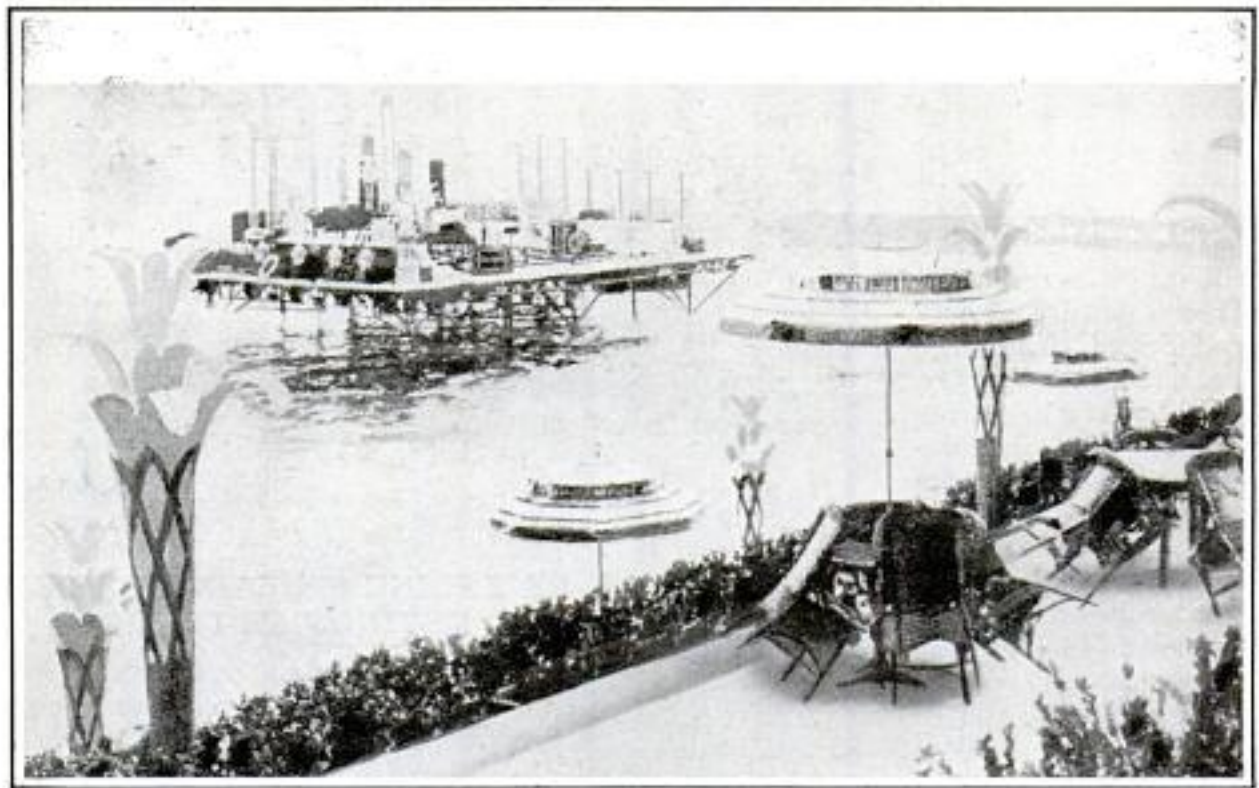
From Le Miroir du Monde
Paris 8/15/31

POPULAR MECHANICS

708

a1764

"Enchanted Isle" Built in Sea on Steel Stilts



Artificial Island Standing on Stilts off the Shore of Monte Carlo's Beach; the Island Supports a Small Theater, a Lifeguard Station and Several Other Buildings

Anchored off the shore of Monte Carlo's bathing beach is an artificial island that stands on stilts. It is forty by fifty-five feet in dimensions and is known as the "Enchanted Isle." The island is within swimming distance of the shore and is constructed of twenty tons of steel, being raised above tide and waves on braced legs. On the island are a small theater, utility buildings, a lifeguard station and equipment for providing gorgeous illumination by night.

The clasp became loosened and was drawn into his lung, and an ordinary X-ray picture revealed it lodged just above the diaphragm. In such cases a long slender tube usually is inserted into the lung. An electric light attached to the tube's end shows the location of the piece to be extracted, and it is grasped by tiny forceps inserted through the tube and withdrawn. In this instance, however, the tube in which the clasp was lodged, was too small to admit the bronchoscope. The position of the clasp was located with the special X-ray device, then, with the aid of a fluoroscope, the exposed forceps was inserted into the lung tube until the bit of metal had been reached and seized.

BIT OF METAL LODGED IN LUNG REMOVED WITH X-RAY'S AID

After a broken part of his artificial windpipe had been sucked into his lung and lodged in such a manner that it could not be extracted by ordinary methods, the life of a Brooklyn man was saved recently through the use of a special X-ray device and an unusual surgical operation. A year ago the man's voice box, or "Adam's apple," was removed when it became infected, and in its place was installed a metal tube attached by a silver clasp to a permanent fixture in his throat.

POTTED PLANT WATERS ITSELF BY OVERCOMING GRAVITY

Using the dry earth as a pump to draw water upward to the roots, a watering device for potted plants has been developed at Cornell University. They are set in a jacket of tile containing water. If the tile holder were set above the plant to

a1836

pred pass

107 Avenue S, Kings Highway, Brooklyn, NY

by Mr. L. A. Richards
Athaca, N.Y.

Copyrighted material

drip upon the soil, it would not supply enough moisture, but when inclosed next to the soil, it is subjected to the suction due to low pressure, and water is drawn through the tile pores in needed amounts.

91800

PLANE PARTS MADE INTO AUTO DRIVEN BY AIR PROPELLER

One of the popular exhibits at the Cleveland air races was a small automobile built almost entirely of airplane parts and driven by a four-bladed propeller housed in a wire guard at the rear of the car. Power is derived from a four-cylinder air-cooled motorcycle engine converted for use in light racing planes. Four airplane tail wheels with low-pressure tires are mounted on transverse springs and provided with brakes. Steering is accomplished by a wheel, whose shaft operates a crossbar connected to the front axles by rods. The body, which accommodates one passenger, is of sheet steel, and an airplane throttle controls the engine. The propeller is started by a crank engaging in a projection of the shaft, at the rear. Except for the engine, no bolts are employed, welded-steel airplane tubing and rods being used throughout. Without the propeller guard in place, the car made seventy-five miles an hour.

propeller 25 1/2 hp



Small Auto Built of Airplane Parts and Driven by a Propeller Mounted at the Rear

Built by J.C. Canfield Cleveland Ohio no street address Ohio



Air Fanned over Ice and Circulated through the Food Chamber Keeps the Ice Box Several Degrees Cooler

FAN CIRCULATES AIR IN ICE BOX TO COOL FOOD CHAMBER

By circulating air over the ice, a fan now on the market maintains temperatures of forty-five to fifty degrees in any good ice box during the hottest weather. Circulation makes the ice box from eighteen to twenty-five degrees colder than when ice is used alone. The fan will provide the low temperatures as long as ice and electricity are supplied. With the colder air directed into the food chamber, vegetables, etc., are kept fresh.

MYSTERY OF HALIBUT'S ORIGIN IS FINALLY SOLVED

The mysteries of halibut origin, their hatching places and their development to maturity bid fair to be solved by the finding of their larvæ. This discovery may eventually enable the United States and Canada to adopt scientific measures for the conservation of this fish family, the annual Canadian catch of which amounts to more than 30,000,000 pounds.

Announced by John Babcock Chairman Canadian-American

91734
D'ingenerator Wiff Co, 7422 Santa Monica Blvd Hollywood, Calif

Halibut Commission

a 1789
710



Elevated Ferry Made by Lashing Two Boats Together and Building a Superstructure on Which Trains Can Be Run in Sections from the Level of the Bank

OK 4

ELEVATED FERRY TAKES TRAIN IN SECTIONS OVER RIVER

Two boats lashed together and carrying an elevated superstructure provide a ferry for trains over the Dong Hai river

in French Indo-China. There is no bridge over the river and the banks are so high the elevated structure is necessary so the train, which is broken up into sections for the crossing, can be run directly from track level onto the ferry.

FENCE MADE OF ELK ANTLERS SURROUNDS RANGER CABIN

Distinctive in design and said to be as effective as barbed wire, a fence of elks' antlers has been erected around the head-

quarters of a forest ranger at Mammoth Springs, Wyo. It is one of the pastimes of the rangers to collect the antlers shed each fall by the herds of elk, and it required but a short time in the little-hunted area surrounding the ranger's home to gather sufficient to make a highly decorative fence.

a 122



Fence of Antlers around Ranger's Cabin, Said to Be as Effective as Barbed Wire

THIS DRUG MAKES PEOPLE TELL THEIR SECRETS

Small doses of sodium amytal, a drug related closely with luminal, veronal and allonal, commonly used as hypnotics and sedatives, will unlock the most secretive tongue and make the subject actually anxious to discuss his most personal and intimate affairs, according to Dr. Erich Lindemann of the Psychopathic Hospital of Iowa State University. His research on the substance was started some time ago as the result of its effective uses in treating certain mental diseases. Administered in small amounts to mentally diseased subjects and to normal persons at the same time, its most striking effect on

a 1840

amytal
doses
small

at meeting American Psychological Assn

This article killed slower landing speed in next magazine

the normal individuals was their desire to tell about personal matters they ordinarily would keep carefully hidden. They were unable to refuse to answer questions about the most intimate matters. Additional effects on normal subjects were warm emotional attitudes toward others, combined with a sensation of strength, self-confidence and serene contentment.

91845

ANGLEWORM AND MOTH FARMS ODD JOBS

Among the odd jobs of the world, probably one of the most unusual is growing angleworms for the market. One California man makes a living by operating an angleworm farm. He propagates the wrigglers and, when they are fully grown, they are packed in cans and shipped to fishermen. The worms are packed five dozen to the can and they usually survive about ninety-five days. An Iowa youth runs a butterfly farm and has hatcheries, traps and displays for raising more than thirty different species of moths and butterflies. Through a hole in the floor of each caterpillar's home, a branch of its particular food is inserted. Each species must be supplied with its own fresh food, the temperature of the nursery must be watched, and the inmates closely guarded. The insects are sold to collectors, nature teachers and makers of decorative trays.



Traffic Signal for Airport Like Ordinary Stop-and-Go Street Light, and Control Board from Which Airport Lights Are Operated

Web World

land, Brooklyn. A remote-control switchboard in the observation-tower room governs the air-traffic lights and the beacons, floodlights and other illuminating devices.

X-RAY WITHOUT VACUUM TUBE RUNS ON HIGH VOLTAGE

91844

Taking X-ray pictures without using vacuum tubes is the feat of a French physicist whose process has recently been announced. High-voltage electric currents are passed through magnesia, alum, yellow oxide of mercury, or other substances having high electrical resistances and rays of low penetrating power are produced. Medical authorities see promise in the new system as being more convenient in clinical and industrial practice than the conventional tube device.

see form letter #

TRAFFIC TANGLES IN THE AIR AVOIDED BY STOP LIGHTS

91824

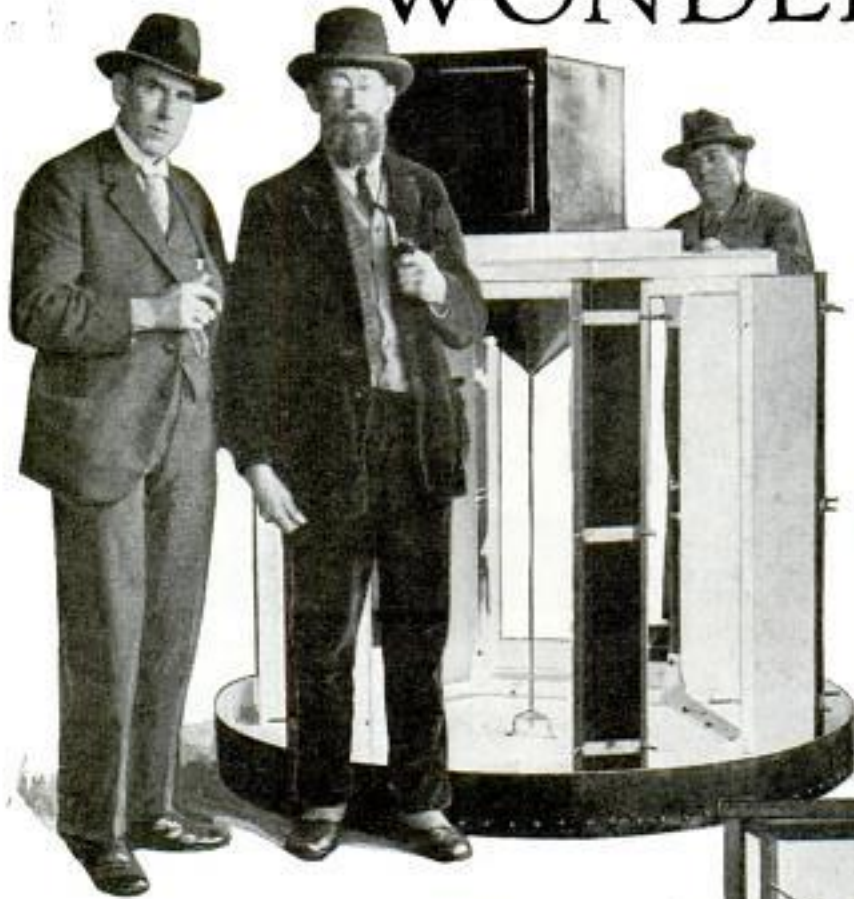
Traffic signals, like the stop-and-go lights that govern automobiles, now direct pilots in landing and taking off from Floyd Bennett flying field at Barren Is-

Erving Schlesselman
Cedar Rapids, Iowa
State College
Alhambra

M. L. Rebaud
no address

a 1724

WONDER RAY



Soest creep past the house on tiptoe after dark, and no cracksman will venture to break into the house of the "wizard," as the inventor is locally regarded.

Day and night, a perpetual humming and vibration in the air indicates that the ray is perpetually at work. This unceasing vibration comes from behind a high hedge and fence where are located an electric generator and radiator, emitting, for a distance of thirty yards all around, waves in whose field no organic matter can decay. These waves, which are not radio or any

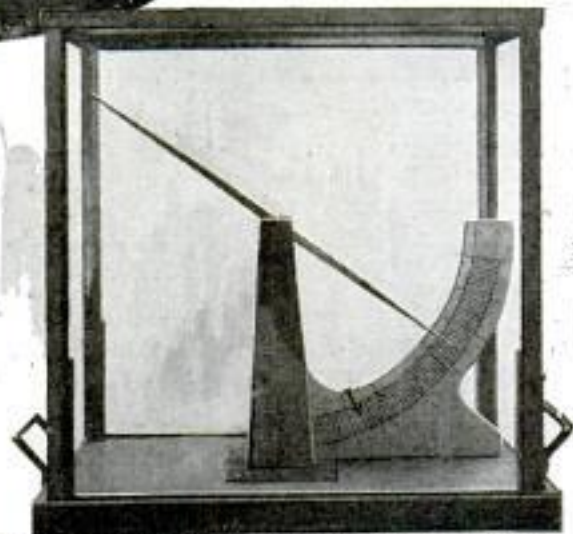
By HAROLD T. WILKINS

A DUTCH investigator, working in a quiet country house surrounded by fields and farms close to the village of Soest, Holland, has recently made a discovery which may revolutionize future methods of food preservation and holds striking possibilities for the cold-storage industry.

He has revealed a wave of energy, at present unknown to puzzled scientists and laboratory workers, which will conserve meat, milk, dairy products, eggs, flowers, fruit, fish and vegetables for an indefinite period, and arrest decay where it has once started.

Since the news of the discovery, scientists and newspaper men, business men and industrialists have visited this quiet backwater, which is near the high road along which autos carry visitors to the pretty village of Doorn, where ex-Emperor Wilhelm and his retainers are spending their days in exile, felling trees in the grounds of the royal castle.

The awe-struck folk of the village of



Mixing Chamber of "Life-Wave" Machine, Above, and How Rays Depress Magnetic Needle

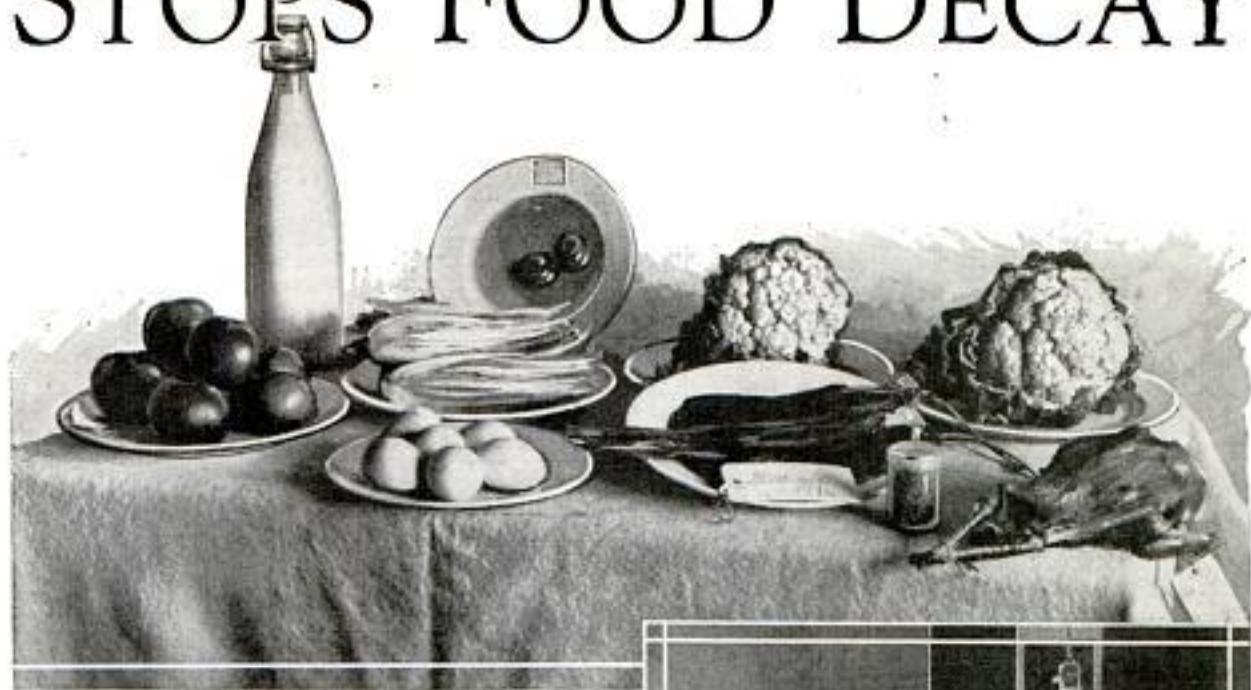
waves so far known, travel at a far lower speed than electricity, the Hertzian ray or the light of the sun. Indeed, the speed of transmission of this new ray ranges at from one yard to thirty-one miles an hour. Yet it has electromagnetic properties similar in some respects to those of radio.

Robert Pape, the discoverer of these rays, is a dairy research worker formerly employed by the government of South Africa. His invention takes the form of an apparatus in which moistened and

Life Wave Syndicate
 24, Kolonieweg, Soest, Holland

Q 1724

STOPS FOOD DECAY



Fresh Foods Kept for Months in Room Adjoining the Machine; Wave Radiator at Right

dry air are combined in a mixing chamber, through which run electrically charged copper wires. The generator radiates short waves of some ten inches. These waves, after about ten days, set up a field of about thirty yards radius, in which no meat, milk, food products, flowers or organic material will decompose or even deteriorate.

"They are not radio waves at all," explained Mr. Pape to a Popular Mechanics representative who chatted with him at Soest. "We do not know what they are, but you can see their effects for yourself. This 'Life Wave,' as I call it, is not shut out by an ordinary lead plate. It will penetrate stone walls, iron, lead, glass and wood, indoors and out, and in any atmosphere or at any temperature. The generator itself is not a bulky machine, and using only about as much electricity as would be needed for an ordinary electric lamp, it will form a field of about 30,000 cubic yards."

He pointed to a large magnetic needle in a frame in the room next door to the generator, on the other side of a thick brick wall. The needle showed a deflection, indicating that some magnetic influence was at work in the room.

Pape also showed me how an ordinary ship's compass needle in the same room



was deflected from the true magnetic north pole by the wave.

"But it is remarkable that a radio receiver is not affected by this wave," he added. "A few days ago, I stood right under and as close up as I could to get to a thirty yards high aerial of the Dutch broadcasting station at Hilversum, which has a power of seventy kilowatts. I held a compass needle there, but it swung only half a degree out of the true magnetic north. Yet that same needle when placed in the range of the life-wave generator was deflected four to five. Now let me

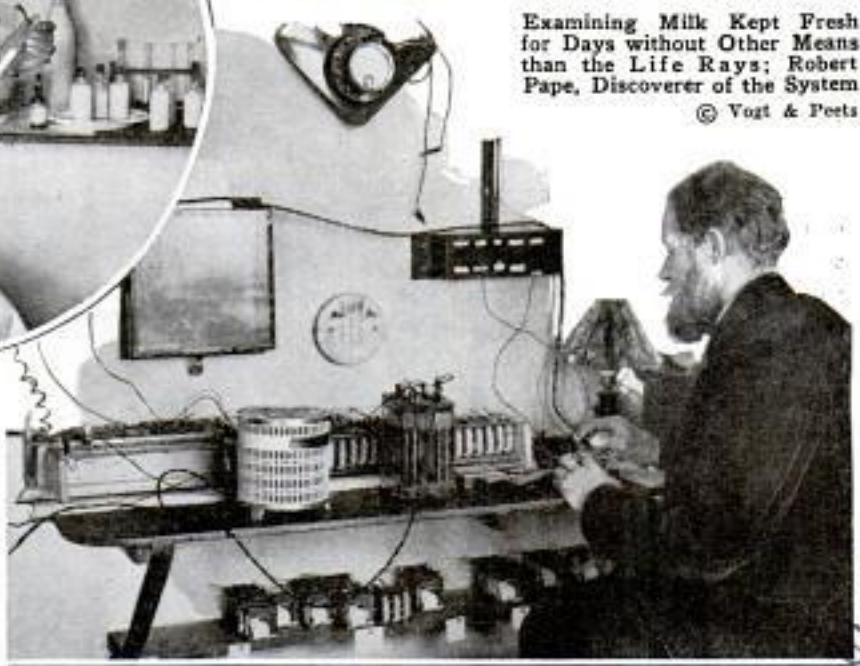
91724
714



while shrimps, to which only four per cent of kitchen salt had been added, showed no ammonia development.

The principal of the infectious-disease department of Wilhelmina hospital at Amsterdam (Dr. D. Herdersche) experimented with dangerous bacteria and

Examining Milk Kept Fresh for Days without Other Means than the Life Rays; Robert Pape, Discoverer of the System
© Vogt & Peets



show you how the life wave keeps food products fresh and pure for an indefinite period."

Pape took me upstairs into an attic of the house and showed me food, on plates, quite odorless and undecayed, which had been there for months. There were new potatoes which had been there from June 30, 1930, to August, 1931. They were slightly discolored, but quite fit for cooking and easily to be scraped by the housewife. Yolks of eggs broken on the plates months ago showed no sign of decay and had no odor. He broke the shells of eggs stored in the house at Soest, May 30, 1930, and turned out yolks perfectly yellow and odorless. Steak, hung for many weeks in the house, was dried but quite odorless and fit for consumption.

Dr. A. van Raalte, chief of the Amsterdam meat-inspection service was asked by the Dutch patent council to investigate and report on the use of the waves for conserving food products. For two weeks, he experimented with samples of milk and shrimps, and found that, when kept in the field of the wave machine, they remained fresh and pure much longer than similar samples elsewhere.

"The acid percentage of milk kept in the field of the wave had not increased," says Doctor van Raalte. Fine pears placed in the field maintained all the qualities they had when first placed therein,

found that these pathogenic germs, after they had been placed in the field of the machine from February 7 till February 18, 1931, showed no sign of growth.

ONLY CAUSE OF EXCESSIVE FAT IS TOO MUCH TO EAT

Fat people have been deprived of the conventional alibi, "I gain weight, no matter how little I eat," by recent researches on internal chemistry. The tests showed no abnormality to support the statement, but led instead to the conclusion that the only way to get too fat is to eat and drink too much. The investigation included a careful check on the intake of energy-producing foods, the exchange of energy within the body, and the amount of water absorbed and lost by the fat subjects. Another investigation involved the problem of where the fat comes from and indicated that body fat is built out of fragments of sugars and starches with a possibility that even the proteins, that are supposed to be the dieter's standby, can be split apart to some extent and reassembled into fats.

*Dr. L. H. Newburgh
Univ. of Michigan Hospital
Ann Arbor Mich*

*Dr. William B. Van der...
Amsterdam*

Dr. A. van Raalte

Dr. D. Herdersche

Dr. Pape

*Wm. H. Blachley
Greenville, S.C.*

1919

Hanes Eye-Finishing Co.
POPULAR MECHANICS
LETTERHEAD OF COTTON PAPER
ADDS TO USES OF FABRIC

\$15.00

*George A. Sloan, Pres.
Cotton Textile Institute*

Cotton-fabric letterheads, one of the many uses to which cotton is being put, are fast gaining the favor of big business firms. At the same time, cotton paper is being used for menus in hotels, restaurants and railway dining cars, as well as for radio programs, because of its "crackle-proof" quality. Among other uses are railroad time-tables, book jackets, theater programs, advertising maps, legal documents, children's nursery books and cut-out dolls, calling cards, direct mail advertising material, business and household charts, insurance policies, convention programs, state and municipal license forms and church music. In addition, there is an increasing preference for cotton display posters, which will withstand the elements two to three years—much longer than ordinary paper.

Wm. H. Blachley, Greenville, S.C.



Electric Water Cooler That Kills Germs and "Softens" the Liquid by Precipitation

Water Purifier: 6; 712 W. 6th St. Los Angeles, Calif.

91771
SHOP RESEMBLING HUGE PIANO
HOUSES MUSIC STORE

One Los Angeles music store is advertising its business to the world by its quarters which have been constructed to resemble a huge grand piano. The illusion is made more realistic by real music which issues from a piano just inside the door of the shop.



Music Shop in Los Angeles Which Advertises Its Business by Its Piano-Like Quarters

Scene same 9/1/21

GERMS KILLED BY ELECTRICITY
IN WATER PURIFIER

Killing germs and making the water appreciably softer, an electric purifier has been devised that is almost entirely automatic in its operation. It consists of a five-gallon glass jar with the electric element inserted in the top. When the jar is filled with water, a switch is depressed and the purifier does the rest, shutting itself off automatically when the proper time has elapsed and the correct temperature has been reached. The cost of operation is about one cent per gallon of water.

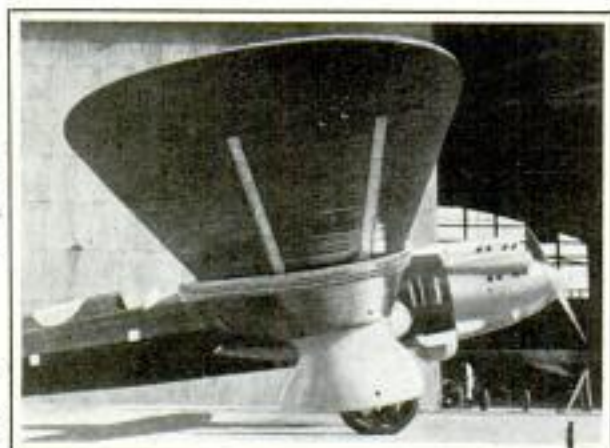
Purity and Surgery
Dr. R. S. Turner, Medicine and Surgery
Electron College, Berkeley, Calif.

PILLS INSTEAD OF SPINACH
TO SUPPLY VITAMINES

91817
Vitamine-producing material of spinach and carrots, the substance known as carotene, has been isolated and may soon be supplied in a form at which children will not balk, as a powder or a pill, it was announced recently before a meeting of the American Chemical society. A new process has been devised whereby this substance can be produced in a highly concentrated crystalline form at low cost. The pure carotene may also be administered hypodermically when desirable.

Dr. R. S. Turner, Medicine and Surgery
Electron College, Berkeley, Calif.
Henry M. Leicester, Aberdeen College, Aberdeen, Calif.

91785
716



Two Views of Monoplane with Extension Wings; the Outer Sections Can Be Drawn into the Inner Sections When Ship Is in Air

TELESCOPING WINGS ON PLANE ADD TO ITS SPEED

Wings that can be extended from thirty-seven to seventy feet are a feature of a low-wing monoplane which, the inventor claims, will gain increased speed in prolonged flight with the reduced wing area, while retaining the advantage of being able to get off the ground with a heavy load with the wings extended. When in the air, the outer sections of the wings are drawn into the larger inner sections, thus reducing wind resistance. In tests, with wings extended, the craft made 105 miles an hour, and with the shortened wings, its speed was 185 miles an hour.

WASTE OIL MAKES EXPLOSIVE AND REFINES ZINC ORE

New by-products of petroleum, most of them made from "ends" of the oil now wasted, have been developed, and speakers at a recent meeting of the American Chemical Society held out hope that they will aid materially in reducing the troubles with which the petroleum industry is now beset. Improved methods for the refining of toluene, a petroleum constituent and the base of TNT, were described. A new use for methane, or marsh gas, in the recovery of zinc from ore, in which the methane is substituted for the carbon

now essential to the process, was explained. A number of interesting features of the ethyl, or "pure grain," alcohol refined from petroleum were told. Gas from this alcohol, when placed under pressure of 725 pounds at a temperature of 700 degrees, turns into an anti-knock motor fuel, odorless and colorless. When the same gas is given twice the pressure, in the presence of aluminum, copper and nickel catalysts, it becomes a violent explosive, bursting a laboratory bomb set to withstand a pressure of 10,000 pounds per square inch.

91792

AUTOMATIC HITCH FOR TRAILER HAS NO BACKLASH

Instantly attached or detached without the use of tools, nuts or thumb-screws, an automatic coupling

to fasten a trailer to an auto not only allows flexibility but at the same time eliminates rattles and backlash. With the all-steel hitch, the wear is absorbed by a positive locking dog so constructed that any forward thrust causes the coupling to lock tight but still retain its flexibility. A hook for the coupler is attached permanently to the rear of the car, and the coupler can be bolted, riveted or welded to any size or shape of pole. To hitch the trailer, the locking dog is rested on the hook, then pushed down and



Automatic Coupling for a Trailer Which Prevents Backlash and Can Be Attached Instantly

pulled back. In uncoupling, the locking dog is lifted and the process is reversed.

Drain machinery, Paris, France

Petroleum Division meeting 1826

Chicago, Ill. Kimball & Co. 1914 Western

Kansas City Star 9/4/31

The Hagel Mfg. Co
716 E. 12th St.
St. Paul, Minn.

hook only - 756

Web of Glass and Steel Re-Covers Big Hall



Workmen, Engaged in Re-Covering the Grand Palais, Paris, with a Network of Steel and Glass, Look Like Flies Caught in a Giant Spider's Web; the Roof Is 150 Feet High

Heavy wire-reinforced glass, laid in sheets, is used in re-covering the Grand Palais in Paris, where the most important expositions have been held since 1900. The steel supports for the glass roof resemble a huge spiderweb, with workmen clinging to it like flies. The roof is 150 feet above the ground.

"BLIND" PILOTS FLY SIX PLANES IN CLOSE FORMATION

In order to circumvent fog and bad weather, airplane pilots are being trained more and more to fly "blind" when necessary, relying only on their instruments to determine their course and position. Recently army flyers have attempted with considerable success the feat of blind flying in military formation, several ships in usual flight array winging their way through the fog with each pilot directed by his instruments. As a result of such maneuvers, it is possible that, in any future war, fog or poor visibility may be as

much of an advantage in aerial movements as it was a disadvantage during the world war. The experiments were conducted at the army flying school at Kelly field, Texas, where three ships were first sent up in clouds and flown in formation with the aid of instruments, the intervals between clouds giving the pilots an opportunity to recover their position if they lost it. Later the flying was done in thick fog, and finally, when the three-ship formation was mastered, six planes were tried and managed successfully. Army aviators believe now it is entirely feasible to fly even larger units in close formation with the aid of instruments. In the six-ship tests, the last flyer could not see the leader, but was guided somewhat by the outlines of the ship ahead of him at times. In such a flight, the leader relies solely on his instruments, and the rest of the pilots are guided partly by the ship in front and partly by instruments. If forced out of formation, however, they must fly by instruments alone.

at Kelly Field.

N.Y. Times 9/6/31



This article taken and filled

Unloading a White Camel from a Ship to the Dock at San Francisco; the Rope Net Solved the Problem When Other Methods Failed

CAMEL UNLOADED IN ROPE NET FROM DECK OF STEAMER

When "Maida," a white camel, arrived in San Francisco recently from Cairo, Egypt, the crew of the steamer faced the task of landing the immigrant safely. The problem was solved by swinging the animal from the deck of the ship to the dock in a rope net attached to a crane. This camel was brought to America as the mate for "Moses," another white camel now in a San Francisco zoo.

WATER MADE TO HEAT ITSELF AND STORE TIDAL ENERGY

Production of continuous power from the tides has been accomplished at Avonmouth docks, England. When the tide is

low and the storage dock is full, the great head of water drives a turbine, which in turn is connected by a long shaft to a vertical electric generator. Connected to the same shaft is a water brake, turned by the turbine shaft against the flow of the waste water. The friction heats the water to temperatures as high as 388 degrees. This water is stored in an accumulator tank. When the tide rises, and the head is depressed so that the turbine cannot operate, a valve opens and the water turns to steam and runs a steam turbine, connected to a second generator. While the steam pressure falls, the tide is lowering, the pressure head again becomes effective, and the process is repeated.

"STONE" BLOTTER IS RENEWED BY BEING HEATED

A manufactured stone, which blots any ink on any paper, has recently been introduced, cut in a curve like a desk blotter. It weighs just enough to be useful as a paper weight also. It is said the stone blotter absorbs ink instantly, leaves no lint and will not offset. The stone can be renewed by heating it to a red color for a few minutes over a stove burner.

GYPSUM AS A FERTILIZER

Gypsum from Nova Scotia is used in large quantities as a fertilizer and moisture retainer in the peanut-growing districts of Virginia. Large deposits of this mineral are found not only in Nova Scotia but in several other Canadian provinces. In addition to its use in growing peanuts, gypsum is employed, when calcined, for making dental and hard wall plasters.

Canadian Government Bureau of Statistics

new York Warren American Accumulator & Turbo 97

91814 see sheet 96

Deitchbacher

This article on the camel

see also #1812

Q.P. 1/2

material

How Continuous Power Is Produced by Tide

1 AT LOW TIDE THE GREAT PRESSURE HEAD PRODUCED BY THE HEIGHT OF THE WATER IN THE DOCK DRIVES THE WATER TURBINE WHICH IS CONNECTED BY SHAFTING WITH A HEAT GENERATOR AND A VERTICAL ELECTRIC GENERATOR



2 THE HEAT GENERATOR IS SIMILAR TO A TURBINE INTO WHICH WATER FLOWS FROM THE FIXED BLADES ONTO THE BLADES OF THE ROTOR

3 IF THE ROTOR WERE FREE TO REVOLVE, THESE WATER JETS WOULD TEND TO DRIVE IT IN A CLOCKWISE DIRECTION

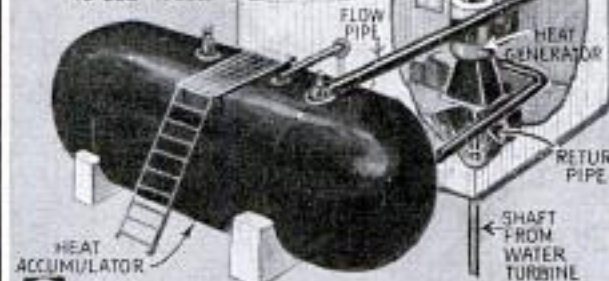
4 HOWEVER THE ROTOR IS FORCED ROUND ANTI-CLOCKWISE BY THE SHAFT FROM THE WATER TURBINE CAUSING A VORTEX BETWEEN THE BLADES

5 THE FRICTION OF WATER AGAINST WATER GENERATES HEAT AND RAISES THE TEMPERATURE OF THE WATER



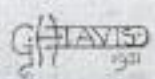
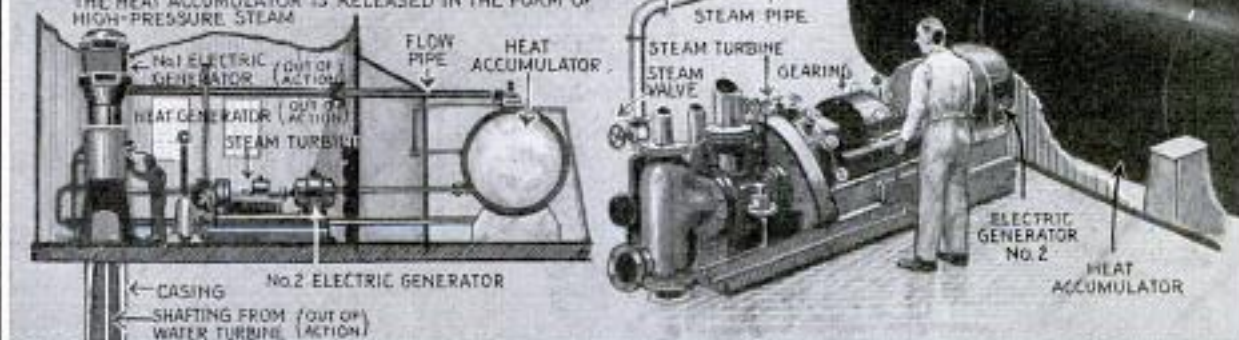
6 THE HEATED WATER FROM THE HEAT GENERATOR IS CARRIED TO THE ACCUMULATOR AT A TEMPERATURE UP TO 306° FAHR.

7 WHEN THE TIDE HAS RISEN TO ALMOST THE LEVEL OF THE WATER IN THE DOCK THERE INTERVENES A PERIOD WHEN LACK OF PRESSURE HEAD PLACES THE WATER TURBINE OUT OF ACTION



9 THIS DRIVES THE STEAM TURBINE WHICH IN TURN SUPPLIES POWER TO ROTATE THE ELECTRIC GENERATOR No. 2 AND SO CONTINUES TO SUPPLY ELECTRICITY FOR THE PERIOD WHEN THE WATER TURBINE IS OUT OF ACTION

8 AS THE WATER TURBINE GOES OUT OF ACTION THE VALVE OF A STEAM TURBINE IS OPENED AND THE HEAT FROM THE HEAT ACCUMULATOR IS RELEASED IN THE FORM OF HIGH-PRESSURE STEAM



Dr. W. Herbert J. Hoopes Loom

720

POPULAR MECHANICS

a 1998 *designer* *Sanford Mills*
MAN-MADE FUR SAVES ANIMAL
LIFE FROM EXTINCTION
Sanford Maine



Artificial Coonskin Made from the Wool of the Angora Goat by Loom That Took Years to Develop

Conservation of the natural supply of fur-bearing animals is expected to be aided by the development of a realistic man-made fur woven from mohair, the fleece of the Angora goat. A loom has been devised that will handle long and short hairs at the same time, leaving a shaggy, fur-like product. The new material is called "koongora" because of its resemblance to coonskin.

BARE LANDS CAUSE OF FLOODS SHOWN IN CHINA

China's disastrous floods which take a toll of thousands of lives almost annually are caused by irregular and abnormal rainfall descending on arid plains barren of vegetation. This is the explanation vouchsafed by the United States department of agriculture. In some regions of China, a rainfall of one or two inches one month may be followed the next by a deluge of from twelve to twenty inches. The rains in China are always heavier in summer than winter, and, during a normal year at the city of Hankow, the focus of this year's disaster, there is a difference

Science Service
9/4/6

Dept. of Commerce

of forty feet in the river's level for these seasons. Centuries of intense cultivation in China have stripped the land of vegetation because everything grown must be edible. Thus, when the rains fall, there is no spongy green carpet to absorb the waters and they rush to swell the large rivers or their tributaries. As a result, the Yangtze reaches the broad alluvial plains and spreads out over the country in one muddy, death-dealing blanket. Attempts have been made to control this river with wooden dikes, but they have been unsuccessful, although the river itself deposits material along its banks each time it overflows until, in some sections, it is actually higher than the surrounding plains. Masses of Chinese live in this flood plain below the river, to take advantage of the rich soil, and when the flood comes, they often pay with their lives.

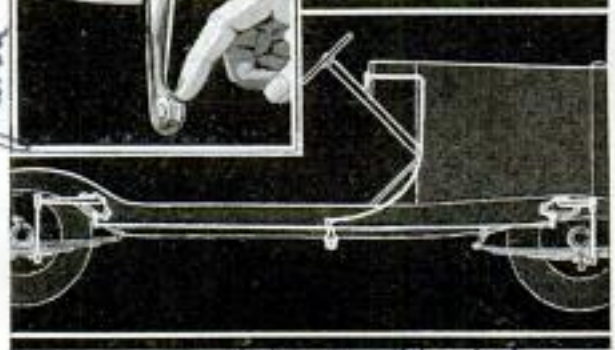
a 1965

ACTION OF SHOCK ABSORBERS CONTROLLED BY LEVER

Actions of hydraulic shock absorbers now can be controlled by a lever located on the instrument panel of the automobile, thus enabling the driver to adjust them according to the condition of the roads. The appliance is known as a ride selector, and the control lever can be placed in three positions, making it possible to enjoy the soft resiliency of the car's springs on smooth roads or to bring all four shock absorbers into instant use for rough parts of the highway. Also, body swaying and weaving are reduced by the device, it is claimed.



Lever on Instrument Panel to Control Action of Hydraulic Shock Absorbers, and Diagram Showing How Control Operates



Monroe Auto Equipment Co., Monroe, Mich

Christian Science Monitor 8/19/31

**GREENLAND 'BOWL'
COVERED BY TWO
MILES OF ICE**

Ice in the center of Greenland that is 2,700 meters thick, slightly more than one and two-thirds miles, has been reported by members of the expedition headed by the late Dr. Alfred Wegener. Followers of Wegener consider this as complete proof of his theory of the shifting of continents. They declare that such great thickness is proof that its weight sunk the solid rock until a cross section of Greenland resembles a bowl filled with ice. The opposite process is noted in Scandinavia, which has risen six meters in 600 years and still is gradually rising. Another argument in favor of the Wegener theory is that Greenland moves thirty-six meters every year toward the west and that the American and European continents are believed to be slowly drifting apart.

**CIGARETS EXTINGUISH SELVES
WHEN THROWN AWAY** *a166*

Treating cigarets so they will extinguish themselves in a reasonable time when thrown away has been tried with success as one method of reducing the danger of forest fires. No change in the taste of a cigaret so treated is noticeable, although there is a certain dryness easily counteracted by humidification. Cigarets treated to extinguish themselves were tested by the forestry service and virtually all went out in what was considered a reasonable time after being tossed aside. The chief difficulty in having all cigarettes so treated is that the process would involve some additional expense for the tobacco manufacturer.

NY Times 8/9/31
 Scheduled American airlines carried 417,505 passengers in 1930.



Italian Liner "Rex," as It Appeared When Launched at Genoa; It Has Been Termed the Fastest Vessel on the Atlantic Ocean

**ITALIAN SHIP CALLED FASTEST
ON THE ATLANTIC OCEAN**

Another greyhound of the deep was launched recently, when the Italian liner "Rex" splashed into its element at Genoa. This giant liner of 50,000 tons promises to compete for speed with the big boats of other countries and, at the time of its launching, was hailed by its owners as the fastest vessel on the Atlantic ocean.

**TYPHUS CARRIED BY RAT FLEAS
EXPERIMENTS PROVE** *a1679*

Fleas, long suspected of transmitting endemic typhus fever in this country, have been convicted of the offense by conclusive evidence gathered by workers for the public-health service. The proof was obtained in the course of laboratory tests through inoculating white rats with the typhus virus and then putting fleas on them. Some of these fleas later were emulsified and injected into guinea pigs, which soon showed signs of the disease. Infected fleas were also placed with sound ones, some of which caught the fever.

Dr. W. E. Flyer, A.S.P.
Amreich and L.F.
Badger
Science Service 8/11/31

Q 1528 Cmt. M. B. Schnäpfer,
2018 & 12 St. Bivobly
ny

The Scientific **MIRACLES**



gion in complete harmony. Built during the Middle Ages as the center of the Holy Roman empire, the Vatican City became the cloistered home of the Catholic religion and only in 1928 awoke from its medieval lethargy. Then—three years ago—began the gigantic task of reshaping the state into a modern metropolis.

It is the first state to possess a fleet of helicopters and a unique landing field for them.

An electric railroad,



Pope Pius XI Uses the Most Modern Business Conveniences, Including the Dictaphone; Below, the Gold and Enameled Telephone Presented to Him

WITHIN the ancient walls of the Vatican City today rises one of the greatest scientific centers the world has ever seen. The aura of antiquity still lingers over the Holy City, but only as a fading contrast with machine-age dominance. The sixteenth and twentieth centuries clash frequently within the few acres that comprise this smallest of the world's states. Always the twentieth century wins out, always the old gives way to the new.

Science and religion interlock there in one friendly grasp. There are no concessions or compromises. Religion has taken science under its warm cloak and uses it to spread the Gospel over the face of the earth, aid missionaries everywhere, educate and hold the faithful.

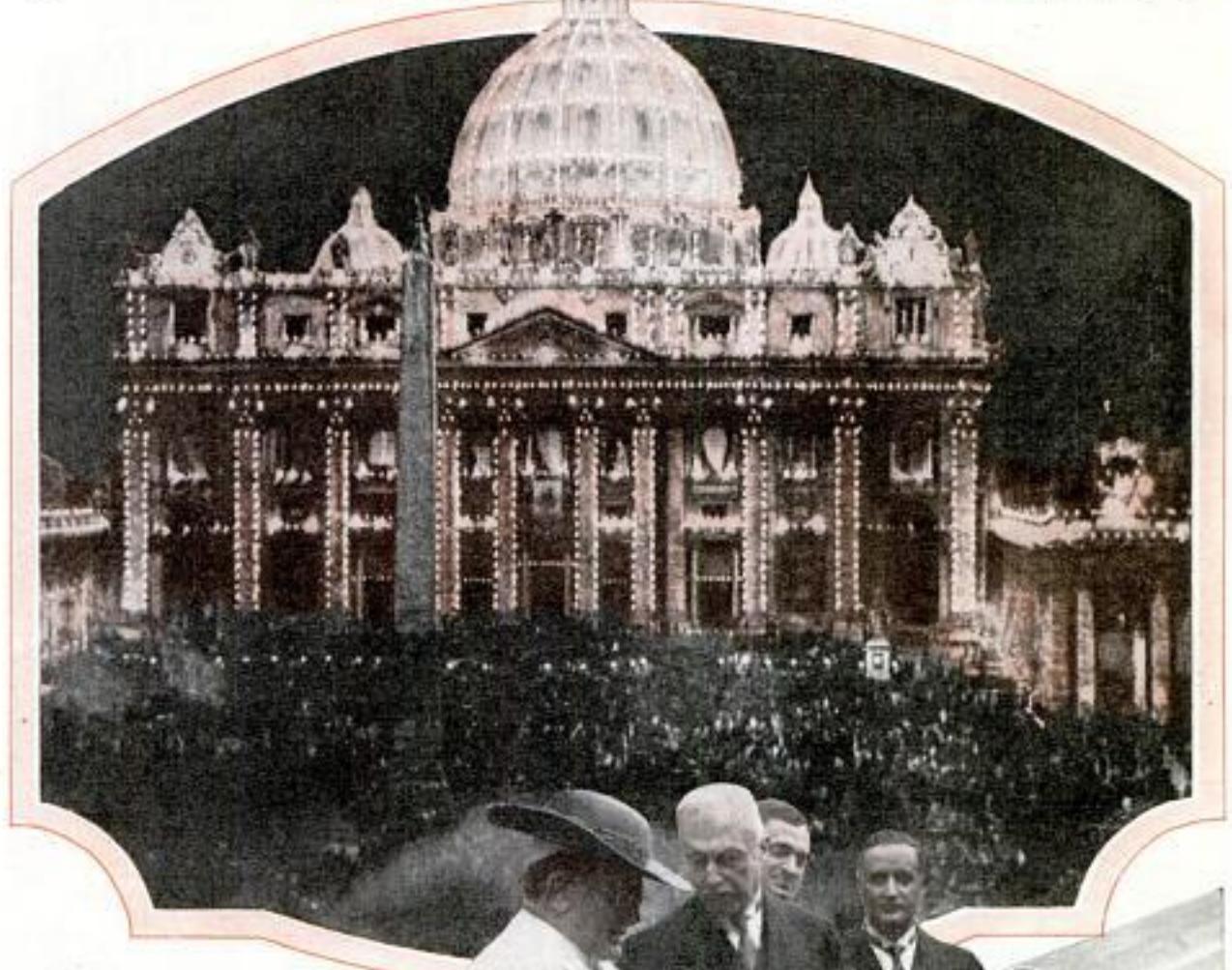
The Vatican City stands today the symbol and embodiment of science and reli-

virtually accident-proof, connects the Vatican City with the outside world.

A sumptuous train, equipped like a modern palace on wheels, stands ready to take the pope where he will.

The 632 citizens—hardly the number of employes in a good-sized department store—have a super water-supply system all their own.

of the VATICAN CITY



The mightiest radio station and receiving set, built by Senator Marconi himself, can tune in on or send messages to any part of the world.

An automatic telephone system, the last word in service, has direct transatlantic connections.

The Vatican City's telegraph, wireless and postal systems are completely up to date.

A powerful printing plant turns out papers, books and pamphlets at extremely high speed.

One of the most scientifically up-to-date observatories is constantly searching the skies.



St. Peter's Cathedral Beautifully and Brilliantly Illuminated, and, Below, His Holiness Inspects the New Automobile Given Him by the Makers

A splendid example of the pope's eagerness to make the Vatican City a model scientific metropolis occurred recently. In introducing His Holiness just before he made his world-wide radio address on



Official Dedication of the Super-Power Vatican Radio Station; Below, International Telegraph Explained to Officials

The next day the pope ordered the installation of elevators of the type used in the Empire State building.

The railroad station, the tall masts of the wireless station, the strong steel bridge leading to the observatory—all seem to be anachronisms, as the great ancient walls of the city look down upon them. As each twentieth-century structure goes up, as helicopters zoom overhead and electric trains roar below, the ancient walls rumble as if with fear.

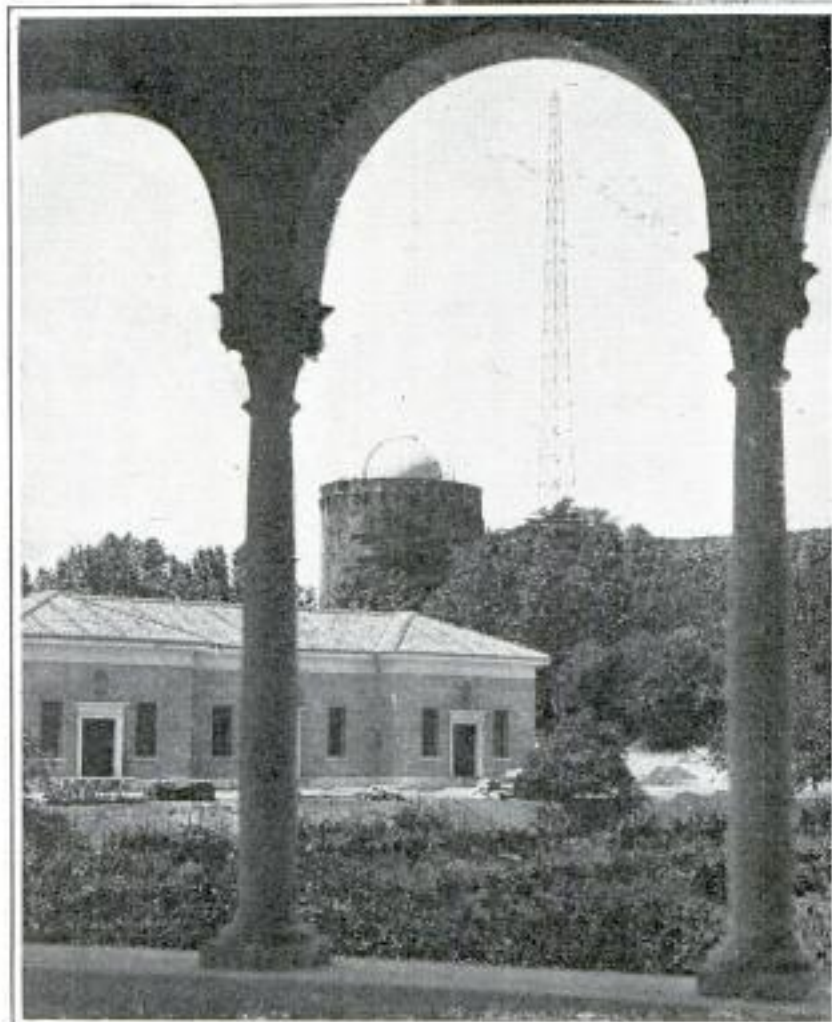
Just to the rear of St. Peter's rises the most completely modernized section of the Vatican City. This section, a third of the state, yesterday was a hill. Giant excavators, hissing fire and steam, appeared one day and ate it up. In the center rises the official residence of the governor of the Vatican City, looking very much like a swanky Fifth Avenue building. It lacks nothing in the way of modern conveniences. It contains two luxurious apartments for visiting royalty. These are fitted with duplex bedrooms, kitchenettes and

labor, Mgr. Francis F. Spellman leaned over to the pope and said:

"By the way, you know there are several elevators in the Vatican. The oldest one is a water elevator presented to the pontiffs by the late Emperor Francis Joseph of Austria. It goes at a speed of about one floor per minute. When Mr. Raskob (he was present at the broadcasting ceremonies at the Vatican City) saw it, he remarked that the elevators in the Empire State building do about eighty floors in the time it takes the Vatican elevator to do one."

ultraviolet ray lights. On either side of this imposing structure are other buildings of recent construction, including the wireless station, the school of mosaics, the offices of St. Peter's, the railroad station, the Ethiopic college, the Church of Santa Marta and the law-courts building.

To the right of this section stands one of the world's unique airfields, especially for helicopters. The planes themselves were built by Coridino



The Pope Making His Second Radio Address, Above, and the Radio Plant in the Vatican Gardens over Which the Message Was Sent to the World

ters is an amusing one. According to the Lateran treaties of 1928 any Vatican City airplanes were not allowed to land in Rome, thus eliminating the possibility of a papal air fleet because of scarcity of land within the Vatican City large enough for an airfield. Just when it appeared that the pope would be obliged to give up all thought of aviation, Signor d'Ascanio's helicopter experiments were successful.

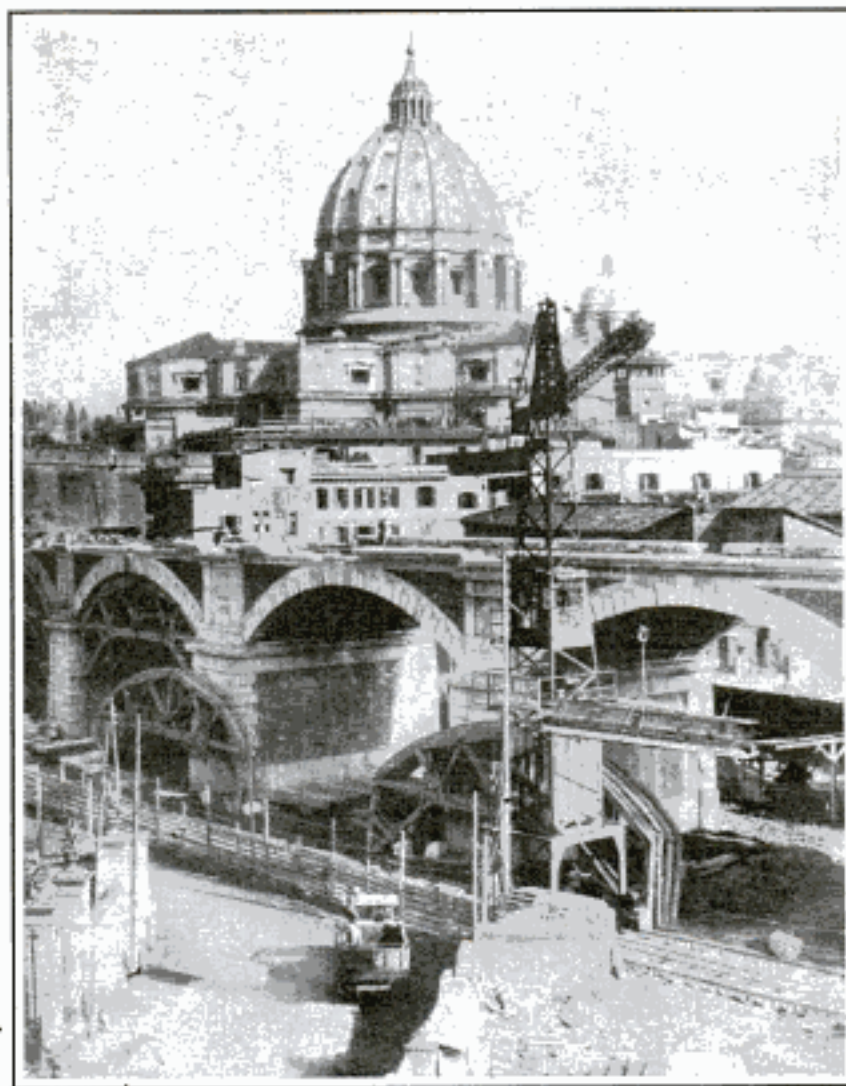
There are 975 telephones for the 632 Vatican citizens. Service to Rome is provided by thirty circuits, through an automatic switchboard, while six trunk lines permit connections with the world. The finest transatlantic radiophone service can be had.

A series of radio, land wire and submarine cable, totaling more than 4,700 miles, connects the Vatican City with the United States. The cost of a call between New York and the Vatican City

d'Ascanio, Italian rival of the Spanish inventor, Juan de la Cierva, under the supervision of Vatican engineers.

The reason the pope ordered helicop-

and submarine cable, totaling more than 4,700 miles, connects the Vatican City with the United States. The cost of a call between New York and the Vatican City



Building the Viaduct for the Railroad Link between Vatican City and the Italian Railway System; St. Peter's in Background

is \$36 for the first three minutes and \$12 for additional minutes.

Telephones are installed everywhere, even on and in the huge ball on the dome of St. Peter's. From the lowly city janitors to the high prelates, all are provided with telephones. A special feature includes a device which registers the number of the telephone making the call.

The phone placed in the pope's workroom is of solid gold with costly enamels of his coat of arms and the symbols of the four Evangelists. This telephone has a special device so that no calls may reach it—"102, Citta del Vaticano"—unless orders are given at the switchboard that they are to go through.

Transportation for many years was one of the city's major problems. During the centuries that the pontiffs remained closed up in the Vatican proper, it was bad enough—very few vehicles were allowed

to enter. With the invention of the steam engine and the automobile matters became worse. Only horse-drawn vehicles were permissible as late as 1928.

The transformation began soon after the present pope's elevation to the chair of St. Peter. On New Year's day of 1928 Pope Pius XI abolished all horse-drawn vehicles, replacing them with motor cars and motor trucks. The magnificent and historic coaches, which once formed the pride of the pontiffs, were moved to the Vatican City museum.

So pleased was the pope with the automobile that he soon announced plans for the building of a railroad viaduct from the heart of the city to the Italian state railway at Rome. Today electric trains, built along accident-proof lines, race to and fro.

Then there is the postal service of which the pope is so proud. Letters mailed to anyone in the Vatican City are delivered within a few minutes by means of a great cable system. But about half the mail received from Italy at the Vatican City post office is held for short postage. The reason is that, as the Vatican City is foreign territory, it costs as much to send a letter from a box in St. Peter's Square, Rome, only a few hundred feet, to the Papal State as it does to dispatch one to any other foreign country.

After a lapse of fifty-nine years, the Papal State has resumed its place among the stamp-issuing countries of the world. By a new process the Vatican City stamps are beyond imitation by counterfeiters. By wetting the stamp, the design will reappear on the back side in a second. If it does not reappear, the stamp is a counterfeit.

The inauguration of the Vatican City's

own coin exchange was a feat that few believed mechanically possible. How could such a tiny state issue its own coins? The cost of the equipment alone would be higher than the value of the coins. The inventive heads of the Vatican evolved, within a few weeks, a machine that turned out 10,000 commemorative sets of nine coins each within a day.

The papal observatory is the result of painstaking researches. With the modernizing of the Vatican City, Pope Pius XI had the observatory renovated according to the plans of the late Father John George Hagen, the only Vatican citizen of American origin. He died in his eighty-fourth year, the oldest astronomer in the world.

The climax of the pope's program to make the Vatican City the most scientific in the world occurred recently with the installation of the giant broadcasting station. With it the pope is able to communicate with stations as far distant as Alaska or Argentina.

In the pontiff's office there is a special microphone that will permit him, whenever he wishes, to broadcast to the world, or to carry on telephonic conversations with papal nuncios, delegates or legates thousands of miles away. Each diplomatic representative has been supplied with a ten-tube short-wave receiver designed by Marconi and his engineers for direct radio communication of instructions from the pope.

TALKING WIRE RECORDS SOUND FOR HOME OR OFFICE

Words and music may be recorded and reproduced by an instrument in which is embodied a "talking wire." A steel wire is used for recording sound which may be played back hundreds of times. In the home, the talking wire is useful for recording voices of the family and friends or to capture favorite radio programs which may be reproduced at leisure. But it is in the office

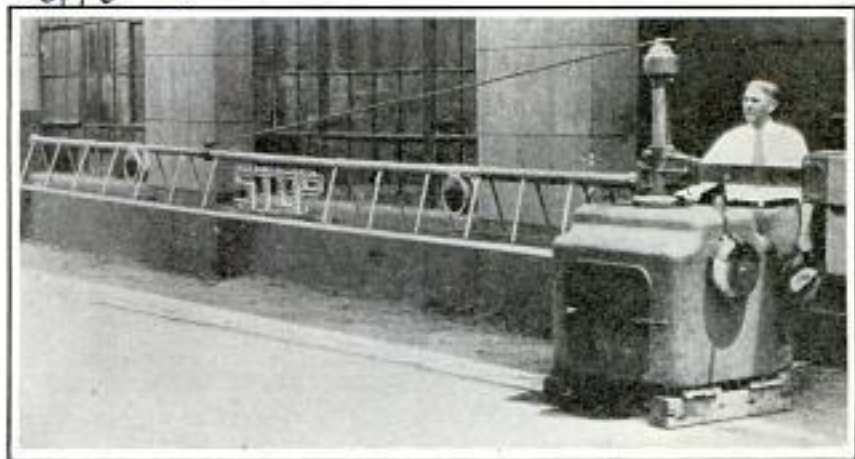
where the talking wire will be of the most benefit, since it is fast and accurate in dic-



tation. Hand-operated mouthpieces are eliminated, and the transcriber need not use clumsy earphones, merely listening to the dictation being "played back" as one would to a radio or phonograph. Words or phrases may be erased by pushing a button and the corrections inserted during the operation or later. The instrument is easily carried.

AUTOMATIC GATE STOPS AUTOS AT GRADE CROSSINGS

Grade-crossing fatalities are being reduced by an automatic railroad-crossing gate which swings into place as a train approaches. The metal gate with a large stop sign on it is operated by hydraulic power. On approaching a crossing a locomotive makes a contact on the rails which sets the hydraulic pressure in action and the gate swings shut by gravity.



Automatic Railroad Crossing Gate Which Swings into Position as a Train Approaches; It Is Operated by Hydraulic Power

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Tested by Korner Engineering Co. 2026 Santa Fe Ave. Los Angeles, Calif.

Inv. M. H. Wilson. St. Louis, Mo.

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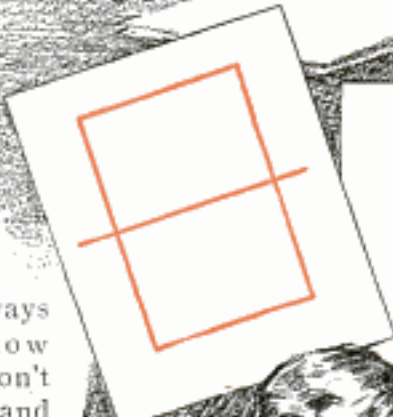
Magnograph Corp. 621 S. W. 1st St. Los Angeles, Calif.

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How



TEST NO. 1



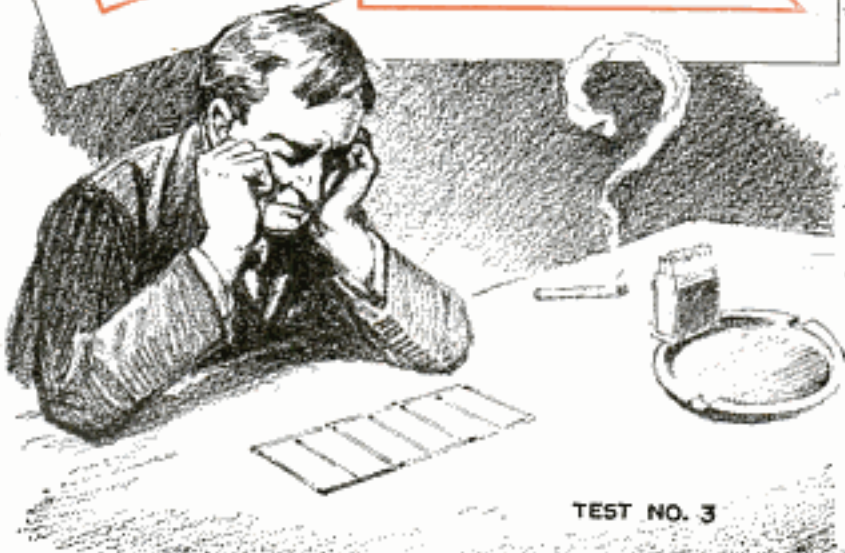
TEST NO. 2



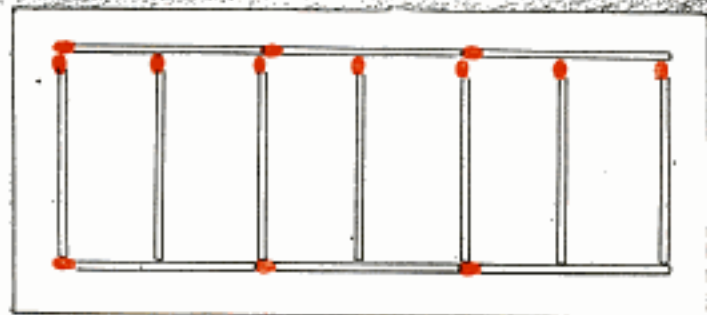
THERE are quick ways of finding out how smart you are. You don't have to wait a lifetime and then, at the end of it, figure out what were your good moves and your mistakes.

The secret of it is that tests are made on the simplest matters of knowledge that everybody has. A test of book learning is absolutely what is not wanted. The purpose is to ascertain the speed and adaptability of the brain-machine.

You may try a psychology test on yourself and give your mind a rating. Below you will find a series of tests arranged by a group of leading psychologists and psychiatrists. The tests are scored for accuracy and speed. You can take a sheet of paper to score yourself, lay your watch on the table and give yourself all the series except Nos. 4, 5 and 6, which are performance tests. A friend can easily give



TEST NO. 3



These Illustrations Will Help You Visualize the Problems When They Are Read in the Article

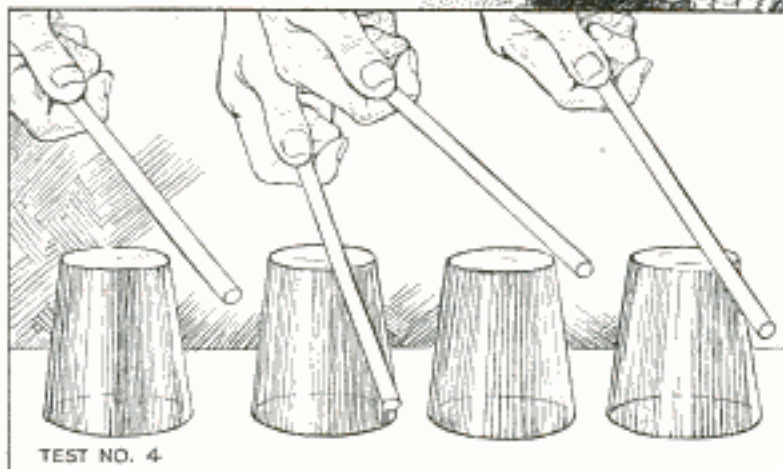
Smart are You

by A. de Ford Pitney

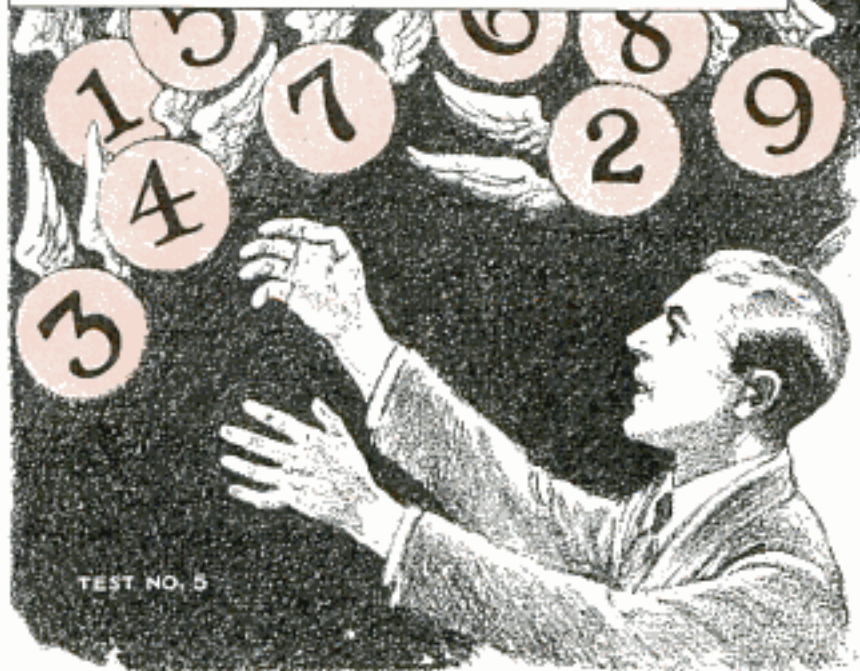
you these at any time to complete the record.

One word—don't read the tests over first and ponder them. They are supposed to be shot at you out of the air. Time yourself closely. Quick reactions are heavily rewarded, just as they are in life.

Each test must be finished



TEST NO. 4



TEST NO. 5

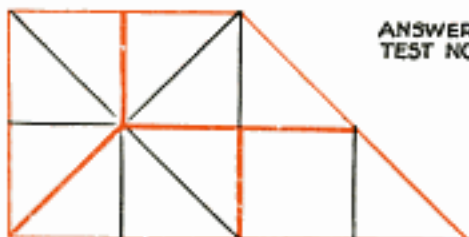
in the time given at the end.

No. 1. Go around the outline shown in the illustration with a pencil in one stroke, without lifting the pencil or going over any part of the outline twice. Score 10; time 1 minute.

No. 2. This outline is a square with the half of another square added. Divide it, without changing the outline, into four parts of exactly the same size and shape. Score 10; time 3 minutes.

Was the Manufacturer Right When He Fired the Watchman? Remember the Picture When You Take Test No. 5; It Will Help

a1449
730



ANSWER TO TEST NO. 2



ANSWER TO TEST NO. 1



ANSWER TO TEST NO. 3

No. 3. Take thirteen matches and make six dog kennels, like those shown, all the same size and shape. Now, take away one match and with twelve matches make six dog kennels again, all the same size and shape. Score 10; time 5 minutes. Increase score by 1 point for each minute under five.

The next three are performance tests of attention and memory. Somebody else will have to give them to you.

No. 4. Set four stout glasses in a row on a table. With a ruler or a short stick the person giving the test will tap the glasses rapidly (at least four taps a second) in irregular sequence, skipping about over the row. Try first four taps and stop; then five taps; then six, and so on. You will sit opposite the person giving the test, and when he stops, you are to take the stick and tap the same glasses he did in the same order. If you make a mistake you can't correct it.

Three tries are allowed after each success and you have three tries to start. If

Don't Use the Same Paper Twice; Take a Fresh Sheet for the Second Cut in Taking This Test

you make four in three tries, you have three tries to make five. If you succeed, you have three to make six, and so on. Score 10 for six; below six, no score; add 2 points to score for each one over six.

No. 5. The examiner will pronounce snappily, but not so rapidly as not to be perfectly clear and distinctly separated, numbers between one and nine in irregular order. He will begin by giving four scattered numbers, then five, then six numbers, and so on.

You will repeat back the numbers in the order given, first forward, then backward. The examiner will note separately the number of digits you can repeat forward and the number you can repeat backward. One try only is allowed. Score 10 for 6 forward and 5 backward; below that no score. Add 1 point to score for each additional number, either forward or backward.

No. 6. The examiner will fold, while you watch him, a sheet of letter paper once crosswise, again crosswise, again crosswise, again crosswise. He will then take a pair of scissors and cut off the top corner on the back of the fold, at the angle where the last two folds were made. You will tell him, before he unfolds the paper, where the holes will appear in the sheet.

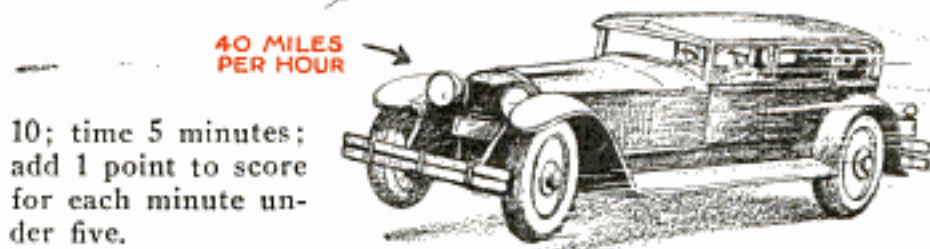
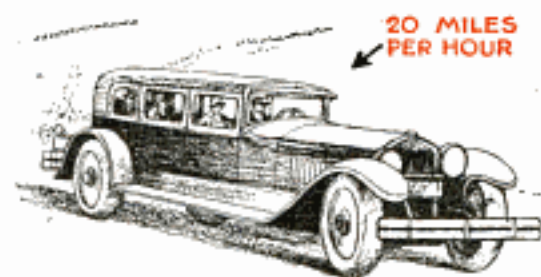
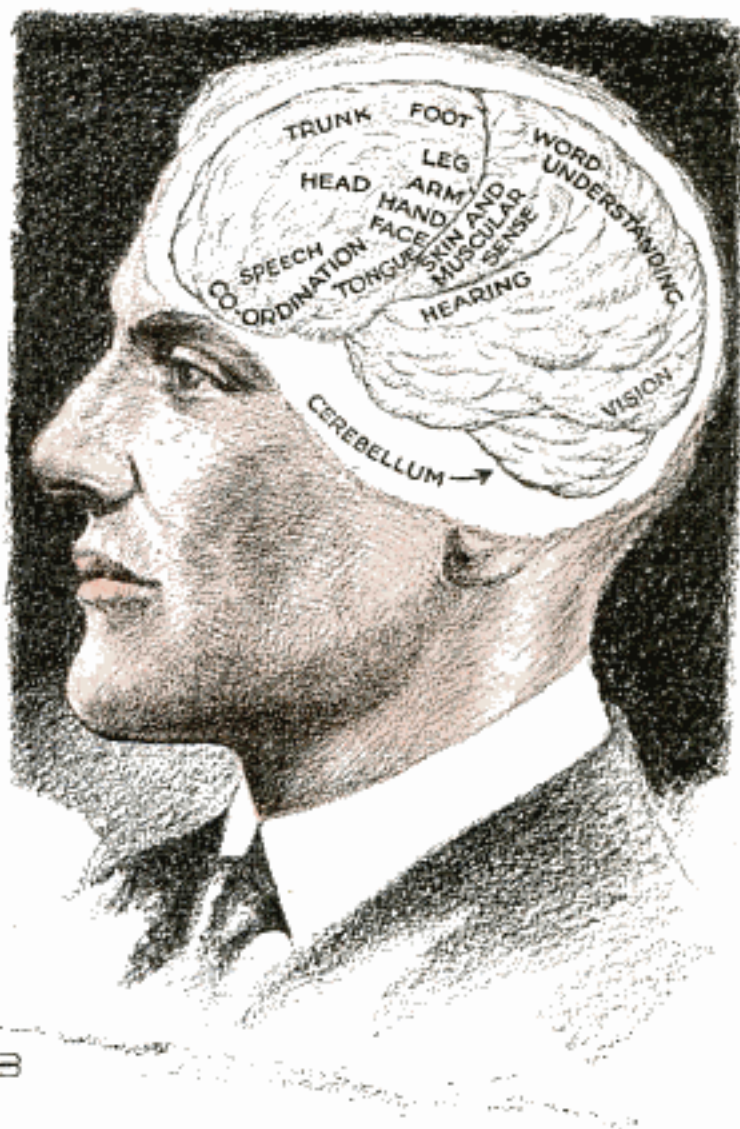
The examiner will then fold another sheet in the same way and this time cut a V-shaped notch through the back of the last fold. You will tell him, before he unfolds the sheet, in what position the holes will appear. Score 10; time 5 minutes for each question; 5 points allowed for correct answer to either question. Add 1 point

to score for each minute under 5 for either question.

The next questions estimate reasoning ability.

No. 7. A stranger goes into a clothing store and buys a suit for \$20, giving a check for \$35. The dealer has to get the check cashed by a neighbor to give the change. The customer goes away with the suit. The check is discovered to be no good. The dealer has to refund the \$35 to the man who cashed the check. The cost to the dealer of the suit was \$15. How much did he lose altogether? Score 10; time 2 minutes; no bonus.

No. 8. You have to bring exactly 6 gallons of water from a flowing stream. You have a 7-gallon can and a 4-gallon can to measure the water. Can you do it, and if so, how? Score



10; time 5 minutes; add 1 point to score for each minute under five.

No. 9. Because of heavy traffic you are able to make only 20 miles an hour on an 80-mile motor trip. But you come back at the rate of 40 miles an hour. What was your average speed? Score 10; time 5 minutes; add 1 point to score for each minute under five.

No. 10. Follow this closely. It is against the rules to repeat. Don't reread.

A midde-west manufacturer decided to make a hurried trip to New York Saturday night. He needed papers from the factory safe. The night watchman came

in, interested in what the boss was doing. When the manufacturer said he was obliged to make a business trip east, the man begged him not to go.

"Don't do it," he urged the manufacturer. "Something bad will happen. Last night I dreamed you took a railroad trip and there was a terrible calamity, a train wreck and an explosion. It was horrible. Please don't go." "Oh, shucks," said the manufacturer, "I've got to go. You are

TEST NO. 9

91449

letting your imagination run away with you. Forget it. Did you have a good time Thursday on your holiday?"

"Yes, sir. But please don't go on the train tonight. I am afraid." The manufacturer went anyhow and came home safely. When he got back he immediately discharged the watchman. Why did he do so? Was he right? Score 10; time 5 minutes; add 1 point to score for each minute under.

If you score 75 in these tests you are well up with the average thinker. The climb above 75 is a hard one. Don't read the answers until you have finished all the tests.

Here they are:

No. 7. He lost the \$15 change given the customer and \$15, the cost of the suit.

No. 8. Fill the 7-gallon can. From the 7-gallon can fill the 4-gallon can, leaving 3 gallons in the 7-gallon can. Empty the 4-gallon can. Pour the 3 gallons from the 7-gallon can into the 4-gallon can. Fill the 7-gallon can. From it fill the 4-gallon can. As it had 3 gallons in it, this will take exactly 1 gallon, leaving the required 6 gallons in the 7-gallon can.

No. 9. You traveled 4 hours out at 20 miles an hour and 2 hours back at 40 miles an hour: Total distance covered, 160 miles; time elapsed, 6 hours; average speed $26\frac{2}{3}$ miles an hour.

No. 10. The night watchman let it slip that he was asleep Friday night, dreaming and having nightmares about things happening to the boss. The employer fired him for being asleep on duty.

THIS WILL GIVE YOU ANSWER TO SPEED PROBLEM

Your brain is a double-acting machine, according to modern psychology. Your brain machine works both in analysis, which is the taking apart of ideas to get at their components, and in synthesis, which is the creation of new combinations from materials most often obtained by analysis. Here is a psychological test which will show to which side your brain inclines, analytical or synthetic? It gives an interesting glimpse of your mental machine at work. Owner of a ninety-mile-an-hour speed boat raced it against a railroad locomotive of the fastest type, tuned to eighty miles an hour. For the trial, the track was cleared 200 miles along a river. A 150-mile-an-hour airplane started at the same time to measure its speed against the boat and locomotive. The boat's performance was disappointing at first. When the locomotive had made eighty miles, the boat was ten miles behind. From then on the boat made its full speed. The airplane flew ahead of the boat five miles and then back five miles over the course until the locomotive was exactly five miles ahead of the boat. After that the plane flew back and forth above them until the boat was abreast of the locomotive, at which time the boat gave up and the race ended. How far did the plane fly? This calculation, involving so many

factors of changing distance between moving objects at different rates of speed, is a test of accurate thinking and close observation. Time yourself on this before you check up your result with the answer, and then try it on your friends and see how quickly they can do it.

THE ANSWER—A thinker of the thorough analytical type might begin by carefully calculating the different trips of the plane above the racers. This type of analytical thinking is one of the most valuable in the world, but it should be applied first to a general survey of every phase. The purely analytical thinker may get his nose too close to the problem. In this case, calculating the plane's separate trips would be a job for an Einstein, but the elapsed time gives an accurate answer instantly. The locomotive and the boat were even at 160 miles. The boat made 70 miles at first while the locomotive made 80, which was an hour's run. Then the boat made its full speed of 90 miles an hour and came even with the locomotive. Ninety plus 70 makes 160, and 80 plus 80 makes 160. That was two hours' run for the locomotive. In two hours the plane, at 150 miles an hour, flew 300 miles.

Those wishing further information on anything described in the editorial pages can obtain it by addressing Bureau of Information, Popular Mechanics Magazine, Chicago.

91738

Cont. A de Ford Pitney Geneva, Ill

TREASURE SHIP RAISED IN HUNT FOR GOLD WORTH MILLIONS ¹⁴⁶

Piece by piece and section by section, a salvage ship is bringing to the surface the twisted masses of plating that formed parts of the liner "Egypt," which went down off the coast of Spain in 1922 with gold bullion worth \$5,000,000 aboard. Divers from the "Artiglio," the salvage vessel, first descend and cut away cabin partitions and other parts of the hurricane deck which then are raised with cables. The "Egypt" went down in 400 feet of water after being rammed by a French cargo steamer. For years plans have been made to recover the fortune in gold.

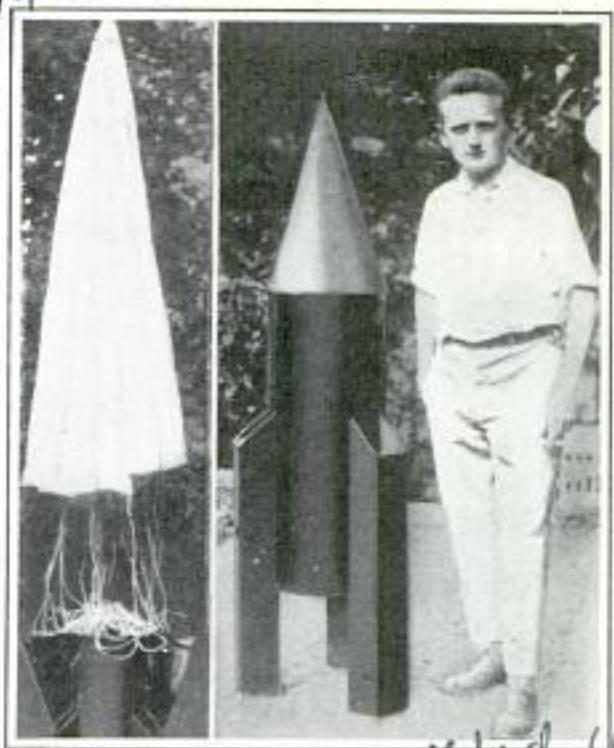
ROBOT PILOT GUIDES AIRPLANE BETTER THAN HUMAN ONE ^{a1686}

Blind flying through fog, the greatest obstacle to safety in the air, is believed to have been greatly discounted as the result of the completion of a mechanical pilot, recently demonstrated in California. In flights above the Alameda airport, the device not only controlled the plane better than its human occupants could, but it took the ship out of tail spins, put the plane through perfect turns, and controlled speed, altitude and landing glides.



"Robot Pilot" Which Operated Plane Better than Human Could in a Recent Demonstration

Inv. George V. Beeson, San Luis Obispo, Calif.



Rocket Motor and Its Inventor on Right, and at Left, How the Parachute Saves It from Damage

PARACHUTE ON ROCKET MOTOR PROVIDES EASY LANDING ^{Belz}

Landing without damage to his rocket motor is provided by Wilhelm Belz in a parachute which opens mechanically when the rocket reaches its greatest height. Belz, who invented the rocket, starts and releases the motor, which mounts high into the sky, then lands gently with the aid of the parachute.

WORK WITH FROZEN CONCRETE SPEEDS WINTER BUILDING ^{a1669}

Winter building operations in Russia are being made possible by one contractor's use of frozen concrete. The work is done in the open air during severe winter weather to force the concrete to freeze before setting. All forms into which this concrete has been poured are protected until spring. As the process of thawing starts, the frozen concrete must be moistened carefully to bring about correct setting of the forms. Although this method ties up the form work for a considerable time, this objection is slight in comparison with the advantages of getting concrete placed during the winter.

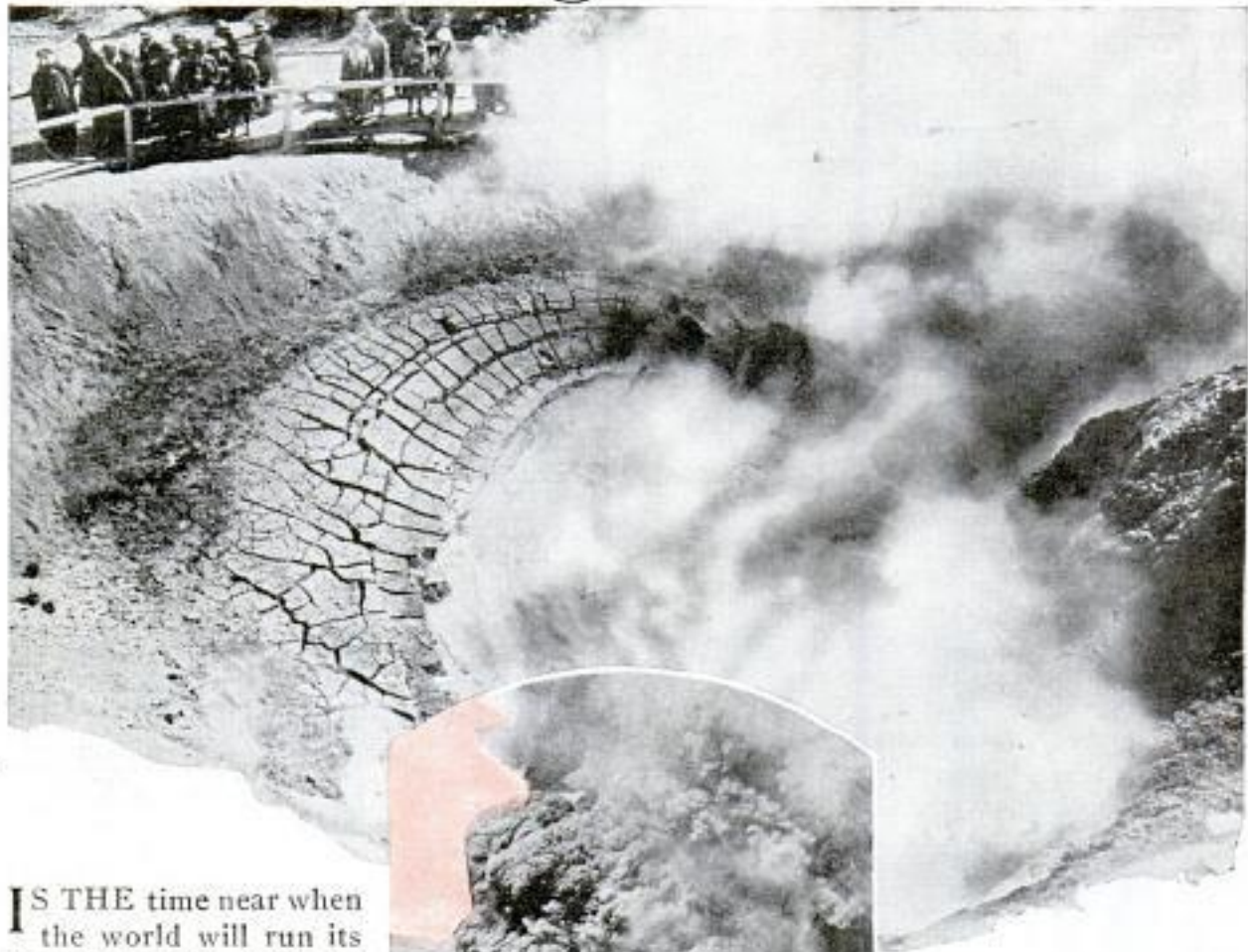
There were 13,500,000 radio sets in use in the United States at the end of 1930.

article by A. M. Esenberg engineer, Charkov, U.S.S.R. Copyright material

Wide World
Bernman
Engineering News Record 8/6/31

a 1830 Cont. J. N. Miller,
Park Central Hotel
Washington, D.C.

Harnessing the Earth's



IS THE time near when the world will run its factories and mills by harnessing the terrific heat that lies buried within the earth, and occasionally manifests itself in the form of volcanoes, geysers and hot springs?

Yes, says Sir Charles A. Parsons, distinguished British engineer. Probably the gigantic feat will be accomplished during the next century, he believes.

Sir Charles has just proposed that science try to sink an experimental shaft twelve miles down, an accomplishment that, he says, probably would take eighty-five years and cost more than twenty-



Crater of a Mud Volcano in Yellowstone Park, and Eruption of Hawaiian Volcano

ty-five million dollars. Just to prove the idea is not as fantastic as it may sound, a commercial concern has succeeded in harnessing steam taken from the earth, some 300 feet below the surface, in the region of Steamboat Springs, Calif. The steam furnishes power to run all the engines in an entire factory.

What's the deepest man has ever been able to penetrate into the earth's mysterious interior? About 10,000 feet, or nearly two miles, according to the geological

Terrific Heat

survey, in the oil region of Bakersfield, Calif.

Some scientists insist that the dead line, or limit to which man could travel in person into the earth, is only about three miles, unless some effective way could be found to counteract the terrific heat, estimated at between 600 and 1,000 degrees Fahrenheit. However, already science has gone far in its development of a brand-new refrigeration system which sends cool air a mile and a half down by means of a vast network of pipe systems. This has been tested with pronounced success in the Steamboat Springs project.

How would you go about digging a twelve-mile hole into the earth? Fortunately oil interests have paved the way with their especially devised new oil drills which are approximately eight inches in diameter and are sent down by a cable with a bit attached to the end. Such a system might be utilized, though of course on a substantially larger scale, along with the new refrigeration method.

Aside from the mighty source of power gained by harnessing the earth's heat, what might science learn from digging a twelve-mile shaft such as Sir Charles proposes? Certainly a very great deal, for science knows far less about what's underneath the earth's cover than what's



Photos Copyright, J. E. Harnes
Giant Geysers Evidence the Mysterious Forces That
Enable Tourists to Cook Meals in Natural Ovens

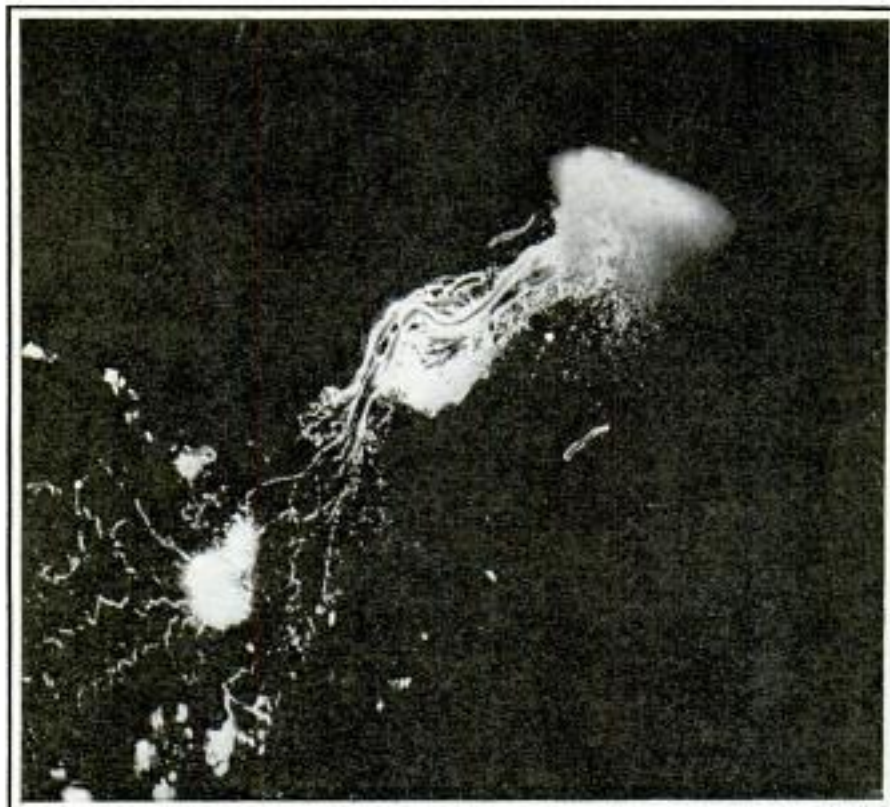
in the heavens and underneath the seas.

However, according to Dr. William Bowie, of the geodetic survey, these facts are pretty well agreed upon:

The earth is like a solid rubber ball

which will yield and change its shape to mighty forces that are exerted upon it. The earth is a globe almost spherical, approximately 8,000 miles in diameter.

a-1330



Hotter than Human Imagination Can Realize Is This Lava Fountain Photographed at Night; Exploring the Middle of the Earth by Gravity, at Right

It has been found by engineers, working in different countries, that the outer portion of the earth, to a depth of approximately sixty miles, is composed of solid rock. This rock will break when forces are acting upon it for a long time, provided the forces are of sufficient strength.

The interior of the earth, on the other hand, has been found to be composed of material that will yield like plastic matter to forces that are acting upon it for long periods of time, say tens, hundreds or thousands of years.

This interior material behaves like an elastic structure when forces are acting on it for only a short time. Such forces are the tremors that go out from an earthquake, and the tide-producing forces of the sun and the moon which change phase several times a day.

The outer shell, frequently called the earth's crust, rests on the interior material very much as a raft formed of logs rests upon a body of water. In other words, the tremendous weight of huge blocks of rock upon each other maintains a more or less constant equilibrium.

No one has accounted adequately for

the cause of the many geysers and hot springs. Both are believed to be evidences of minor volcanic activity, since they result only after powerful eruptions have ceased. As for hot springs, the heat of the water is believed to have its origin in subterranean lava.

Experts say lava is a molten mass of rock in which certain minerals, due to the tre-



mendous heat deep down in the earth, have dissolved in other minerals. Lava never attains the exact fluid stage of water, but tends always to be rather stiff, taking solid form when it cools.

Many lavas contain large amounts of water vapor. A striking illustration of this lies in the fact that volcanic eruptions often are accompanied by the condensation of escaping steam which hurls bits of lava to heights of seventeen miles. Dust and ashes from volcanoes have been carried several times around the earth.

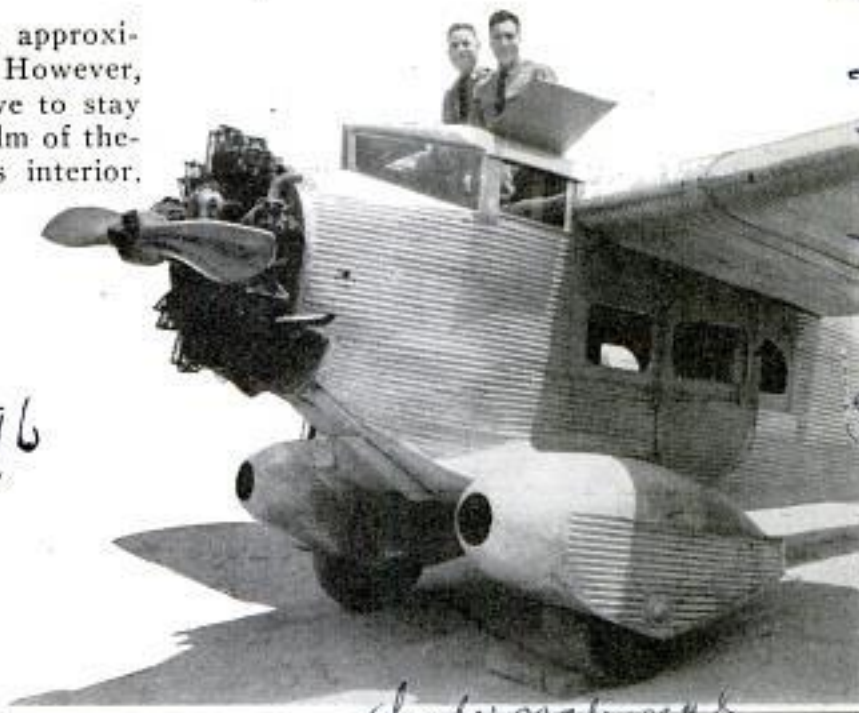
Government experts are able to weigh

U.S. Dept of Agriculture 91687

huge blocks of the earth approximately 100 miles square. However, science admits it will have to stay pretty well within the realm of theory regarding the earth's interior, until it finds the necessary capital with which to try out the plan of Sir Charles Parsons.

CHANGE OF COMBS BETTERS FLAVOR OF HONEY 9196

Variance in the color and flavor of honey stored by bees from different flower sources is quite marked, and beekeepers can separate these kinds by changing combs at the right time. If the bees filled one comb before starting another, the honeys could be sorted easily, but many combs are only partly filled, when the source of supply from one flower ceases and the bees begin storing from another. Then the honey can be separated by removing all combs before the bees begin on the new blooms.



All Metal Plane, Much Lighter than Most of Type, Capable of Carrying Heavier Load; Mexican Army Officials Put It through Its Paces

METAL PLANE THAT'S LIGHTER LIFTS A HEAVY LOAD

Construction of an all-metal monoplane that is from 700 to 1,500 pounds lighter than contemporaries carrying the same load, is announced by an airplane designer in California. Officers of the Mexican army recently put the plane through an official inspection, and as soon as final tests have been completed, a series of transcontinental flights are planned.

FLOUR MADE OUT OF SEAWEED AND BAKED INTO BREAD 91704

Bread made from seaweed is the accomplishment of California bakers. A huge dehydrator has been installed at San Pedro and the kelp is heated to 1,200 degrees, coming out of the vats as flour. One baker declares the innovation is exceedingly popular with his customers.



Dehydrating Plant That Turns Seaweed, or Kelp, into the Finest Flour at Temperature of 1,200 Degrees

Philipp A. Park, Inc. 608 N Dearborn Chicago

AQUARIUM FOR NATIVE FISH 91807

Plans for the new department of commerce building in Washington incorporate space for a large aquarium in the basement where native fish are to be displayed. There will be twenty-four large tanks from six to twelve feet deep and three small floor tanks, all supplied with fresh water from a refrigerating system which will make it possible to exhibit fish found only in the coldest streams. About 2,500 fish are to be obtained from inland streams of the northwest, the Great Lakes, and from Maine to Florida. Blackfish will be brought from Alaska, and a mudcat from the Mississippi.

Carl Everett Spring 1929 2 Capitol Hill Washington D.C.

U.S. Weekly 8/28/21

Crawford motor (Crawford plane) Seal Beach Calif Harvey Crawford

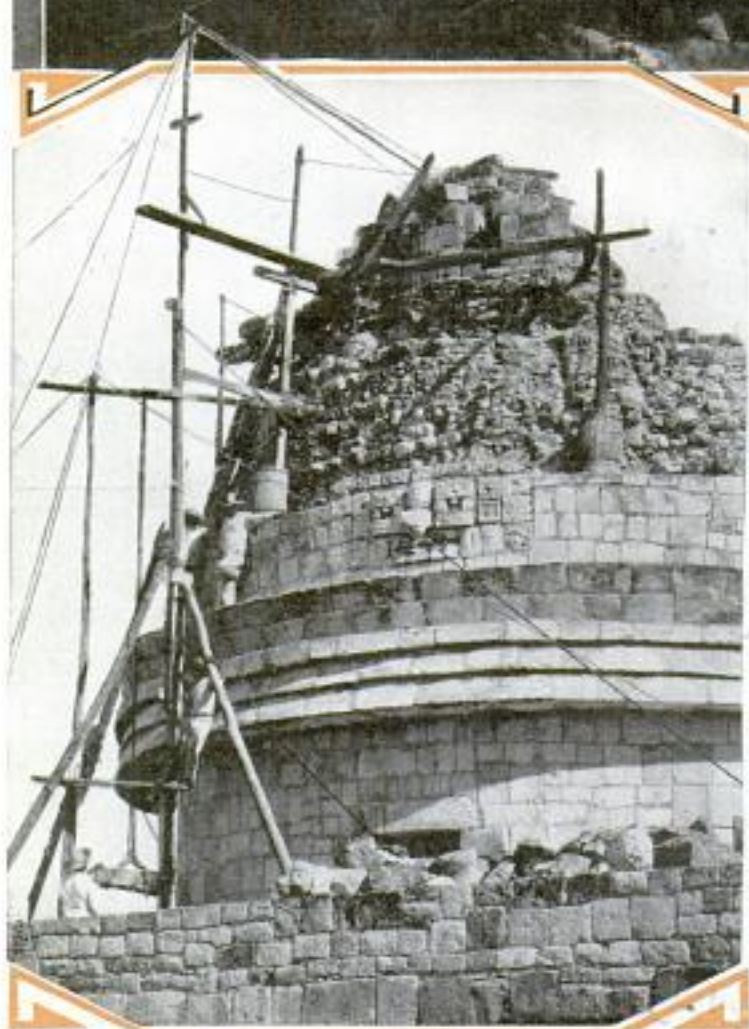
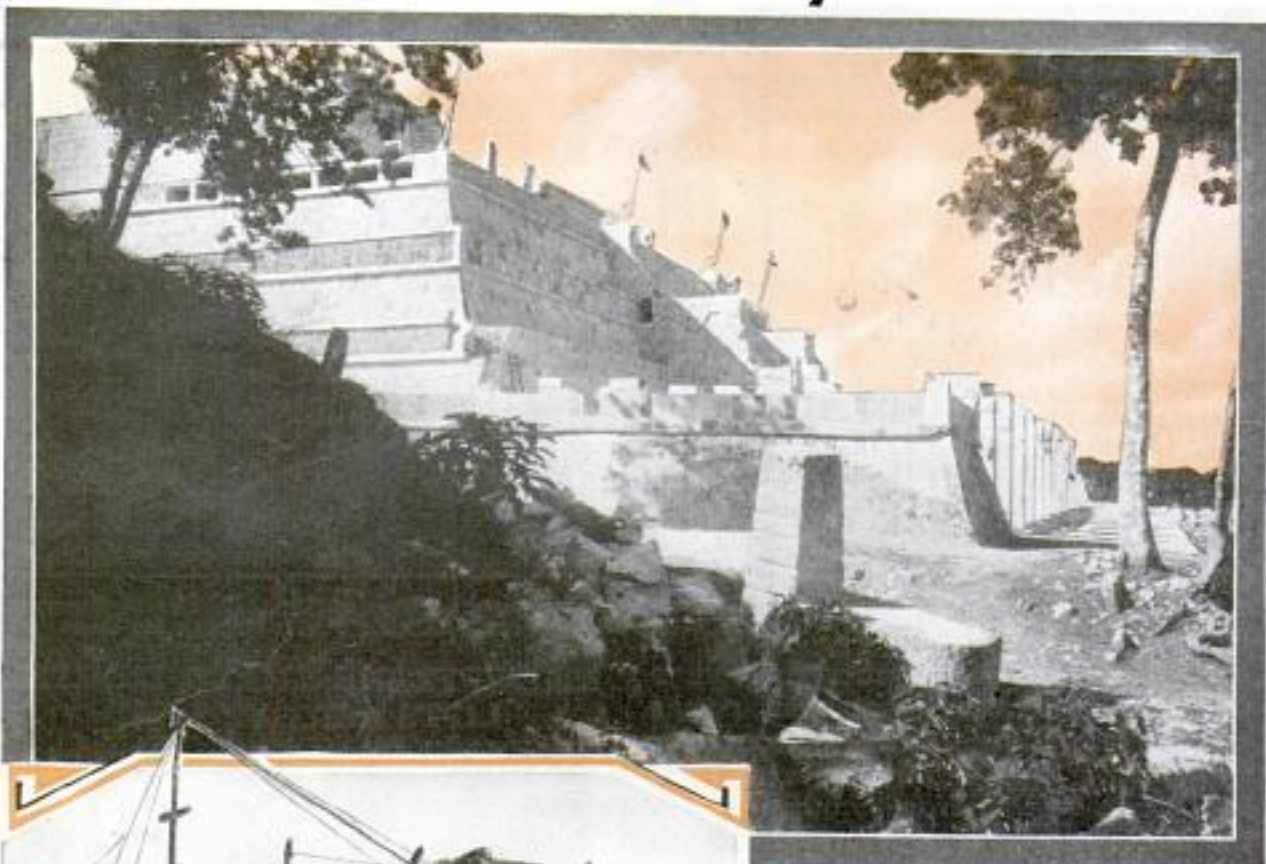
at sea kelp plant

wid world

and at head of...

a1525 Copy George W. Leary
Sparkill, NY

MAYAN Mysteries



Magnificence Torn from the Jungle's Grasp; the Maya Temple of the Warriors; at Left, Repairing the Ancient Observatory

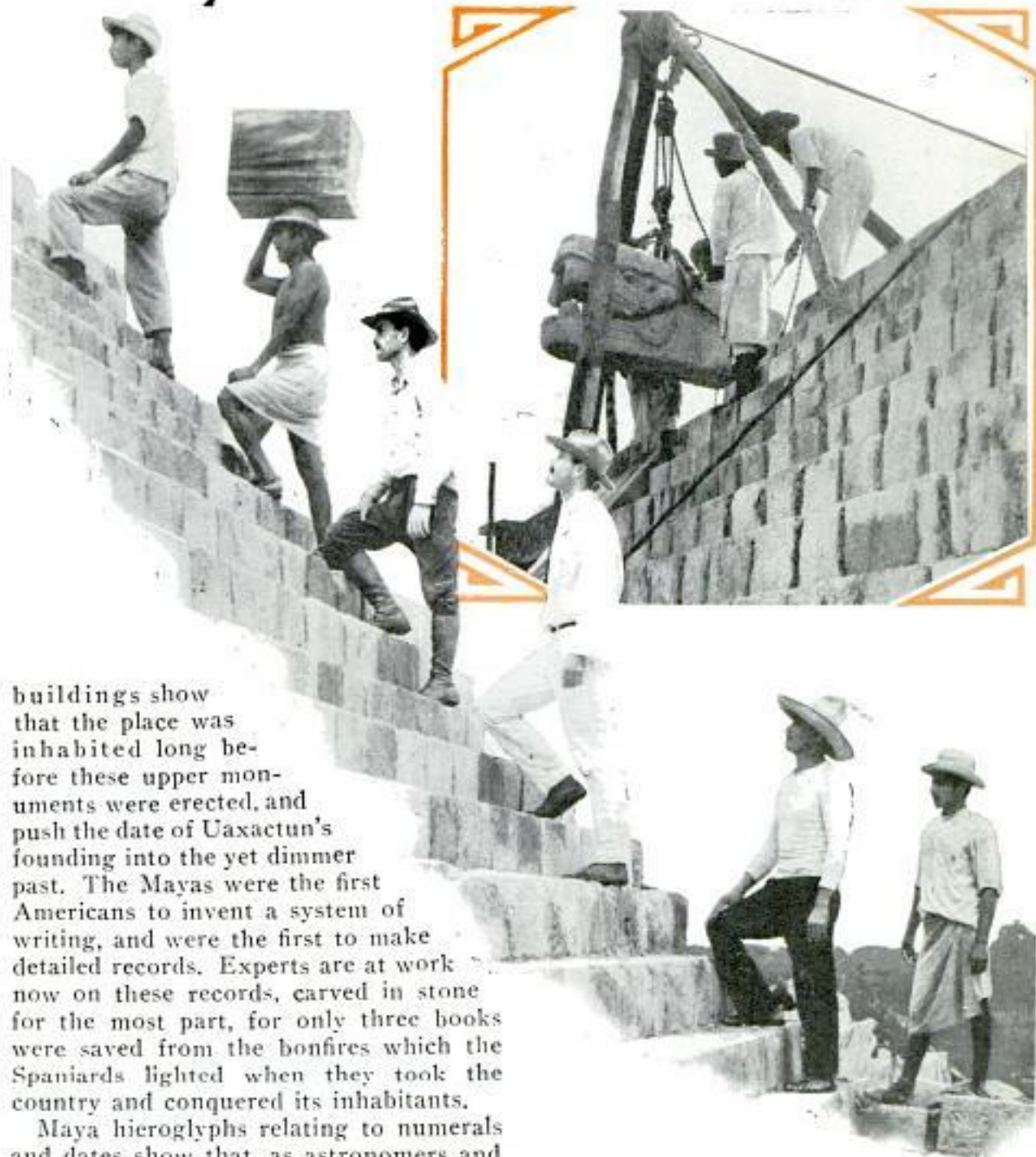
RECENT digging in Uaxactun, that oldest of all Maya cities, reveals buried structures at levels below that of the great white pyramid and other surface buildings, and points to a much older date for this settlement than the inscriptions show.

Dr. S. G. Morley, the American archaeologist who discovered the ruined city in the thick Guatemala jungle and gave it its name, which means "Eighth Stone," found one monument here with a Maya date carved in hieroglyphs which he reads as equivalent to 68 A. D. It is the oldest dated monument ever to be found in the western hemisphere, and this now abandoned city is our oldest dated settlement.

But Uaxactun must be far older than that monument. The remains beneath the level of the

Photos Courtesy Carnegie Institution

Defy Modern World



buildings show that the place was inhabited long before these upper monuments were erected, and push the date of Uaxactun's founding into the yet dimmer past. The Mayas were the first Americans to invent a system of writing, and were the first to make detailed records. Experts are at work now on these records, carved in stone for the most part, for only three books were saved from the bonfires which the Spaniards lighted when they took the country and conquered its inhabitants.

Maya hieroglyphs relating to numerals and dates show that, as astronomers and mathematicians, they were far ahead of those of Europe and Asia.

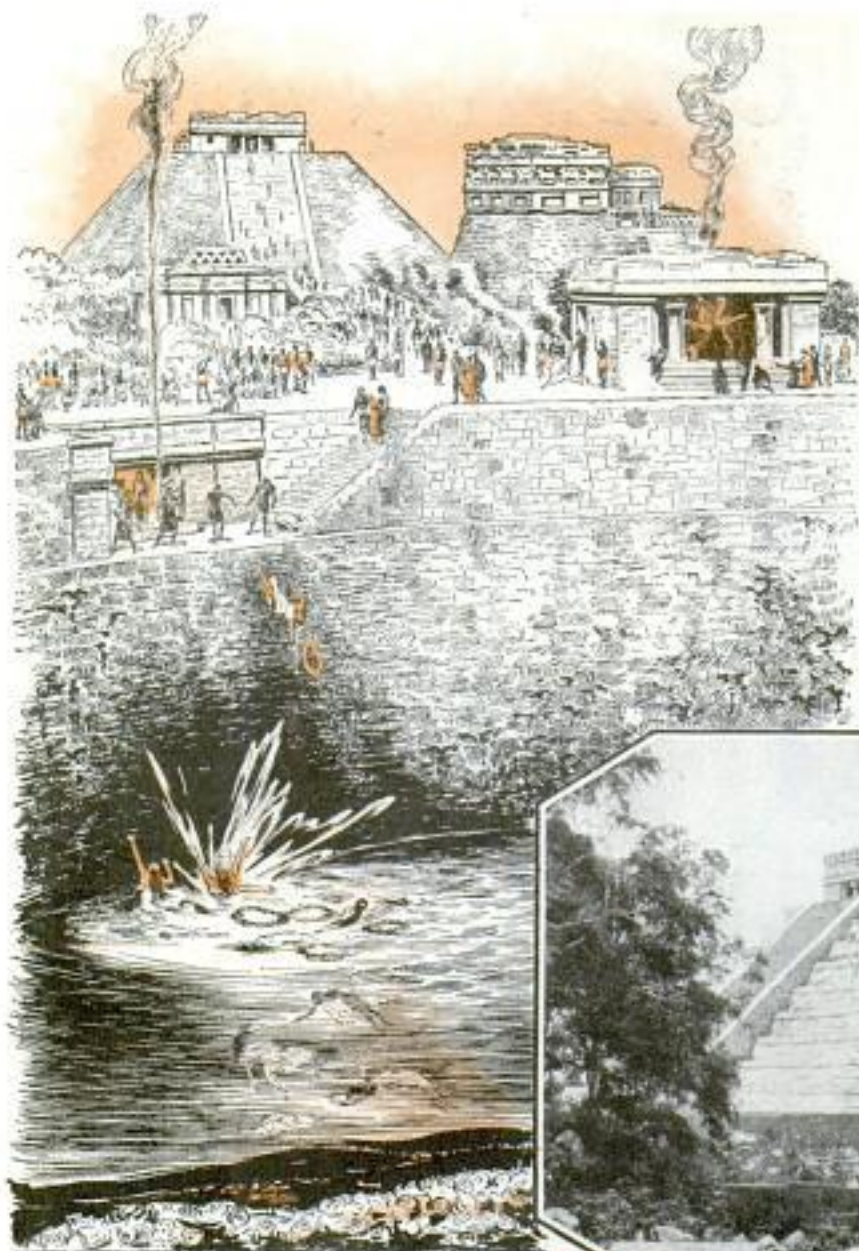
Thus, the Mayas invented the zero and had been using the idea in their computations a thousand years before the zero we use was invented by thinkers in India, later to be brought by Arabs to Europe.

The convenient decimal system of arithmetic, which we use as a matter of course in our everyday figuring, was unknown to

Steep Stairway to Maya "Heaven." Entrance to Temple of Warriors; Top, Replacing Serpent's Head

Julius Cæsar and to all Europe for hundreds of years after him. But over here, in the hot American tropics, there were Maya wise men who could multiply, divide, and do all manner of computations far in advance of the mathematical skill of any other people in the world.

Their main use of this ability, so far as



Artist's Conception of the Ceremonies at the Sacred Well of Chichen-Itza; Maidens Were Hurlled into Its 160-Foot Depths as Sacrifices to the Rain God in Times of Drouth

we can learn from the evidence that remains, was in astronomical calculation. The Maya religion seems closely woven with time, and the exact reckoning of the year appears to have been of the utmost importance.

There is a great towering circular structure in Yucatan, in the ancient city of Chichen-Itza, believed to be the remains of a Maya astronomical observatory. It is the finest building of its kind yet discovered in the Maya country, and may be thought of as the great central observatory of the nation. Until recently, this antique hall of science was nothing but a huge pile of tumbled stones, but, thanks

to the work of the Carnegie Institution, its walls have been picked up and replaced, and it is now in a fair state of repair.

You can crawl up the narrow corkscrew stone stairs in the upper section of this massive tower, and find yourself in a tiny room. On two sides, the stones have fallen away and been lost, but on the other the walls still stand, and here you look out through three square holes in the solid masonry.

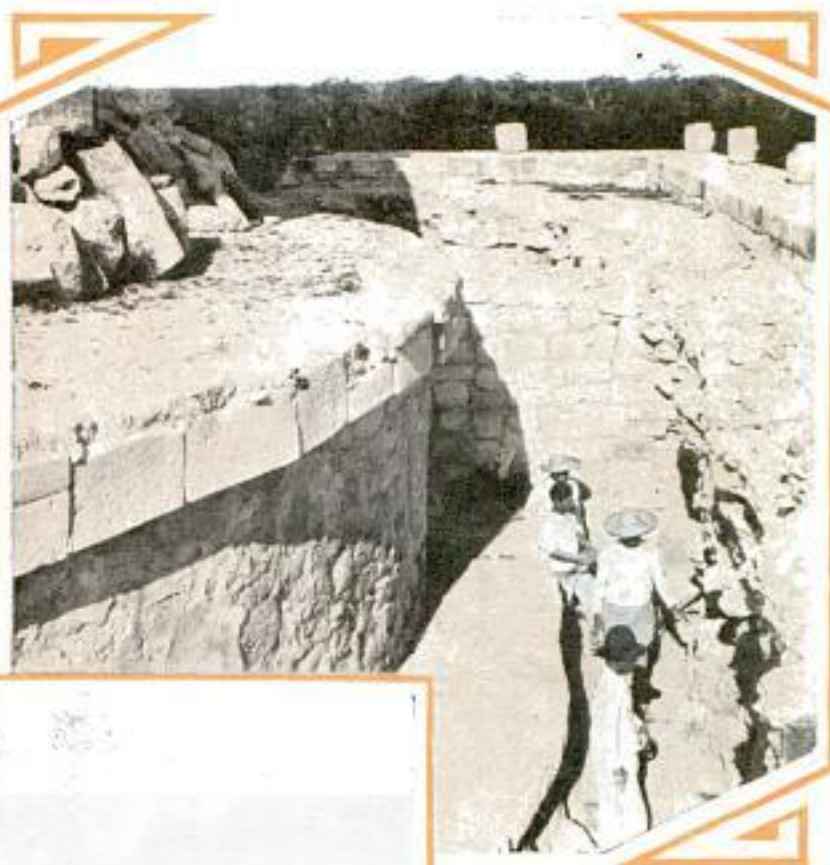
You can see over the tops of the jungle to the



Airview of the Sacred Well as It Looks Today; Mighty Architecture of the Jungle Folk, Center

far distant horizon, and imagine the keen-eyed astronomer who kept his vigil here in lonely hours, watching the setting of celestial bodies. It has been found that on March 21, the spring equinox, the sun sets in the exact center of the line of sight through the western hole. There is reason to believe that there were similar lookouts in the other walls, and that this upper chamber was indeed the "observers' room."

Certainly the Maya astronomers attained an



Uncovering the Astronomical Observatory at Chichen-Itza, Above, and How the Walls Were Dug from the Bush and Rebuilt, Below

paving a curiously uniform pattern of stones. They are built in a circular form and are believed to be the base of a sundial used by the native astronomers in their measurement of the hours. The pointer of the dial has not been found.

Nor have any astronomical instruments been discovered in the Maya country, but pictures and sculptures show the method of sighting through a notch and along a point like a gun-sight. A sculptured altar

accuracy in their calendar which was far ahead of any other calendar at the time. Thus, when Columbus sailed on his first voyage of discovery, the European calendar was several days behind the true calendar as measured by the earth's journey around the sun—so much, indeed, that Christmas was slipping into fall and summer was lagging into spring.

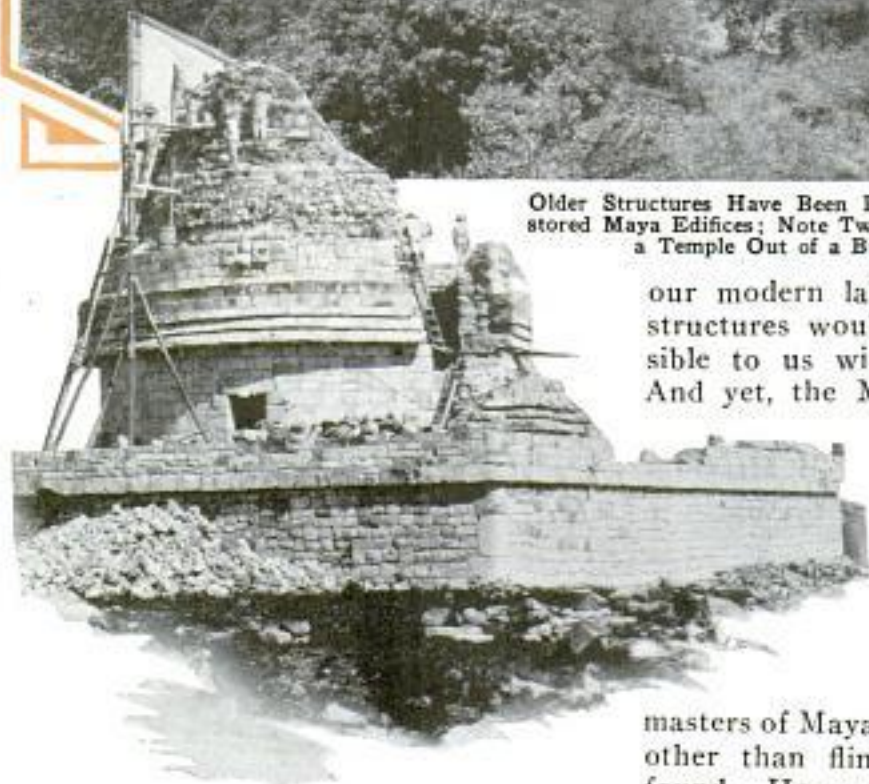
On the platform terrace on which the observatory tower stands, there is in the

has been found in the old city of Copan showing a number of seated figures that hold sextant-like objects in their hands; and this has been accepted by some archaeologists as picturing a conference of astronomers. It is possible that instruments like our ship sextants were made of wood which long ago crumbled into dust.

Another scientific mystery is the engineering skill of the Mayas. Some of the stones used in their buildings are of im-



Older Structures Have Been Discovered Beneath Previously Restored Maya Edifices; Note Two Levels in Photo Above; Digging a Temple Out of a Bush-Covered Hill, at Left



our modern labor. The repair of these structures would seem well-nigh impossible to us without the aid of wheels. And yet, the Mayas got along wonderfully. How? Yucatan limestone is of an amazing hardness. Some of the carved serpent heads that have been lying in the sun and rain for a thousand years still preserve the sculpture that was engraved by the old masters of Mayan art. No sculptor's tools other than flint implements have been found. How were these deep and accurate carvings made?

mense size. Thus, the heads of the feathered serpents that guard the portals of the Tiger Temple in Chichen-Itza are each carved out of a single block which weighs many tons. How the Maya builders were able to raise these huge weights to the top of the temple pyramid, is a riddle.

To see the workers of the Carnegie Institution in Chichen-Itza tugging with a pulley and rope to restore some fallen block to its place in an upper temple, is to realize how indispensable is the wheel in

The Carnegie Institution diggers have recently completed the unearthing of a magnificent temple from a forest-covered mound. In the pyramid or base of this Temple of the Warriors, they discovered the remnants of a buried temple of much older date. Excavating in the floor of this buried temple, they came upon a hidden jar containing a plaque or disk made of 2,500 pieces of turquoise fitted together to form a decorative pattern. It is by far the most beautiful and delicate piece of

A 1720 Isebrüder Sulzer,
Winterthur, Switzerland 743

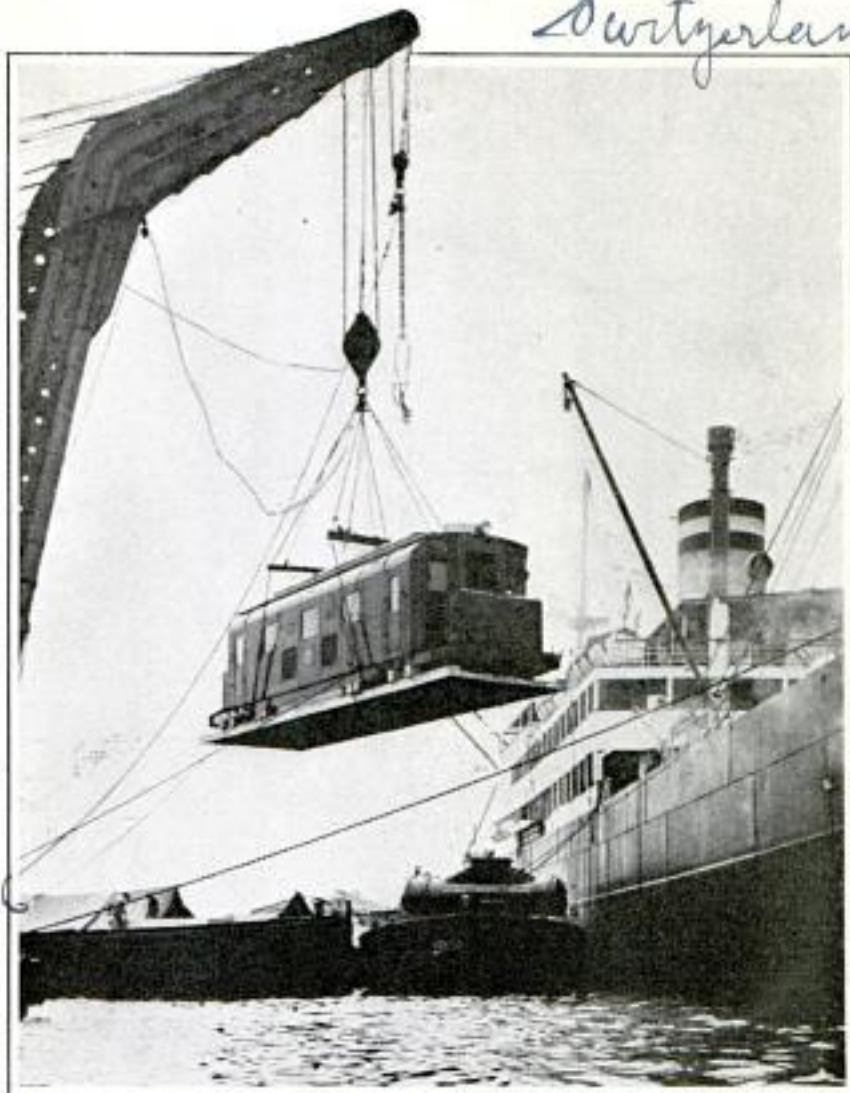
craftsmanship yet found in the Maya country; and it is also the poser of another riddle.

For it makes us ask where this turquoise came from. There are no turquoise deposits known nearer than New Mexico. Were these blue jewels mined there, carried some hundreds of miles through the jungle to the holy city of the Maya?

There are other objects in Maya land whose presence there it is difficult to explain. Some time ago E. H. Thompson, an American archaeologist, found in the Sacred Well at Chichen-Itza, a number of carved pieces of jade. Where did the jade come from?

9172
DIVING BELL WITH CRAB CLAW HELPS HUNT TREASURE

Steel arms, worked from the inside, will help hunt sunken treasure from a deep sea diving bell just constructed. The bell, made of steel and glass, has oxygen tanks, controls for the compressed-air tanks and for two interchangeable arms which extend in front for handling the treasure or for doing other work.

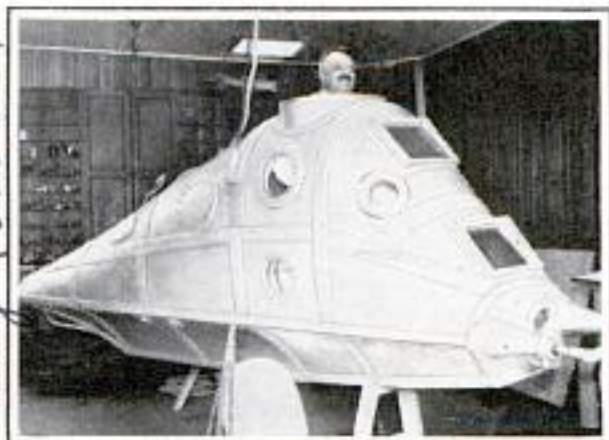


Huge Crane Picks Up a Diesel Locomotive Bodily, Swings It High in the Air and Loads It into Ship's Hold, Bound for the Far East

DIESEL LOCOMOTIVES ARE SENT BY SHIP TO FAR EAST

Dock workers at Genoa recently were startled to see a powerful crane lift bodily a huge Diesel locomotive and swing it into the hold of a steamship anchored in the harbor. It was the sign of further railway progress in the Far East, where it was ordered by the South Manchurian railways for regular freight traffic. The locomotive is equipped with a 750-horsepower four-stroke Diesel engine with two double-axle driving bogies. It is built for standard-gauge track, and at a speed of slightly more than fifteen miles an hour on the level, the engine can haul forty cars of forty-five tons' capacity each.

□ The project of pumping dry the Zuider Zee will be completed in 1952, according to present plans.



Unique Diving Bell, Fitted with Steel Arms, Which Will Search Sea's Bottom for Treasure

Dr. W. Emil Kulik, no record as of.
Brooklyn, N.Y.

also by Cmdr. Joseph S. Edgerton
c/o Evening Star, Washington

ADRIFT ^{for} Five Days



Flotation Gear Inflated. Above: the Flyer and His Rubber Boat; Note Patches near His Knee

THE story of a naval aviator, forced down in the Pacific ocean, who drifted five days in a little rubber life raft, fighting sharks and dolphin and endangered by a tropical sun that melted the rubber of his cockleshell, will enter navy records as one of the most stirring epics of the men who go down to the sea in airplanes.

For five days he drifted helplessly after his plane had gone down, bearing up under the blow of watching one steamer pass him, unseeing, at close range and a

Flyer Battles Waves and Sharks Under Sun So Hot It Burns Holes in His Frail Craft

flying boat passing overhead, before he finally was picked up by a steamship. During this time, 135 naval vessels and 200 planes were making an intensive search for him.

For five days he was without food, and obtained water by catching it in a silk scarf and permitting the tiny trickle to drip into a canteen top.

Chief aviation pilot Verne W. Harshman, one of the pilots of a navy Curtiss "Hawk" fighter squadron protecting observation planes which were spotting battleship gunfire on a cloudy morning, had been in the air about two hours when the squadron started through a cloud bank.

"We had just got well into a cloud," Harshman said, "when my auxiliary tank of gasoline ran out, the motor cut out and I lost sight of the rest of the squadron.

"I switched to the main tank, and climbed through the clouds, but I did not see anyone."

Coming out beneath the clouds, with only the vacant sea below and the gray

in a Rubber Boat

sky around, Harshman circled, straining his eyes for boats or planes which were not there. He made three careful scouting circuits, but his gasoline supply was getting low, and he made up his mind to land in the open sea while he had power enough to prevent a dead stick landing. He made a good landing and did not hurt the plane or himself. He inflated the flotation gear, compressed air filling two large bags on each side of the fuselage.

He prepared his rubber boat and supplies and, about fourteen hours after his landing, the plane sank, casting him completely adrift.

"Wednesday," Harshman reported, "sharks started bothering me, but I managed to keep them away from the boat by using my oar like a spear and hitting them with it. The spotted dolphin seemed to take a delight in rubbing their sides against the bottom of my boat.

"When the sun came out Friday, it was very hot. I had to pour water on my boat to keep it cool. About noon, I heard a hissing sound and discovered a leak in the forward air chamber. I finally managed to get the leak patched, but had a lively time preparing the rubber to receive this patch while holding the air in at the same time.



The Three Views from Top to Bottom Show How a Rubber Lifeboat Is Unfolded from Its Storage Space in the Naval Seaplane, Inflated with Air and Launched

Described by J. H. Eschsch V. P. Cornel Engine Co



Harshman Floated Five Days, Fighting Sun and Sharks, and Drinking Only Water He Could Catch with His Silk Scarf When It Rained

I found if the sun hit the cement it would melt. I kept the spot wet and covered with a signal flag.

"About 8:30 Saturday night, I sighted the masthead light of a ship. She came fairly close, and when she got to a point I thought the closest, I fired my two remaining Very stars, but these were unnoticed.

"Sunday, the weather cleared. I sighted a plane about 8:00 a. m. He was flying low and too far away to see me. About 12:15 I sighted a ship and began rowing so as to place myself directly ahead of it. As the ship came closer, I waved my red flag. When I was certain they saw me, I took a good big drink of water from my canteen. I was picked up at 12:30 p. m. by the S. S. 'Cerigo' of the Hamburg American line, Capt. Karl Manitius commanding."

Harshman was fed, put to bed, and landed at Buenaventura, Colombia, reporting from there to the naval air station Coco Solo, C. Z.

FLUID SEALED IN PLANE MOTOR MAY ELIMINATE RADIATOR

Aviation engineers have found that they may be able to fill the radiator of an airplane motor and seal the top, never to be faced again with engine-cooling troubles. This, in effect, has been done by research engineers experimenting with a liquid-cooled engine which has no radia-

tor in the ordinary sense of the term. The agent used is ethylene glycol which boils at 385 degrees Fahrenheit, instead of 212 degrees, as water does. Having a higher specific heat, it conducts heat away from the cylinders faster than water. It flows around the cylinders, but instead of passing through coils and fins, it circulates within itself, the hot fluid rising and the cool falling, giving off through the engine casing and external fins the heat absorbed from the walls

With the new medium it will be possible for engineers to build an engine with a radiator only half as large as one that is water-cooled.

FLUSHER FOR AUTO RADIATORS REMOVES RUST AND SCALE

Rust and scale can be removed from automobile radiators with the aid of an automatic flusher for use in garages. This unit consists of a portable tank containing water and a chemical compound, the solution being forced into the cooling system through a heavy hose attached to an electrically driven centrifugal pump. A second hose returns the liquid from the radiator to the tank. In it is a glass tube which enables the operator to observe the condition of the return water.



Automatic Flusher Containing Chemical Compound Which Removes Rust from Auto Radiators

The Marquette Mfg Co 218 N Wabasha St. St. Paul, Minn

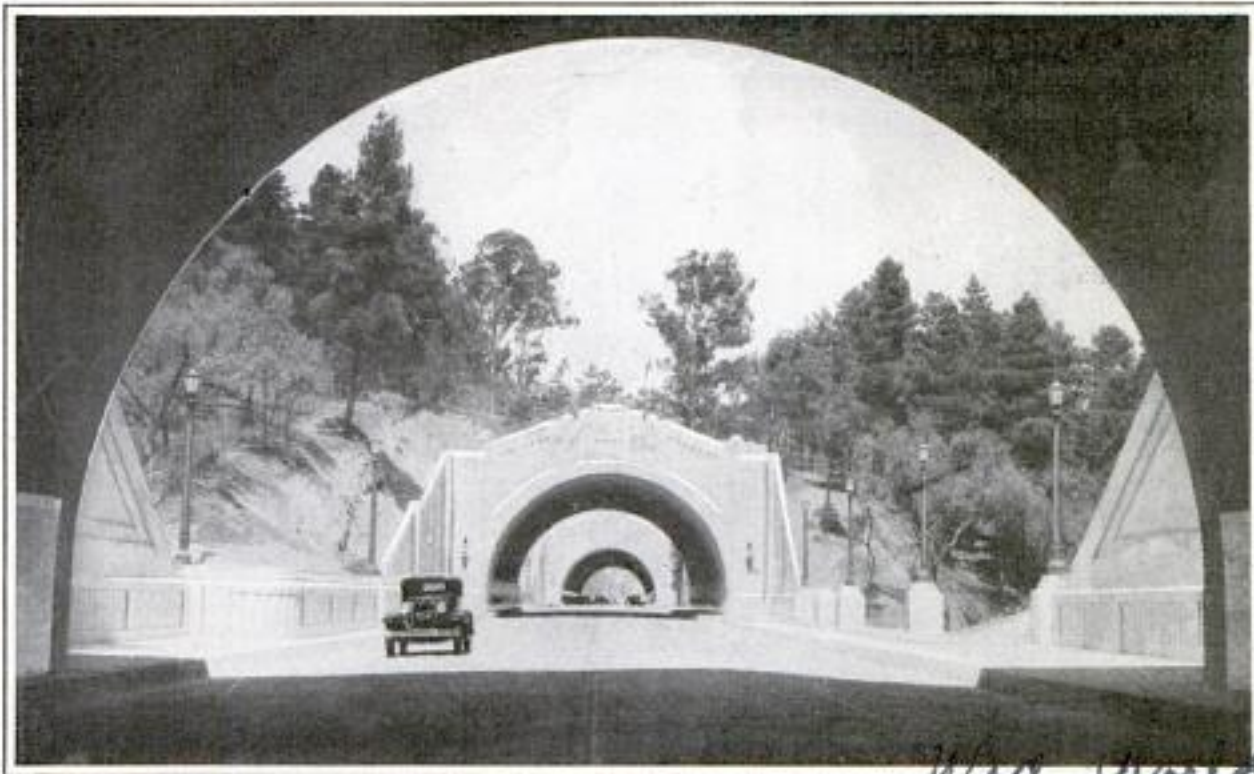
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Sept 11 - July 1920
Rams as Reptable Car parts 42 miles
and Chemical Corp. 30 2 Lee York

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Cornel Engine Corp, Madison Wis

Triple Tunnels Under Hills Untangle Traffic



Road near Los Angeles Which Runs through Triple Tunnels; Dug under Three Separate Ridges, They Have Opened a New Outlet from the City and Solved a Major Traffic Problem

Triple tunnels under the scenic ridges of hills rimming Los Angeles are solving the major traffic problems of that city by opening a new outlet to the north. A big burden was taken off other highways entering Los Angeles by this unusual construction of a road running through these tunnels.

SUN'S ENERGY IS DESTRUCTIVE TO MOUNTAINS AND HILLS

In reality the traditionally friendly energy of the sun is the relentless enemy of mountains and hills, seeking to level them and dump them into the sea. Conversely, the dark, upheaving forces of the inner earth, usually considered as destructive, are constantly building up while the sun-born forces are tearing down. This paradox of geology was explained recently by Dr. W. H. Twenhofel, of the University of Wisconsin. Neither the forces from above nor those from below are wholly benevolent to man, he explained. The earth-born forces destroy man and his works with earthquakes and volcanoes and the sun-born ones cause floods, cy-

clones, tornadoes and great waves of the sea. But the former build up while the latter tear down. The most obvious effect of the sun's energy is to make life more pleasant for man, and the most obvious effect of the inner forces is to make life more unpleasant, hence the sun has been considered wholly good and the forces of the inner earth wholly bad. Each is vitally necessary, however, for each sets in motion essential earth activities to make the earth habitable for land life. Throughout the eons of time, the two powers have struggled with the surface of the earth as the stage. So far, the contest has been a draw, otherwise the development of land life would have been interrupted. At times the earth forces have rested, and the sun has reduced the surface of the earth to a featureless plain, while at other times the earth forces rose to great magnitude, and the earth became extremely rugged, only to be leveled again by the sun's energy.

☐ Three-way radio-telephone conversation, between three planes in flight and a ground station, has proved successful.

Madison, Wis

a1929
748

Back-Yard Roller Coaster Furnishes Big Thrill

Building their own roller coaster in back lots, a group of North Philadelphia children recently astonished their guardians and provided themselves with a great



Three Views of the Back-Yard Roller-Coaster; Bottom Shows How Car Was Constructed of Skates

thrill maker. It took a week for them to construct it out of old lumber and a pair of roller skates. A canvas tunnel was built over the lower section of it to provide more realism and add further joy to a ride on the "scenic railway." Sloping ground was selected and the "hills" made steeper by suitable supports.

RADIO "FEELER" TESTS THE AIR BENEATH GIANT DIRIGIBLE

When the "Akron," the navy's giant dirigible, settles toward a landing field obscured by fog or clouds, it does not need to "go it blind," but drops a radio-equipped "feeler" which signals back to an automatically registering apparatus conditions in the air levels below. The instrument was designed originally for sending aloft in sounding balloons to obtain meteorological information at high altitudes. It carries apparatus to measure temperature, air pressure and moisture, and an automatic radio sending outfit whose signals are picked up and recorded on a revolving drum in the dirigible. The sending set is dropped from the ship on a cable to inform navigators whether there is clear air beneath a cloud.

a1929
Ward W. ...
Science Service ...
Russian scientist.
Prof. Mollischanov

91957

Mr. Carl W. Osborne
and Mrs. Blanche
Hatchcock, Buffalo, N.Y.

RINGWORM OF FEET PREVENTED BY WATER PURIFIER

Sodium hypochlorite, a common chemical used in purifying city drinking water, has been found to be effective in preventing the spread of a ringworm infection of the feet, known as "athlete's foot." This infection often develops among people in sports, particularly where common dressing rooms are used, since the spores of the fungi causing the disease are spread rapidly, later causing irritation, cracks and watery blisters. Two Buffalo workers in medical research conducted tests in schools where pans were installed in gymnasiums, the students washing their feet in a weak solution of sodium hypochlorite by wading through these pans as they went to and from gymnasium classes. This treatment checked the spread of the disease effectively, it was found, although the solution is not looked upon as a cure for already established cases. This is the second preventive measure against ringworm of the feet reported recently, other investigators having found that a sodium-thiosulphate solution is helpful.

Science Service 8/21/31

Bushnell Mfg Co. Berkeley, Calif.

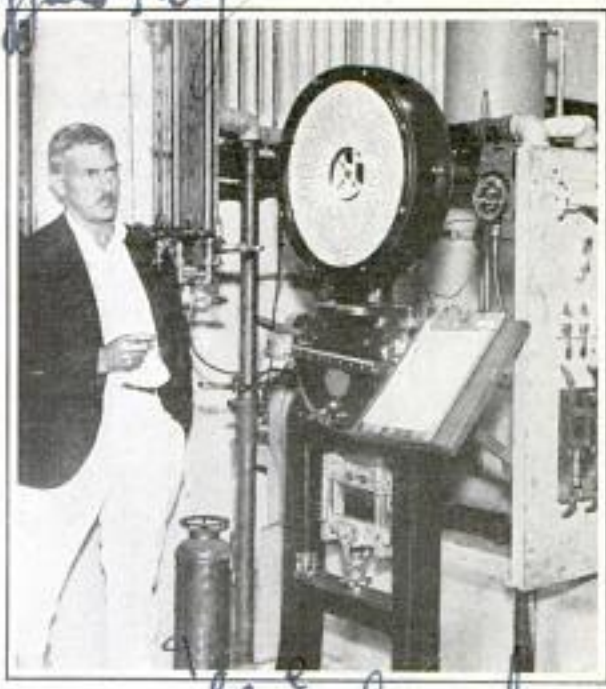
"SLIP-ON" COUPLING FOR HOSE SAVES TIME AND WEAR

Making it unnecessary to screw the hose to the faucet or unscrew it when finished, a "slip-on" coupling recently has been placed on the market. It is produced in different sizes and provided with safety catches, so that it is handy not only for home owners but also for gasoline and oil-truck operators, and for use on pipe couplings and air hose. Half the coupling is screwed to the faucet and the other half to the hose, and all that is necessary when



it is desirable to connect the hose is to slip it over the coupling end on the faucet.

91716



© U. & U. *Is & Israhahm*
Measuring the Efficiency of Various Types of Auto Ignition Systems on a Special Engine

AUTO IGNITION SYSTEM TESTED WITH SPECIAL ENGINE

Peculiarities and characteristics of various types of automobile ignition are being studied by the bureau of standards with a view to finding the kind best suited for easy starting and smooth running. An electro-dynamometer is connected to a special engine and measures the power increase or loss caused by various methods of ignition, a dial registering the horsepower generated by the engine.

CHUTES AND BELTS TO HANDLE MILLION LETTERS AN HOUR

Planned as the largest mail-distributing point in the world, the new post office under construction at Chicago will be equipped with more than twenty miles of conveyor belts, about 450 electric motors for power and thousands of feet of chutes to enable the handling of 1,200,000 letters and hundreds of tons of parcel post and newspapers hourly. Mechanisms will handle the mail in virtually all stages. Incoming mail will be lifted to upper floors and there handled and distributed to chutes leading to predetermined loading places on the main floor. It is calculated that, by 1943, the Chicago office will handle 19,500,000 letters on a peak day.

91806

W. S. Dandy 12/10/31

Instant Sales Co
2926 Telegraph Ave
B. B. ...

Post Office Department
Washington, D. C.

EASIER WAYS



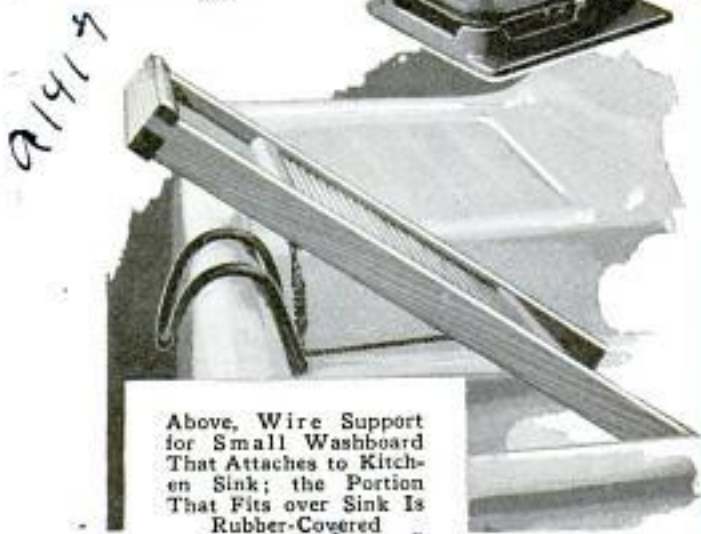
Above, Stove Ventilator Equipped with an Electric Light and Fan to Create a Forced Draft



Above, Rubberlike Flexible Buttons for Washable Garments; They Will Not Break Nor Chip and Do Not Cut the Threads; at Left, Fruit Press That Extracts and Strains the Juice of Oranges or Lemons When Handle Is Pressed, the Pulp Remaining in the Shell of the Fruit; It Has Only Four Parts, All Easily Cleaned



Right, Ice Breaker That Is Operated by a Crank; It Makes Crushed Ice Out of Cubes Taken from the Electric Refrigerator



Above, Wire Support for Small Washboard That Attaches to Kitchen Sink; the Portion That Fits over Sink Is Rubber-Covered



Above, Wire Egg Beater and Separator; It Is Handy for Removing Food from Boiling Water, and as a Strainer by Inserting a Piece of Muslin in It

of DOING IT

Right, Electric Heating Coil Mounted on a Circular Support Which Can Be Attached to Guard of Any Electric Fan, Converting It into a Heater or Hot-Air Drier



Below, Clothes Drier That Fits the Top of Any Bathtub; It Contains Twenty-Seven Feet of Rustproof Line and Can Be Folded When Not in Use



Above, Self-Heating Percolator with Stove in Base and Fuel Reservoir in Handle

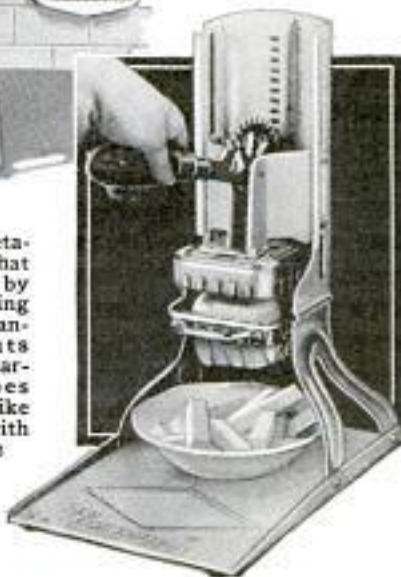


Electric Insect Killer and Light for the Porch; the Light Provides Illumination and Serves as a Lure for the Insects, and the Charged Wires Electrocute Them



Left, Automatic Heater and Fan That Attaches to Hot-Water Supply Pipe

Right, Vegetable Dicer That Is Operated by Merely Pressing Down the Handle; It Cuts Turnips, Carrots, Potatoes and Other Like Vegetables with Equal Ease



91942

*Mr. Wells A. Baker
Alhambra Calif
Letter rec'd 10/20/31*



Bulbous Parachute Which Opens in the First Ten Feet of Descent; Small Chute Acts as a Shock Absorber

NEW CHUTE OPENS INSTANTLY ADDING TO SAFETY

Instantaneous opening, almost entire elimination of drift and drag, and considerable reduction in size from that of the regulation type—these are some of the advantages claimed for a parachute of a peculiar bulbous construction. A smaller auxiliary chute, halfway down the short shrouds, comes out of the pack first and throws the shrouds out in the proper place, keeping them untangled in the quick opening, which occupies less than the first ten feet of drop. This small chute, which is only five feet in diameter, also acts as a shock absorber in breaking the initial impact and carries its proportion of the load. The large chute is fifteen feet in diameter, has a top panel over which the shrouds run and through the center, holding down the bulging top and creating a higher compression under the chute with a partial vacuum on top. The entire

equipment weighs less than ten pounds, yet supports from fifty to 175 pounds with equal steadiness of action.

"ROMAN CHARIOTS" HELP BUILD ROAD TO HOOVER DAM

91695

Giant vehicles that resemble Roman chariots and others that look like gondolas, with scrapers to match in size and appearance, are building the seven-and-one-half mile stretch of road between Boulder City and the site of Hoover dam. Over this highway supplies for the dam will move. The chariots and gondolas, pulled by tractors, carry as much as seventeen cubic yards of dirt to a load. The wheels are six feet in diameter and eighteen inches wide. This width prevents the vehicles from miring, and the driver of the tractor pulling each can dump the load in a single operation. Scrapers also can be pushed

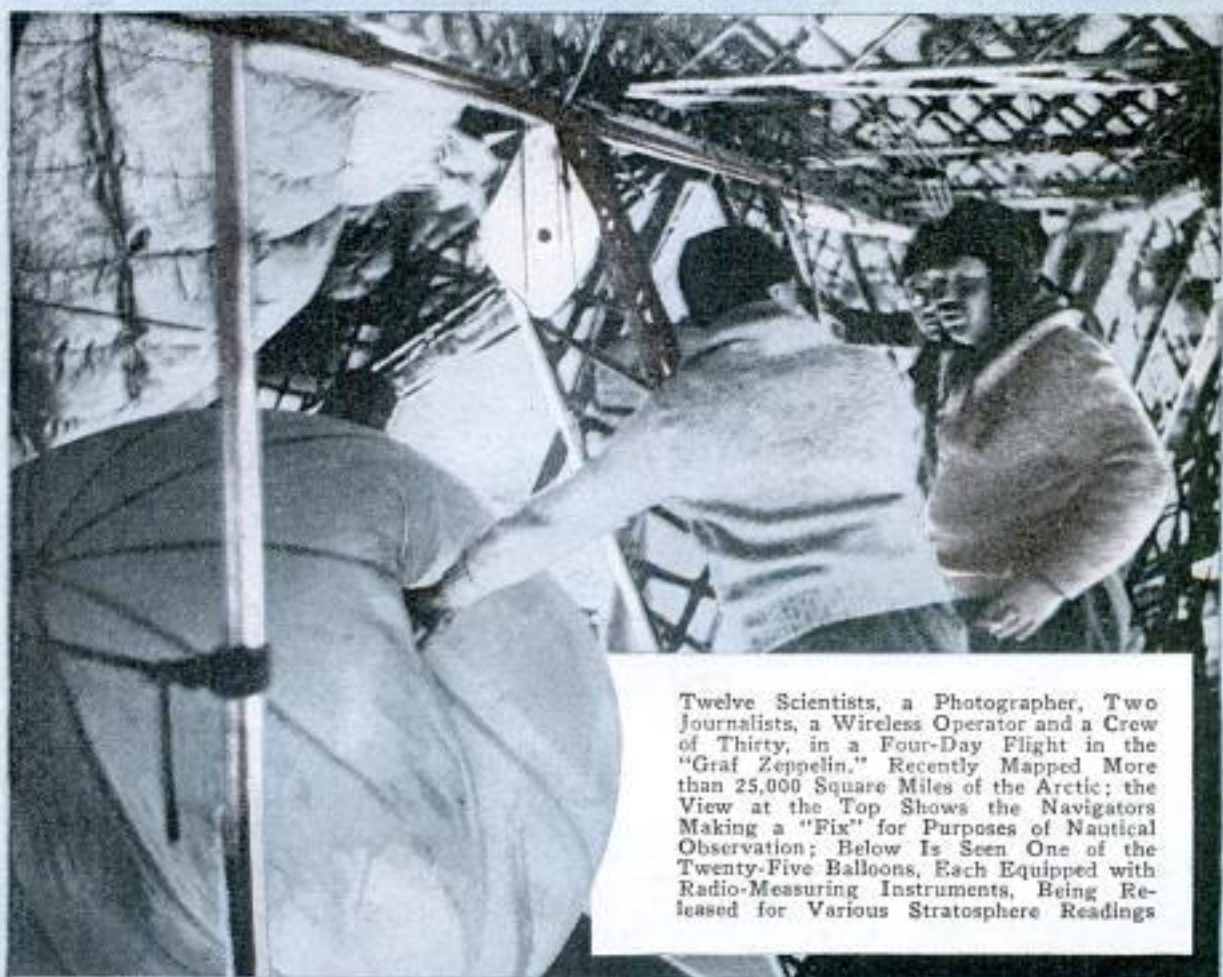
in front or pulled behind these tractors, and they level the area over which they pass, so that it becomes unnecessary for a crew of shovel men to follow in their wake to do this job.



One of the "Roman Chariots" Used in Making a Road to Hoover Dam; the Wide Wheels Prevent Tipping

21713

Into the ARCTIC WASTES *with the* GRAF ZEPPELIN



Twelve Scientists, a Photographer, Two Journalists, a Wireless Operator and a Crew of Thirty, in a Four-Day Flight in the "Graf Zeppelin." Recently Mapped More than 25,000 Square Miles of the Arctic; the View at the Top Shows the Navigators Making a "Fix" for Purposes of Nautical Observation; Below Is Seen One of the Twenty-Five Balloons, Each Equipped with Radio-Measuring Instruments, Being Released for Various Stratosphere Readings

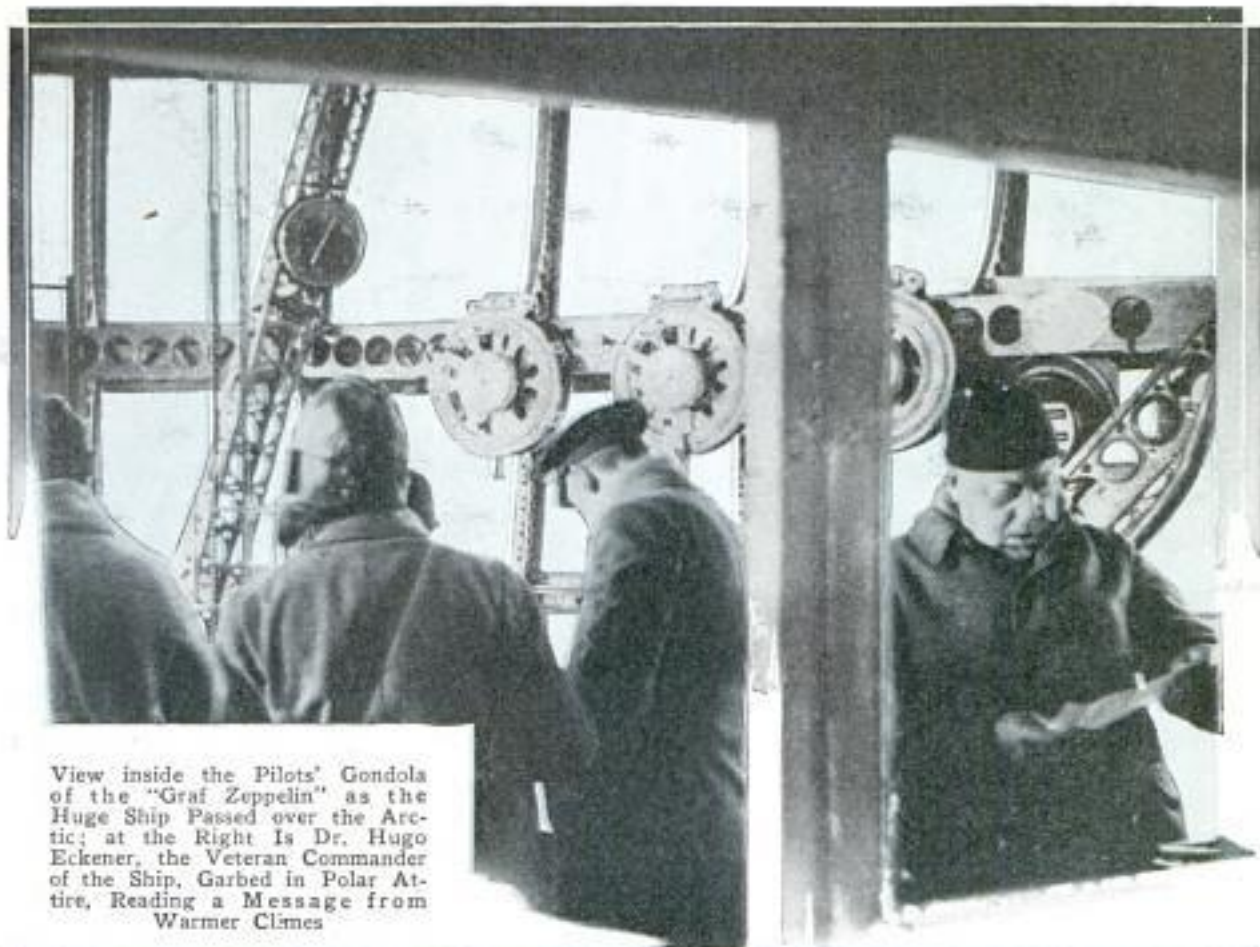
Wide World 753

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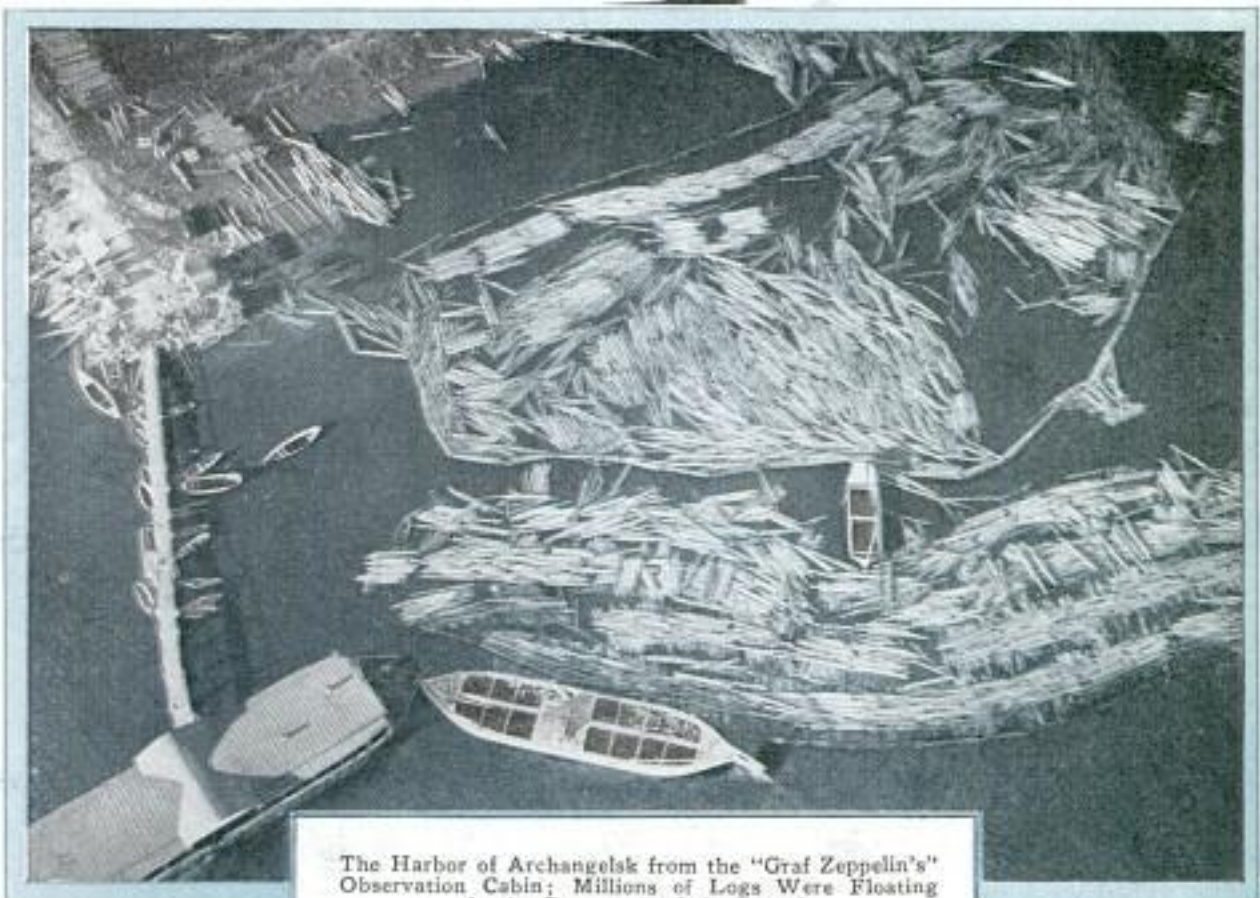


Navigation Officer Listens for a Report on Radio Logging, Above; at the Right is a Close-Up of One of the Captive Balloons Going up the Side of the Airship; Below, Officers and Their Scientist Guests Studying the Travel Plan of the Ship in the Social Room; a Rich Reward in Meteorological and Geographical Data Was Reaped, and, Apart from Lack of Water for Washing and the Necessity of Retiring in Sleeping Bags, the Voyage Provided Almost All the Comforts of Home

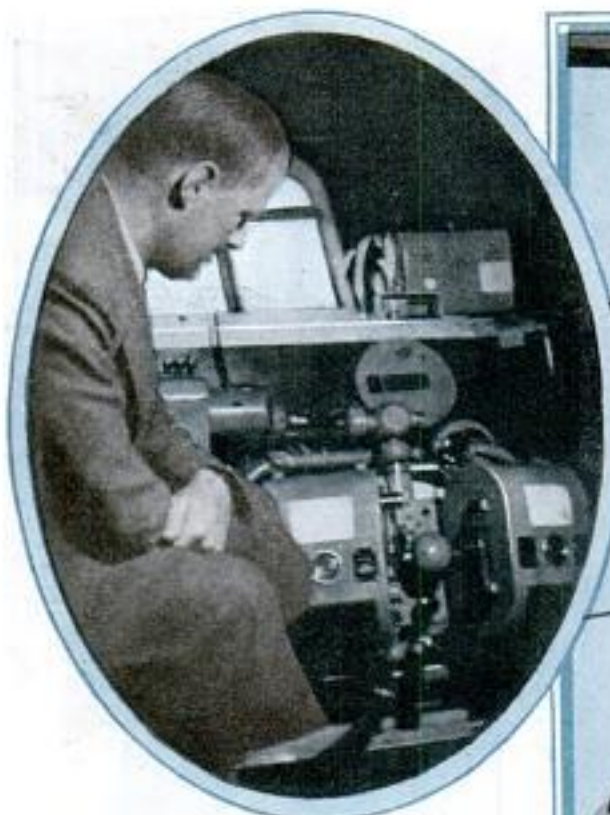




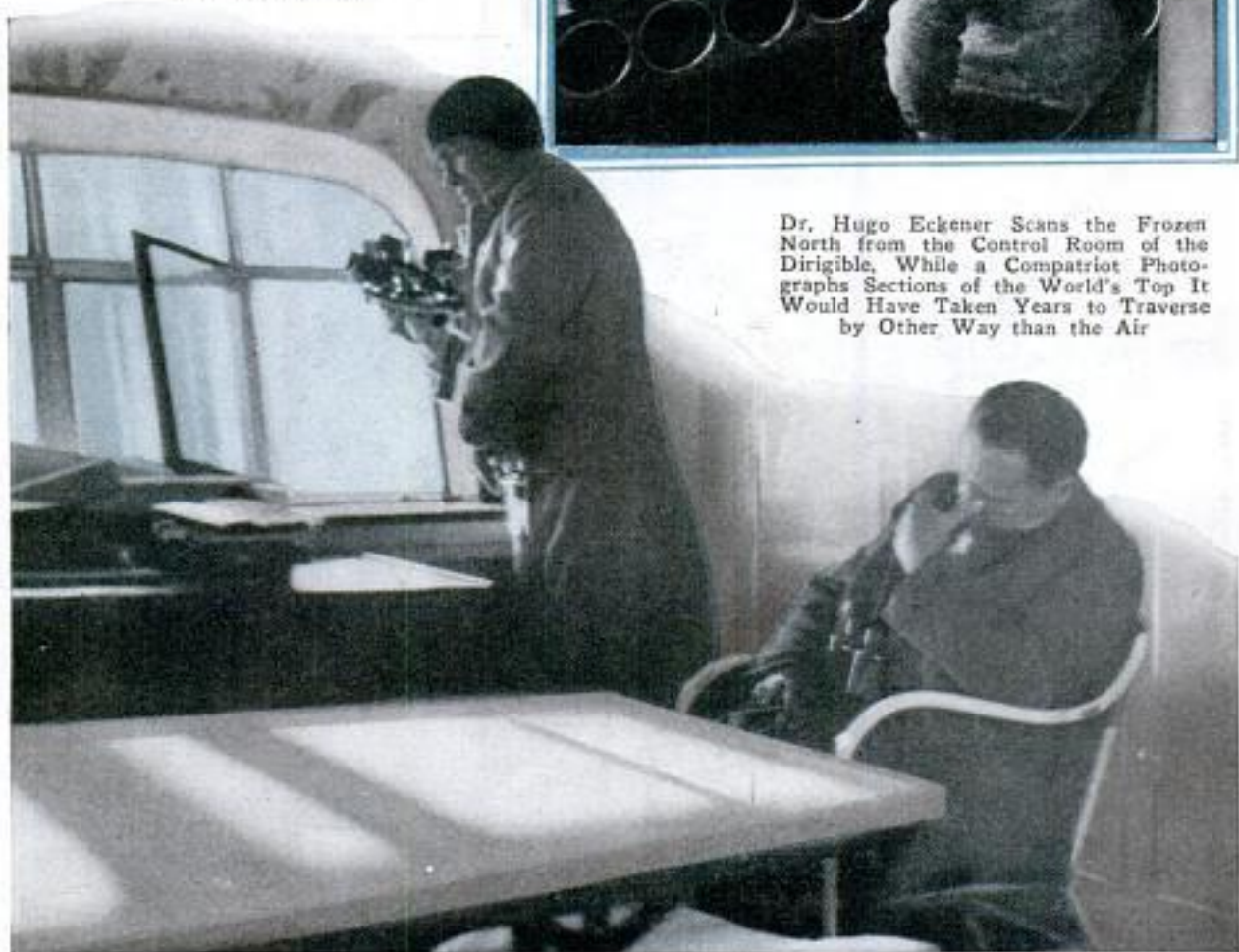
View inside the Pilots' Gondola of the "Graf Zeppelin" as the Huge Ship Passed over the Arctic; at the Right Is Dr. Hugo Eckener, the Veteran Commander of the Ship, Garbed in Polar Attire, Reading a Message from Warmer Climes



The Harbor of Archangelsk from the "Graf Zeppelin's" Observation Cabin; Millions of Logs Were Floating in the Bay as the Ship Passed



Photogrammetric Apparatus in Operation during the Flight, Above; and Taking Sextant Observations by the Light of the Midnight Sun, Below



Dr. Hugo Eckener Scans the Frozen North from the Control Room of the Dirigible, While a Compatriot Photographs Sections of the World's Top It Would Have Taken Years to Traverse by Other Way than the Air

91713



The Last Hour on German Soil before the Flight, Above; the "Graf" Is Moored to the Mast in Berlin after a Heavy Rain; Many of the Participants in the Expedition Are Eating in the "Restaurant of the Mooring Mast," Seen in the Left Background; Below, Professor Moltchanoff, One of the Russian Members of the Flight, Is Listening to an Officer's Explanation of a New Sextant, and Two American Members, Lieut. Comm. Edward H. Smith of the Coast Guard, and Lincoln Ellsworth, Sportsman and Explorer.



no further information

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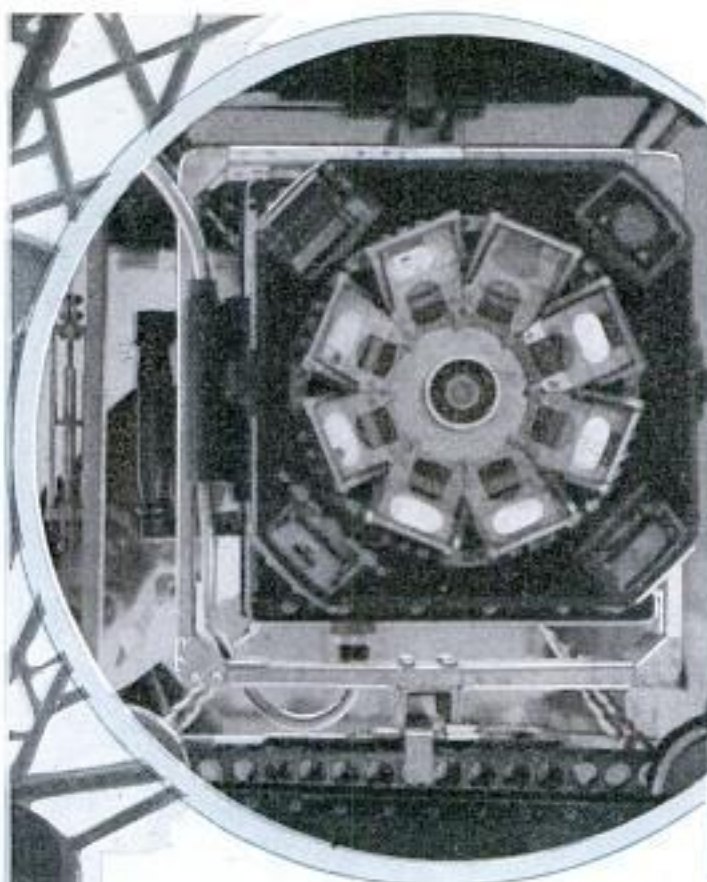


The Above View of the Catwalk of the "Graf Zeppelin" Indicates the Great Size of the Interior and the Crew's and Passengers' Means of Travel from Cabin to Cabin

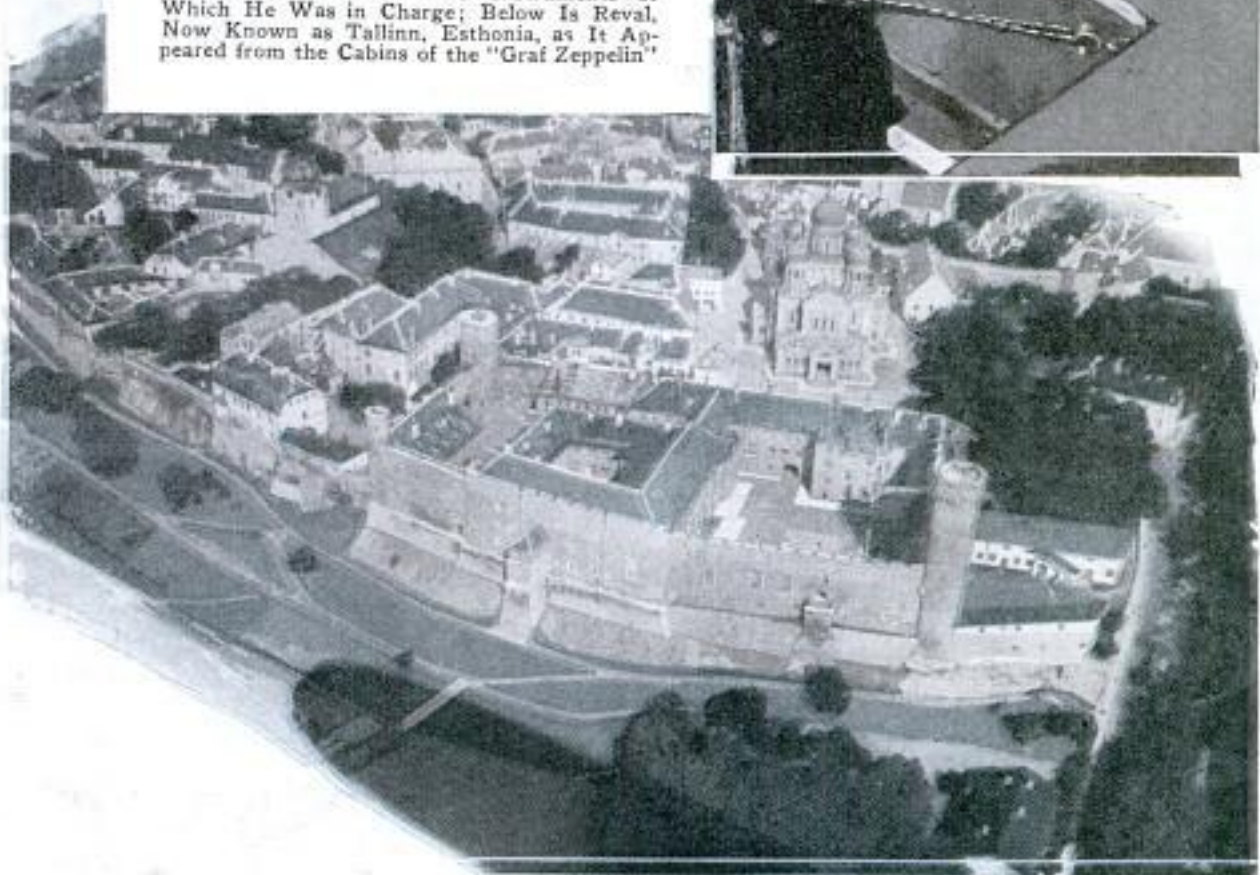
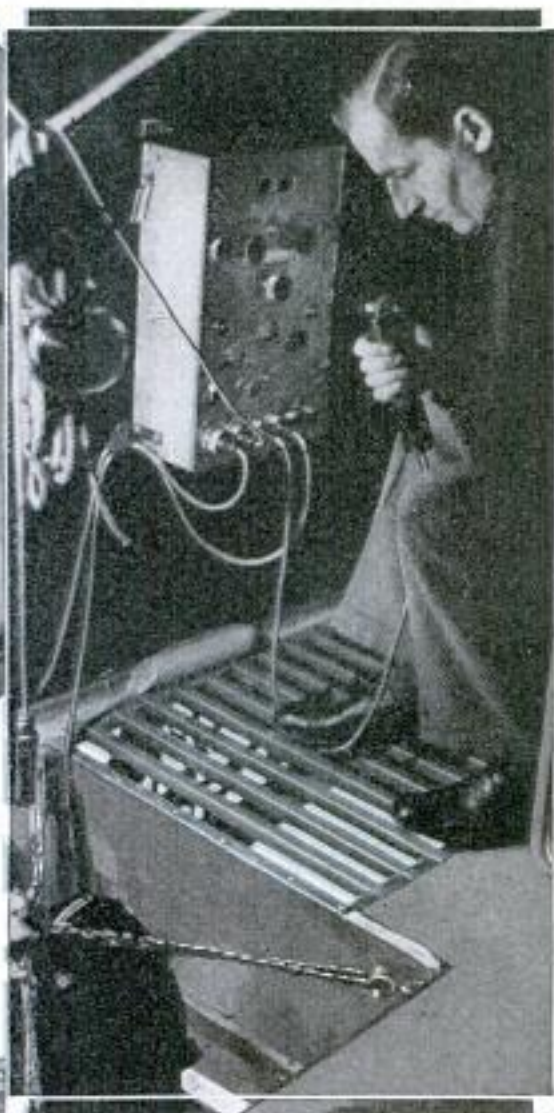


Professor Samodlovitch, Scientific Director of the Expedition, Is Seen Above, Confering with One of His Associates at Work during the Flight; at the Right, the Arctic's First Aerial Post Office Prepares to Make a Delivery of Mail to the Russian Ice-Breaker "Malygin"; the Post Official of the "Graf" Is Seen Stamping the Last Piece of Mail, Before It Is Sent over the Side for the Ship





Huge Photogrammetric Camera, Built into the Airship for Taking Vertical Pictures of the Country over Which It Passed, Is Seen Above; at the Right Is Seen Doctor Aschenbrenner with the Geodetic Instruments of Which He Was in Charge; Below Is Reval, Now Known as Tallinn, Esthonia, as It Appeared from the Cabins of the "Graf Zeppelin"



91713



Miles of Hitherto Unmapped and Largely Unphotographed Water, Ice and Land, Constituting Nova-Zembla, Are Seen in the Photograph Above at the Right, Which Also Shows the Forward Gondola of the Dirigible; Above Is Walter Bosshard of Zurich, the News Photographer of the Expedition, in Polar Costume



The Pilot Room of the Dirigible Shortly after Its Take-Off for the 7,000-Mile Trip over the Arctic; Doctor Eckener Can Be Seen at the Extreme Left of the Picture, Scanning the Instruments

Unio. of Nebraska News
8/27/31

POPULAR MECHANICS

Ans. J A
Straley

EGGWHITE POLISHES LEATHER AND LOOSENS CHEWING GUM

Eggs are being used in many ways to make household tasks easier. The whites will remove chewing gum from furniture or even from hair. Leather chairs rubbed with well beaten eggwhites and then polished, shine like new, and the whipped whites make a substitute for cream in salad dressings, while, if stiffly beaten and added to whipped cream, they double the quantity and improve the flavor. When beating eggs separately, a little of the beaten white added to the yolks will cause the latter to thicken more quickly and will not stick to the beater. If fresh-laid eggs are allowed to stand in cold water for ten minutes before boiling, they will peel easily, and it is also claimed that if a knife is dipped into water before cutting hard-boiled eggs, the yolks will not crumble. Cold water has been found best for cleaning soiled egg dishes and for removing egg stains. When only the whites of eggs are to be used in cooking, the yolks can be kept for some time by beating them and adding a little cold water, then placing in the refrigerator.



Electric Hammer That Takes Dents Out of Auto Fenders at Rate of 1,500 Blows a Minute

ELECTRICITY TAKES OUT DENTS WITH PORTABLE HAMMER

Designed especially for metal work, such as fenders, automobile bodies and floors, a portable electric hammer recently was announced that is very light and easily handled. Dents are removed from metal at the rate of about 1,500 blows a minute. A second model is capable of heavier duty. It can be bolted to whatever work in which it may be useful.

Portable Power Hammer Tool Co.
2208 Fairmount Ave. Phila.

HOSE HAS BUILT-IN SPRINKLERS FOR WATERING LAWN

Lawn hose with built-in sprinklers to facilitate the watering of lawn or garden is now on the market. Small sprinkling units, resembling bicycle-tire valve stems, are placed along a length of standard garden hose. The free end of the hose is capped, so that water must pass out through the sprinklers. Thumbscrews enable adjustment of the sprays, and flat metal strips, having a recess for the hose and a hole for the sprinkler, keep the nozzles upright.



ANTS BUILT FIRST SKYSCRAPER EONS AGO EXPERT FINDS

White ants built their "skyscrapers" and were well organized in colonies millions of years before man's advent on the earth, according to Dr. Thomas E. Snyder, entomologist of the department of agriculture. He has found fossilized remains of the ants that show they were in a highly perfected state as far back as the Eocene period, when other animal life dawned. After this, the insects lived through three periods of the age of mammals and then managed to survive the ice age. When the lowest type of man was being developed the white ants were as highly organized as they are today.

Chicago - 316 Taylor

50 H. S. Mangle

Our Bureau of Information is for your benefit. Use it as often as you please.

W. H. Goodrich Co.
Akron, Ohio

U. S. Daily 8/31/31

A 1403 Cont. John L. County,
714 Jefferson St. NW
Washington D.C.

Millions Moved

More than a Million
and a Half in Gold
Coin Being Unloaded
and Placed in Ar-
mored Cars for the
Chase National
Bank from Cuba to
Meet Interest Pay-
ments Due



TO the man in the street, moving millions is a thrilling spectacle of gold piled high in guarded trucks, with officers of the law clearing lanes of progress. But to United States treasury officials, moving millions is just another day's work. Each day sees officials of the government moving untold wealth from the bureau of printing and engraving, where currency and bonds are printed, to the treasury, and from the treasury to banks throughout the country.

How does Uncle Sam guard this money and how is it handled?

The daily replacement of worn-out currency in the United States is around \$10,000,000. This means that around \$10,000,000 in currency finds its way into the treasury each day and a corresponding amount goes out. Tracing the movement of the currency to the source of origin—the bureau of printing and engraving—the daily output of currency at that plant must approximate this figure.

But these figures, huge as they are,

pale into insignificance when it is stated that in December, 1929, alone—the month the stock market broke—over \$1,000,000,000 in currency was shipped out of Washington to the country's banks.

Handling as much as \$3,100,000,000 in a year, Uncle Sam must exercise the greatest precaution and care to safeguard it against thieves of all sorts—gangsters, robbers, inside plants. What are these precautions?

First are impregnable steel chests of great weight, the keys of which never move with them in their eight-ton Gibraltar truck, steel-barred, loop-holed and manned by locked-in guards, armed with rifles, shotguns and machine guns.

Second, the men; the task of guarding

© Keystone

in Cash Every Day!

Uncle Sam's money as it rolls through the streets of Washington is a part of the routine duties of



Above, Steel-Lined Car for the Movement of Treasure in the Wall Street District; Below, Guarding \$2,500,000 in Gold from Japan

the secret service. The very name of this organization defines the manner in which its work is performed. Veiled in mystery, it is known only to exist as a service attached to the treasury to spy out counterfeiters, watch over the president and the treasure of the United States.

You notice an armored truck moving silently under the elms around the Ellipse south of the White House, from the bureau of printing and engraving to the treasury department. You know, perhaps, that it carries the wealth of a Croesus. You know further that guards peer from behind rifle loopholes. But what you do not know, perhaps, is that the eyes of one, two, three, or more, sauntering pedestrians near the great treasury gates

and along the path of the armored car are watching every living, moving thing within the range of their vision. All men of nerve, steel and deadly aim.

And inside those treasury gates no man is permitted. The swiftly, silently moving truck is engulfed by their great maw. Hidden machine guns, gas bombs, electrical devices that can close the treasury in three minutes, locking every soul within, stand by unsuspected as guards

move the treasure chests from the truck cage and along underground passageways to secret vaults.

So perfect, so flawless is the technique of the secret service that a visitor to the treasury department has no knowledge of its existence. Not one penny of the treasure ever has been stolen.

To get an idea of the banknote shipments by Uncle Sam, you take one year, 1922-23. In those twelve months about \$1,500,000,000 in federal-reserve notes left the capital, \$600,000,000 in national banknotes and \$900,000,000 in the three remaining issues, silver certificates, gold notes and greenbacks.

Uncle Sam has, all told, in his hands \$3,696,000,000 in gold. This means that,



Above, Moving \$15,000,000 in Gold from a Liner, and, Below, One of New York's Payroll Cars

in addition to the vast coin store in the vaults at Washington, he has a billion and six hundred-odd millions of dollars worth of gold in the assay office at New York; in San Francisco about a billion; \$600,000,000 at the mint in Philadelphia; \$400,000,000 at Denver, and varying smaller amounts scattered through-

out the nation. There are 525,000,000 silver dollars in existence. In addition to the \$50,000,000 at Washington, the Philadelphia mint has \$230,000,000; San Francisco \$90,000,000; New York \$65,000,000, and federal reserve banks about \$7,000,000.

Elaborate precautionary methods are outlined by the treasury department for banks sending in currency for redemption.

Several months ago, an express guard at Union Station, Washington, was blackjacked and a package of currency destined for the treasury department for redemption was stolen. A few days later the package was found cast away in a Washington alley. It totaled \$800,000 in currency. However, it was worthless. Only half of the bills were there.

Uncle Sam, just to forestall such robberies, in moving millions, instructs banks to slit currency for redemption lengthwise, perforate the halves on a machine and ship half of the total at a time. When the first batch is received by the treasury, the sending bank is notified.

made by Prof. George L. Clark
University of Illinois
 POPULAR MECHANICS
Urbana, Ill.

air 25

**STRONGER COTTON
 POSSIBLE X-RAYS
 DEMONSTRATE**

Better cotton than is being produced anywhere in the world was grown by the Egyptians before the Christian era. This has been revealed by an X-ray study of cloth, taken from Egyptian mummies, at the University of Illinois. In addition to showing that cotton grown centuries ago was better than that produced today, the X-ray analysis also indicated that Texas cotton can be made just as strong as the ancient Egyptian product. The treatment involves softening of the cellulose molecules and alining them under tension. The change in structure is determined by the X-ray pattern. Possibly the Egyptians also treated their cotton.



Glider Boat Equipped with an Airplane Propeller and Driven by 400-Horsepower Motor; It Makes a Speed of Fifty Miles an Hour

**BOAT WITH AN AIR PROPELLER
 RUNS FIFTY MILES AN HOUR**

Fifty miles an hour is the speed attained on trial runs by an odd-looking glider boat, driven by a 400-horsepower motor connected to an airplane propeller, which has been designed for passenger service on the Danube. The first of these boats carries fifteen to twenty passengers with baggage and reduces the time between Vienna and Budapest by seven to ten hours. Larger boats are being built.

**WINDLESS HORN PLAYS MUSIC
 JUST LIKE A VIOLIN**

Carved with a pocketknife, a violin which has an ordinary steer's horn for a sound box produces tones, which its maker says are equal to those of high-priced instruments. The horn-fiddle was made in three months' spare time. It is not placed under the chin like an ordinary violin, but is held against the collarbone when being played. The bow and strings are the only parts which the maker did not produce with his knife.

**ELECTRICITY FINDS NEW TASKS
 ON MODERN LINER**

Of the 105,000 horsepower developed by the engines of the German liner "Bremen," 5,000 are consumed by the many electrical devices for the safety and comfort of passengers. There is a smoke register, for instance, in every room where there may be a fire hazard. This instrument is so sensitive that, if a person steps into the room with a lighted cigaret, a signal is transmitted to a room on the bridge. There are more than a score of telephone loud speakers which replace the old-fashioned speaking tubes, and electricity has also replaced the old-time logs as speed indicators. Electricity likewise shows the engine revolutions, steering position, drives 494 clocks and, from a signal room, water-tight doors can be closed automatically, the electric devices also showing which are closed.



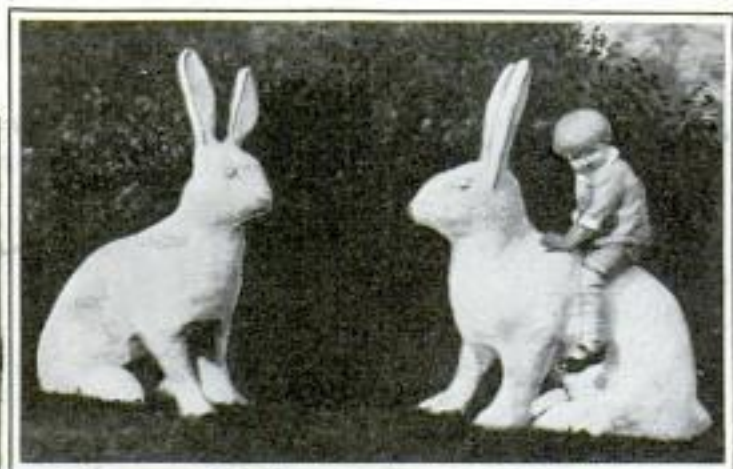
Violin Carved with a Pocketknife out of a Steer's Horn

Wid World
made by Louis Selby

Com. Add. H. H. H. H.
Boys' Club
Phoenix, Ariz.

The Cook Studios
548 E. The Point St. Rox.,
Philadelphia, Pa.

Big Statues Are Made from Old Newspapers



Examples of Large Statue and Other Figures Which Have Been Made from Old Newspapers

Old newspapers are being transformed into huge, bronzelike statues of men and animals that weigh only a few pounds but are very durable. The newspapers are shredded and bleached in a boiling solution of chemicals until the resulting dry pulp resembles gray wool. This pulp is worked into a plaster by mixing it with boiling water and glue as well as alum to prevent shrinkage during drying. The material then can be worked like plaster. The figure to be made is first modeled in clay in full size. A plaster-of-paris cast of the model is made and removed, and the pulp is spread inside with backings

of glue-impregnated paper, openings for working being provided in the cast. When the pulp has dried, the cast is removed and the rough edges on the outer surface are smoothed. In large figures it is also necessary to assemble the head, arms, legs and other parts at this time, as they are made separately. It is also possible to make figures with moving eyes and arms, or a facial expression that changes. In the latter case, the face is made of leather like that used for organ bellows, and the movements are controlled by wires to

Refer enquiries to Mr. Cook, of Cook Studios. We'll give any information that does not interfere with his business.

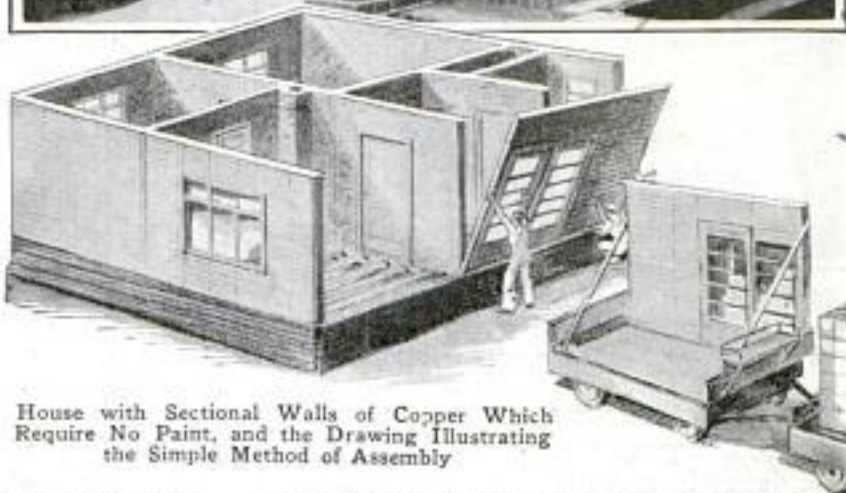
21740

which small motors are attached. Because of the light weight, little power is required for the desired motions. Paper models also have been made of entire towns since the newspaper pulp is an extremely plastic medium, and hence easy to work with.

Q1539

RADIO TREATMENT FOR BRAIN AIDED BY HEAT RAYS

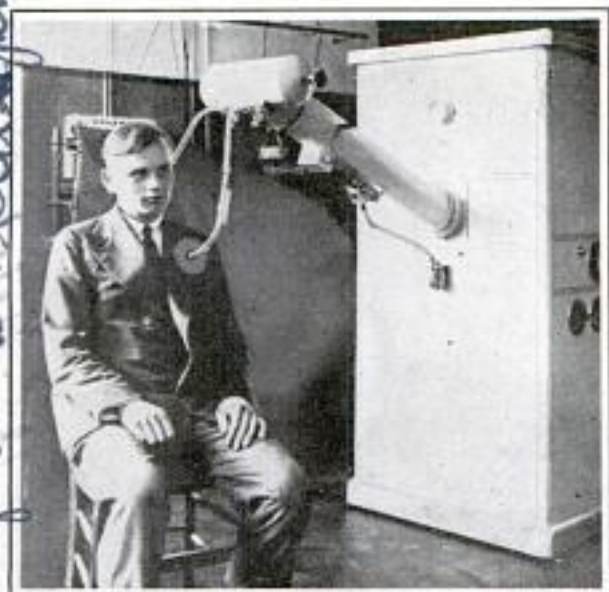
Treating diseases of the human body with heat applied by ultra-short radio waves has been found beneficial in Germany. The waves, of not more than ten meters' length, penetrate deeper and can be controlled better than the longer rays which formerly were used. By changing the wavelength, a definite organ can be reached. The apparatus is regarded as entirely practical in the treatment of the head. A layer of air does not prevent penetration of the rays, so the electrodes need not be applied directly to the body to get the full effect.



House with Sectional Walls of Copper Which Require No Paint, and the Drawing Illustrating the Simple Method of Assembly

HOUSES WITH COPPER WALLS REQUIRE NO PAINTING

Bungalows with walls of sheet copper are being constructed in Germany since it has been found that this metal offers advantages over steel houses, principally because it is rustproof and requires no protective coat of paint, either inside or outside. The walls are formed of large plates which support a ceiling of beams and have lining of wood as insulating material. In this form, they offer as much protection from heat or cold as a thick brick wall, and experiments have shown the copper houses to be unusually cool in summer and to offer fuel economies in winter as compared with other types. The interior walls are finished in gray, embossed with arabesque patterns and can be washed, so no wall paper is needed. The metal walls are formed ready for assembling, and such a house can be constructed in twenty-four hours. It is easily altered, extended or moved.



© Press Photo Patient Receiving Heat Treatment from a Radio Apparatus Generating Ultra-Short Waves

Designer Dr. Schickelphahn

Handenbergstr. 43. Berlin. Charlottenburg. Germany. Messingwerke A. S. of

Dr. Prof. Esau
Jena Germany

No A.S. agent known

91696
768

Plant Pathology Bureau
Department of Agriculture
Washington, D.C.



Copperized Paper That Will Prevent Spread of Gray Mold in the Storage of Pears

COPPERIZED PAPER FOR PEARS PREVENTS SPREAD OF MOLD

Spread of gray mold and elimination of nest decay in storage of pears can be prevented by the impregnation of paper wrappers for the fruit with a copper solution. Great savings will be made yearly by covering the pears with this paper.

NEW EXPLOSIVE ADDS POWER AND SPEED TO BULLET

Infantry arms may be placed in the class of light artillery by a new explosive invented by a German engineer which has been found to increase both the speed and consequently the power of a rifle bullet. Using this explosive with an ordinary rifle and soft-nose bullet, tests showed that the projectile could penetrate a steel plate covered with cement at 150 feet. The muzzle velocity developed by the new explosive is about 4,500 feet a second, or about twice that of present military arms. This is expected to enable infantry arms to be used effectively against tanks and light armored artillery. It is said that the recoil is no greater with the new than with ammunition used at present.

Dr. W. Beerlich,
Kiel, Germany

91778
Cml. Add 1 Halsey
Box 4 77
Phoenix
Ariz

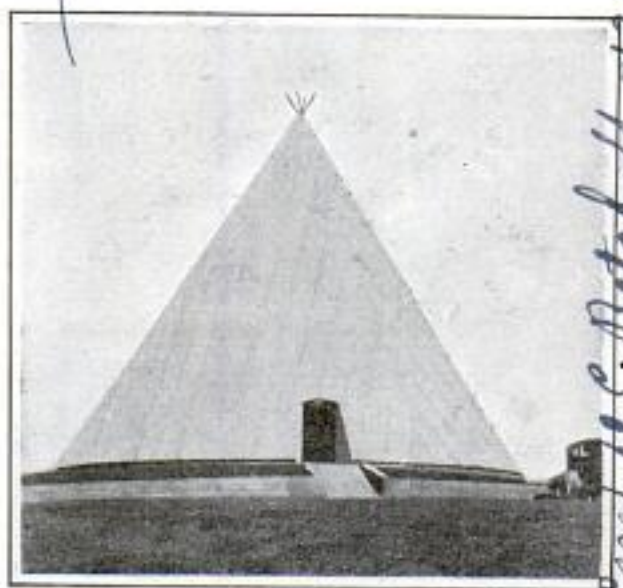
PEANUT SHELLS USED AS FUEL TO PRODUCE ELECTRICITY

Electricity from peanut shells is the method proposed for lighting a town in South Africa. The shells are abundant here and are already being used as fuel in the boilers of several factories. Now it is planned to employ them as fuel to produce electric current for a lighting system. The shells, when used as fuel, leave two valuable residues, a fertilizer that is rich in potash salts, and a valuable firm-setting tar.

91769
Spencer James
Potgietersrusk

GIANT WIGWAM OF CONCRETE MAKES A NOVEL HOME

Finding what he considers the ideal location, a hilltop 1,100 feet high, a California orange planter has built on a flat surface, two acres in extent, a huge tepee-shaped house of wood, concrete and steel. The building is sixty feet in diameter at the base and fifty feet high. A third of the circular floor space will be used for dining room, kitchen and storeroom, and the remainder for the living room. A feature of the latter is the fireplace built in the center of the house, with the smoke escaping just as in a regular wigwam. Winding stairs ascend from the living room to a balcony, off which are sleeping rooms, baths and dressing rooms, and another spiral stairway leads from the balcony to an observatory installed on the third floor.



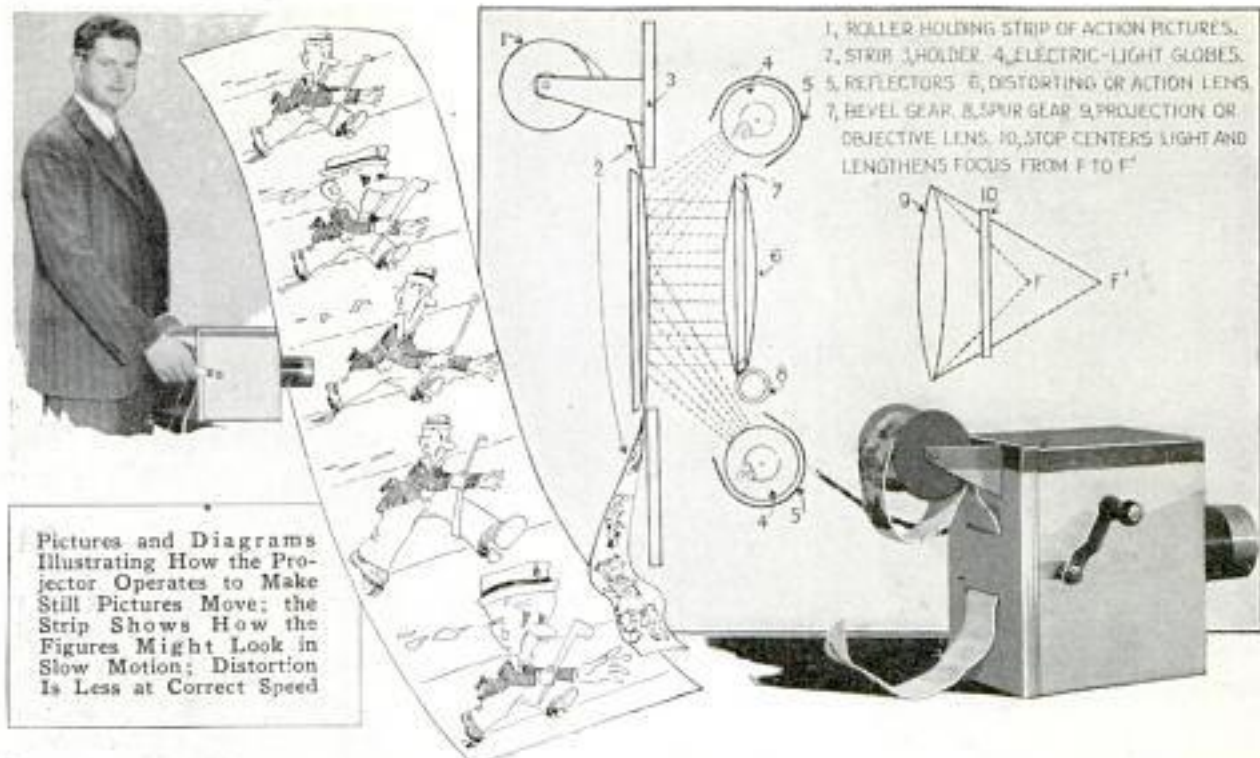
Giant Wigwam of Concrete and Steel Built on a Hilltop Brings Early Days Home to Owner

91720
A. L. Houghtelin,
San Pasquel Valley,
Southern Calif.

91720
Plant Pathology Bureau
Washington, D.C.

A 169.¹ Mrs. Maurice & Morris
 2329 Quincy Ave Quincy Ill
 POPULAR MECHANICS
 Editor Utah 769

"Bent Light" Makes Movies of Still Pictures



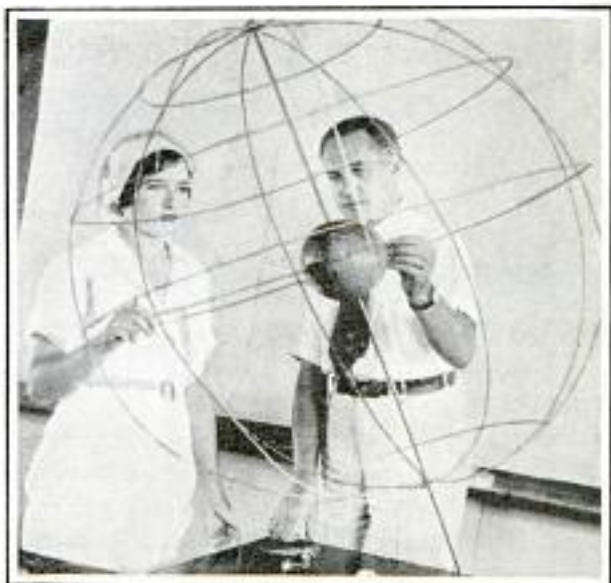
Pictures and Diagrams Illustrating How the Projector Operates to Make Still Pictures Move; the Strip Shows How the Figures Might Look in Slow Motion; Distortion Is Less at Correct Speed

Have you ever stood before a large convex and concave mirror arrangement at an amusement park and laughed at the funny pictures of yourself reflected from the looking glasses? A Utah man did, and it gave him an idea that he has developed into a projector that makes movies out of still pictures. He discovered that if the glass were revolved, the repeated shortening, broadening and lengthening effect of the mirror gave the subject an appearance of motion. The same effect, it was found, was obtainable by placing a revolving power lens between the mirror and the object. It is the latter method that is used in the projector, now being produced as a toy. The lens is turned by a crank, just like a regulation movie projector.

EARTH GLOBE IN CAGE OF WIRE HELPS TEACH NAVIGATION

Hoping to be the first woman flyer to cross the Pacific ocean, Juanita Burns, co-holder of the endurance record for women, has announced she will attempt a flight from Tokio to Seattle, in competition for the \$50,000 in prizes offered for the first pilot to complete such a trip. Her plane, a specially constructed one, now is

being shipped knocked-down to Japan, where it will be assembled, and in the meantime Miss Burns is making an intensive study of the art of navigation under an expert teacher. To make it easier for her to visualize the principles involved, her instructor has mounted a globe at the correct angle and surrounded it by a cage of wires, which are projections of the principal parallels and meridians of the earth.

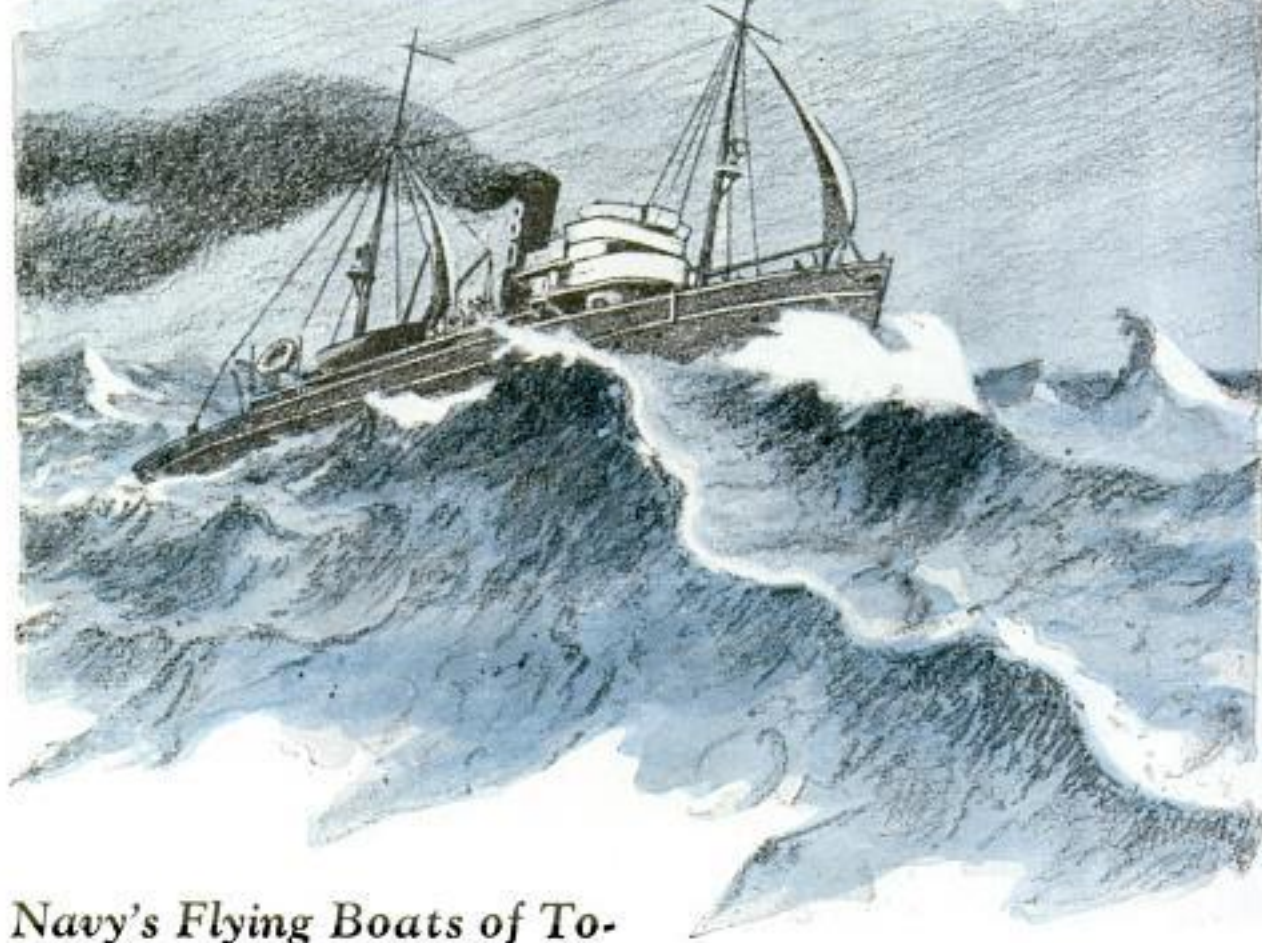


Juanita Burns and Her Instructor Going over Navigation Problems She Will Have to Face

Wide World

a1283 Cmt John Warren Woodley
2589. 29th St NW
Washington, D.C.

The "ME-TOO" Boats



Navy's Flying Boats of Today Carry a Crew of Five Men, are Practically Invulnerable to Attack from the Air and are Able to Stay Aloft for Fifteen Hours

A SQUADRON of six navy patrol planes was under orders to take off at dawn from the southeastern shores of Cuba, their objective the Atlantic terminus of the Panama canal, 700 miles over the wind-swept waters of the Caribbean.

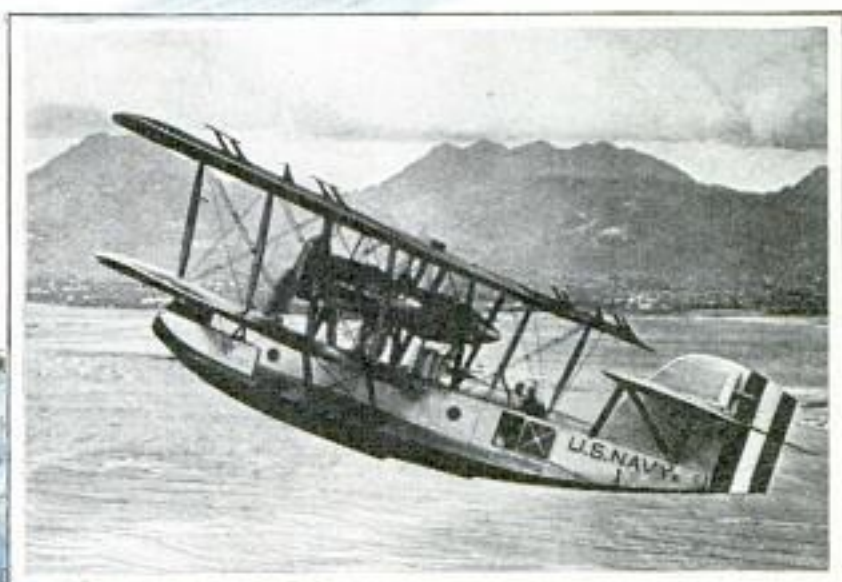
Promptly at the zero hour, engines roaring, the flying boats mounted dripping to the skies and soared southward. Nine hours later, they came to rest on the waters fringing the entrance to the canal and moored to bobbing cylinders anchored along the coastline by their "me-too" tender, a staunch seagoing craft which

had preceded the planes from Cuba. From the tender a purring motor launch had shoved off. As it came alongside each plane, the five men composing the crew of the flying giant heaved their aching bodies into the boat. Soon they were aboard me-too. A shower bath, a change of clothing, a hearty meal, and they stretched out on comfortable bunks in the compartments reserved for them.

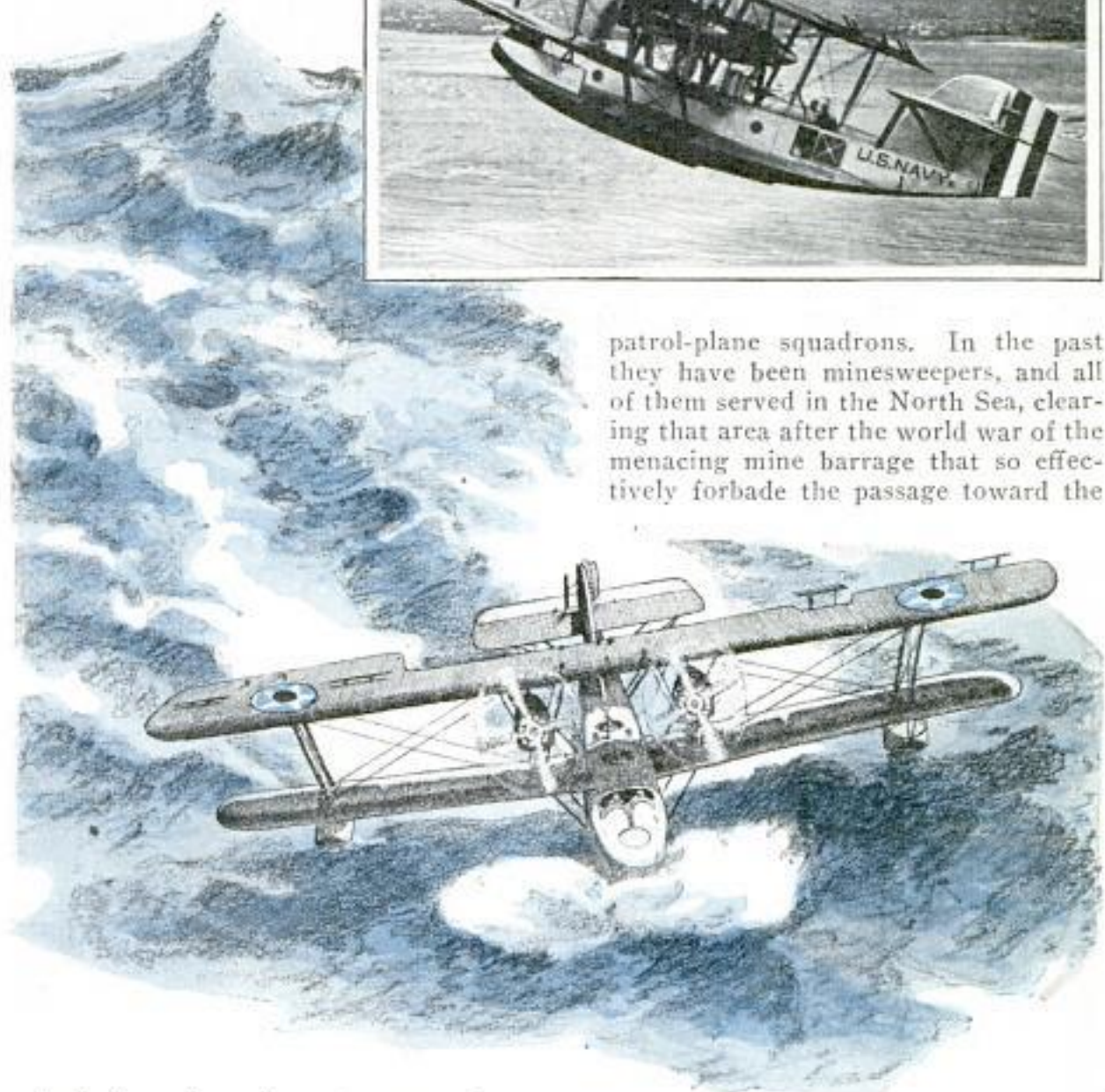
The me-too captain sent out his crew of mechanics. They brought the planes astern, one at a time, gassed them from the big tanks, drained and renewed the lubricating oil, towed them back to the buoys. Repairs would wait for the plane-crew mechs. A half day for that, then the me-too would see the planes safely away for the Pacific. The buoys would be picked up, steam raised, and the isthmus crossed. On the Pacific side another me-too would have anchored more bobbing cylinders.

and their BROOD

A "Me-Too" Boat, on the Opposite Page, Riding Weather in the North Sea; in Addition They Were Threatened by Destruction by Mines; Plane Needing Only Minor Repairs after Drifting Nine Days, at Right; Ready to Take-Off, Below



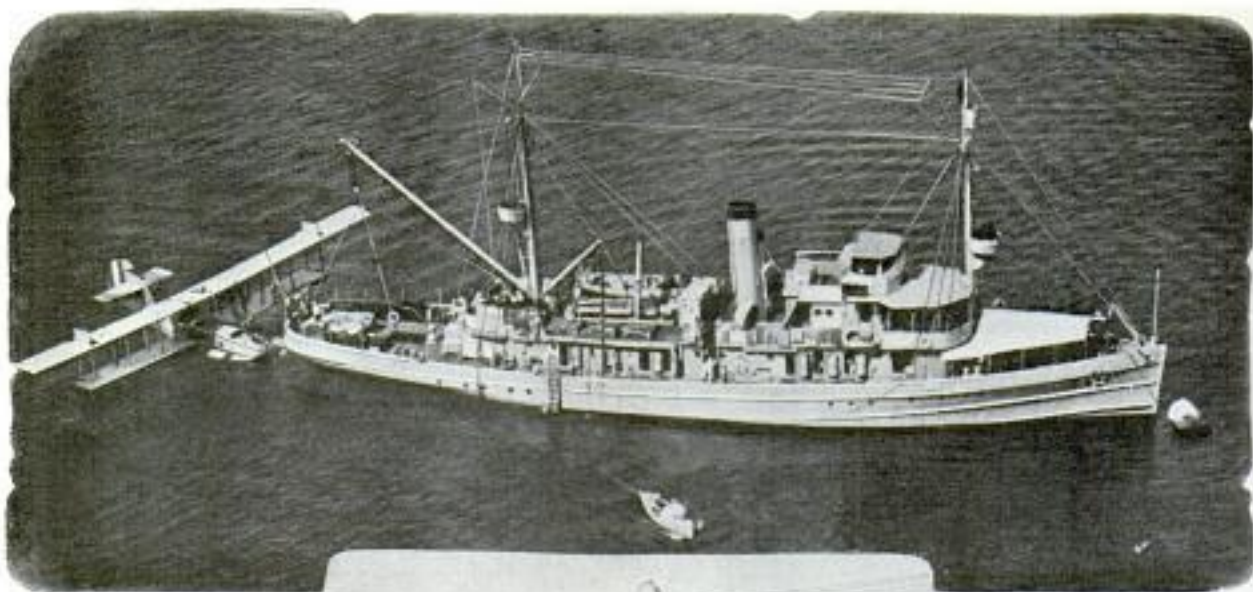
patrol-plane squadrons. In the past they have been minesweepers, and all of them served in the North Sea, clearing that area after the world war of the menacing mine barrage that so effectively forbade the passage toward the



And thus, throughout the year, whenever the navy's patrol planes are ordered on over-water flights, there always are included schedules for the ever-moving, efficient craft which are known, because they are always on hand, as me-too boats.

There are seven of those tenders for the

close of 1918 of the German fleet. In appearance, these tenders resemble gray ocean tugs. A crew of five officers and fifty-seven men is aboard, and they are seamen all, as well as mechanics. When



wind conditions are favorable, this crew is not above making sail. In 1925, when the fleet was en route to Honolulu, the commander-in-chief ordered a fleet speed of fifteen knots. The me-too boats could make but fourteen with their oil-burning boilers, but they hoisted sail and were ready in port for their flying brood when the fleet steamed into anchorage.

Recently, the navy has removed all minesweeping gear from the me-too boats and installed additional fuel and oil tanks. They have been equipped, as well, with heavier lifting gear, an extra seaplane cradle and more spacious quarters for plane personnel. The minesweepers which have undergone these alterations are the "Sandpiper" and "Teal," attached to the flying-boat squadrons operating in the Atlantic; the "Gannet," serving the west-coast patrol planes; the "Swan," operating from the fleet air base at the Canal Zone; the "Pelican," tending the patrol planes at the fleet air base, Honolulu, and the "Avocet" and "Heron," attached to the aircraft squadrons of the Asiatic fleet.

In sum, these seven me-too boats tend



a brood of 186 planes—thirty-one squadrons, comprising the mobile, long-distance patrol arm of the U. S. fleet. The evolution of the flying boat or patrol type of seaplane has progressed remark-



"Sandpiper" Refueling a Visitor, Top, Taking Planes Aboard, Center, and Scouting Plane with Two 500-Horsepower Engines

ably in our navy, and the additional facilities recently installed on board their surface tenders indicate another permanent advance toward more efficient operation.

Today, the navy has developed patrol planes to a point where they are the envy of all nations. The original flying boat of

a1383

a1405

world-war days was a mediocre two-passenger machine. These "HS-1" planes, however, performed valuable services along the shores of France and Italy. Toward the close of the war, the navy developed the "NC"-type, one of which, in 1919, made the first transatlantic flight. Thereafter, the navy concentrated its efforts on a "PN," or patrol-navy type, one of the earlier classes of this patrol plane, a "PN-9" under Commander Rogers, making the historic flight from San Francisco to the vicinity of the Hawaiian islands. Today's navy flying boats are seaworthy, habitable with a crew of five, practically invulnerable, by virtue of their armament, to attack from the air, possessed of powerful radio equipment, and capable of fifteen hours in the air at a cruising speed of eighty knots.

As an example, one of the squadrons, attached to the scouting force operating in the Atlantic, cruised during the period from January to April, 1931, a total distance of 95,640 nautical miles. The six planes of this squadron left Hampton Roads in January for winter maneuvers in tropical waters. The planes flew to Guantanamo bay, Cuba, thence, in February, across the Caribbean to Panama and up the west coast of Central America.

There, basing on the me-too boats, they participated successfully in a fleet war problem, scouting 25,000 square miles of ocean daily, discovering and bombing "enemy" ships. Their radio reports were intercepted in Washington.

On their return trip to Guantanamo bay, the planes of this squadron took an active part in air-concentration exercises in the Caribbean and then, in April, returned to Hampton Roads.

a1646

**CLUE TO AMERICA'S FIRST MEN
UNEARTHED IN ALASKA**

Skeletons of humans believed to have been among the first inhabitants of North America have been unearthed on Kodiak island, off southern Alaska, by Dr. Ales Hrdlicka, of the national museum at Washington. The skeletons support Doctor Hrdlicka's belief that the first settlers of this continent came to Alaska from Siberia by Bering straits, moving from island to island in canoes, then south.

Chicago Herald and Examiner

**TARGET SHOOTING IN REVERSE
SHOWS SKILL ON RANGE**



Expert Marksman Who Shoots in Reverse and Aims Rifle with His Head Upside Down

Capt. George Ash, of the Canadian police, has been engaged to give instructions and demonstration in rifle and pistol marksmanship to military units ordered to Salisbury Plain, England, for target practice. One of Ash's most spectacular stunts is to demonstrate sharpshooting by holding the rifle backward between his legs and sighting over the barrel with his head upside down.

**GASOLINE MADE FROM WASTE
BY "ELECTRONIC BARRAGE"**

a1749

Discovered in the laboratory of the University of Minnesota, a new source of gasoline that seems to promise economical production has been announced. In research done for the American Petroleum Institute, the scientist has extracted gasoline, petroleum oils and other allied products from methane gas, which in modern processes of refining is mostly wasted. Methane, commonly known as marsh gas, has a very low carbon content, and the cost of producing gasoline from it is at present prohibitive commercially. Those conducting the research, however, feel confident further tests with propane, ethylene and butane, other gases wasted in refining and having higher carbon contents, will produce fuel and lubricants from waste at attractive prices.

*New York Herald Tribune
8/23/31*

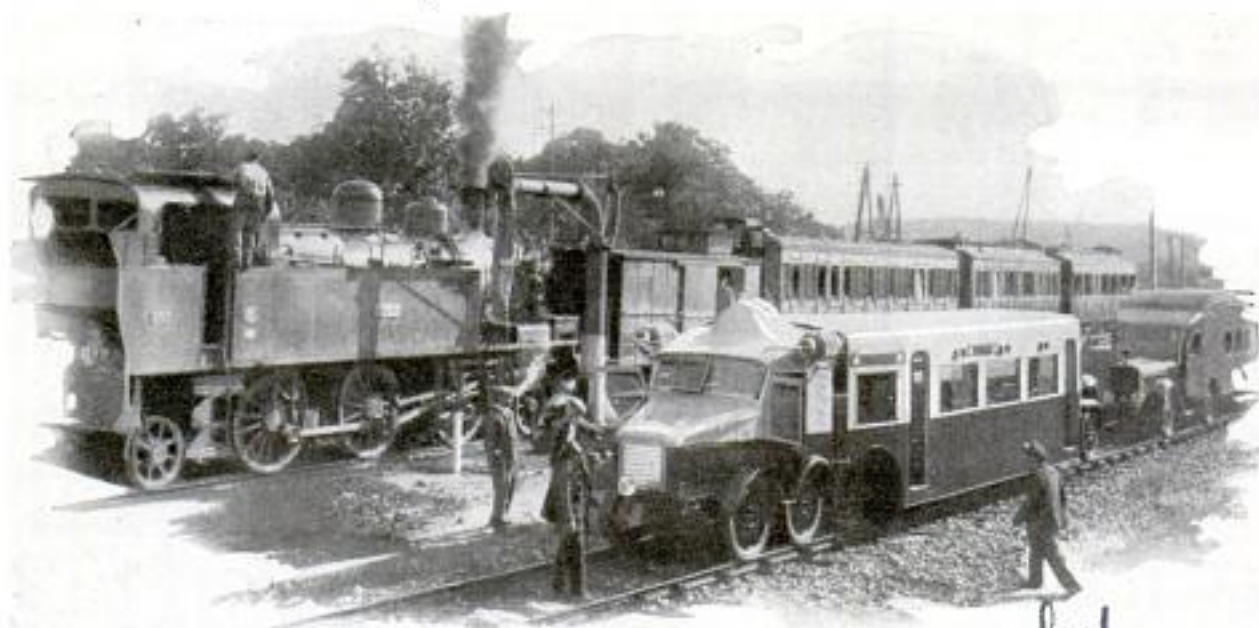
*Dr. E. A. Schuttge
under direction of
Dr. E. Lind*

91612
774

at Saint Ann's, France
POPULAR MECHANICS

Motor Railway Cars Run on Rubber Tires

Michelin Tires Co
uses and vehicle



Comfort for Passengers and Plenty of Speed Are Combined in the Motor-Driven Railway Coach Which Is Equipped with Rubber Tires; Note How Much Smaller the Coach Is Than the Old Equipment

Rubber pneumatic tires have replaced steel wheels on railroad motor cars now in service on a French line, resulting in greater riding comfort. The motor cars are smaller than the old type coach drawn by steam locomotive, but run on the regulation track.

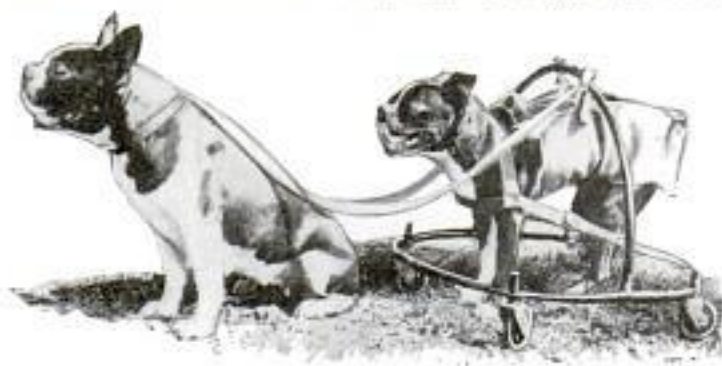
much repair work on planes. Somewhere between the two types is the ideal flyer, and of those selected after mental tests, seventy per cent made good.

9173 WAY TO TELL A GOOD AVIATOR BEFORE TRAINING FOUND

Personality, as shown by psychological examinations, is an index to whether or not a student will make a good aviator, according to authorities of the navy medical corps. Bookworms and "grinds" were found not to do so well as a group at the naval air station at Pensacola, where it was shown that the "poor mixer" and also the individual who is overly serious were likely to give too much consideration to the possibility of danger and accident. On the other hand, the mentally dull and self-satisfied student progresses rapidly with his training because he lives only in the present and either does not know when he is in trouble in the air or would not admit it if told. The second type, however, was found to be the careless flyer who is apt to have crashes, collisions in the air and cause

91681 INJURED DOG IN "WHEEL CHAIR" IS PULLED BY COMPANION

Despite an almost hopeless injury to its back, a Boston terrier is slowly learning to walk again with the help of an improvised "wheel chair" and the aid of another dog. The chair consists of a metal frame in which the injured animal is suspended by means of braces, both rear legs being rendered useless as the result of an accident. The dog is able to get around in this harness with reasonable ease and the occasional help of another dog which has been trained to tow its injured friend.



Teaching His Injured Pal How to Walk Again Is Just a Game for This Dog

Science Service 8/18/31

Leut. P. L. De Loney
U.S. Navy Medical Corps
in Medical Bulletin

Judge W. W. Knight a 1680 and George
 Bungle 775

POPULAR MECHANICS

ENGINE ON CULTIVATOR LIFTS WATER FOR FARM a 1710

With power supplied by a motor garden cultivator and the water supply a well ten feet deep, an irrigation system on a farm near Brookings, S. D., this summer resulted in crops that developed much faster than others on the same farm which received only the normal moisture. The owner dug the well himself and found that it had a capacity of about three barrels a minute. The maximum capacity of the cultivator engine and pump is about four barrels, but, at normal operating speed, the three-inch pipe, with a total length of about 500 feet, was kept full without running the well dry. a 1665

TRAFFIC LIGHT CHANGES SHAPE TO AID COLOR-BLIND DRIVER

Traffic signals which change shape in addition to colors are helping color-blind drivers in one large American city. Instead of having three round lights, as is customary, the green light is oblong and placed vertically, the amber light is diamond-shaped, while the red light is also



oblong but placed horizontally. Many persons are helpless in traffic, being unable to distinguish red from green. One man in each hundred is color-blind, while in women, the percentage of color blindness is somewhat lower.

GAME FISH WITH "MORE FIGHT" DEVELOPED BY HATCHERY a 1709

Crossbreeding brown trout with Atlantic salmon, the fish-culture division of the Canadian government has developed a fish larger than the usual brown trout but with the fighting gameness of both parents. It is said the fish is a better fighter than any now found, even in most of the unfished waters, and it is expected the government will stock streams throughout the Dominion for sport fishing at an early date.

Com. James Montagnes
 6081 Harbour. Comm. Bldg
 Toronto, & Ont. Can.



All Jokes about Rubber Fenders Are Stopped by This Bus Equipped with Semi-Flexible Mudguards

RUBBER FENDERS PROTECT BUS IN MUD OR ACCIDENTS

Motor coaches in one American city are equipped with stiff, semi-flexible rubber fenders. The wheels of the busses are in recesses under the floor, but the fenders extend four or five inches from the sides, serving as mudguards and as protection for the paint if the bus should be side-swiped by another vehicle.

BLUE OF THE SKY IS CAUSED BY SUN'S ELECTRICITY a 1718

Electrons streaming from the sun probably produce the blue color of the sky, Dr. Willi M. Cohn says after laboratory experiments with cathode rays. A stream of electrons, which is the cathode ray, was allowed to meet larger electrically charged particles of matter, known to scientists as ions, which are formed either from a piece of radioactive metal, such as thorium, or from a gas. A blue light appeared where the electrons and the ions came together. This light resembles the sky's color closely. Doctor Cohn points out that the sun's electrons and the ions from gases in the air would produce a similar light when the electrons strike the earth's layer of atmosphere.

University of Berlin

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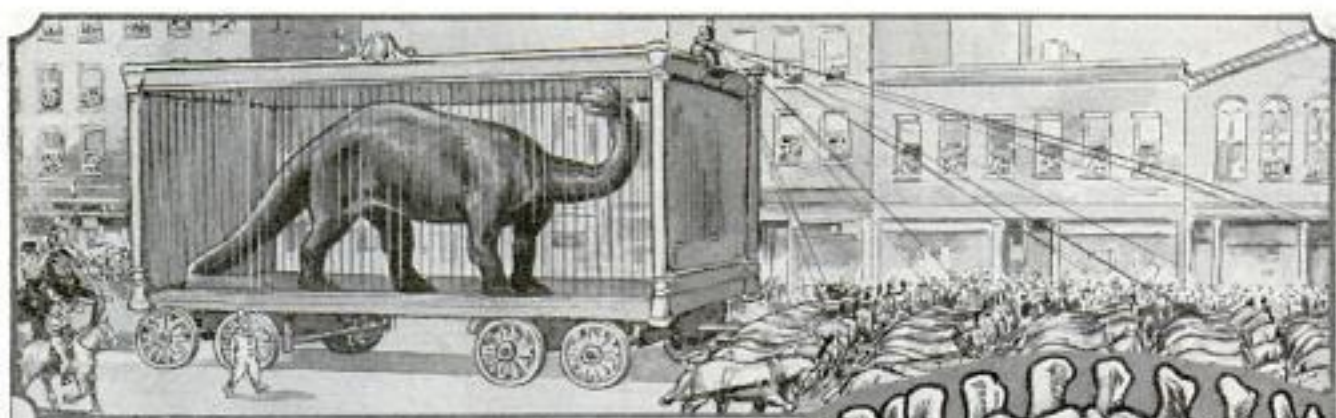
Com. George R. Harrison
 219 Bay St. Council Bluffs
 Iowa

Dr. Charles Adkin
 Baltimore, Md.

Used in Iowa Coaches, made by F. aged at Kent, Ohio.

James pernce
 8/17/31

Giant Thunder Lizard That Shook the Earth



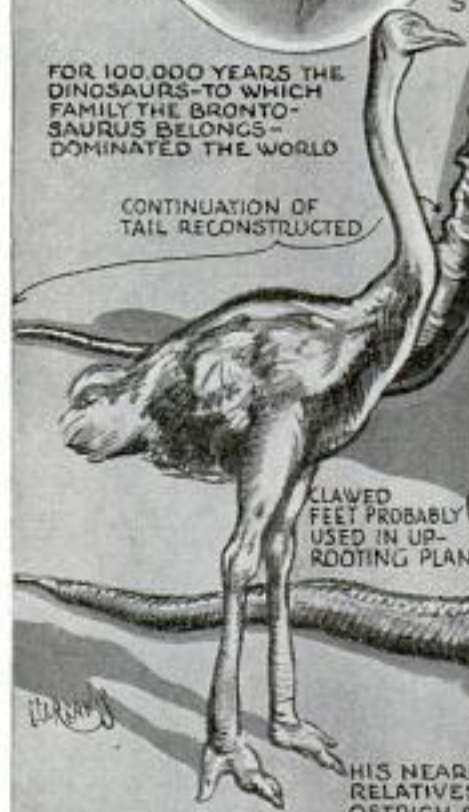
A CIRCUS THAT COULD EXHIBIT THIS ANIMAL IN A PARADE MUST PROVIDE A CAGE AT LEAST 65 FEET IN LENGTH AND 80 HORSES TO PULL IT



LONG TAIL USED AS COUNTERPOISE

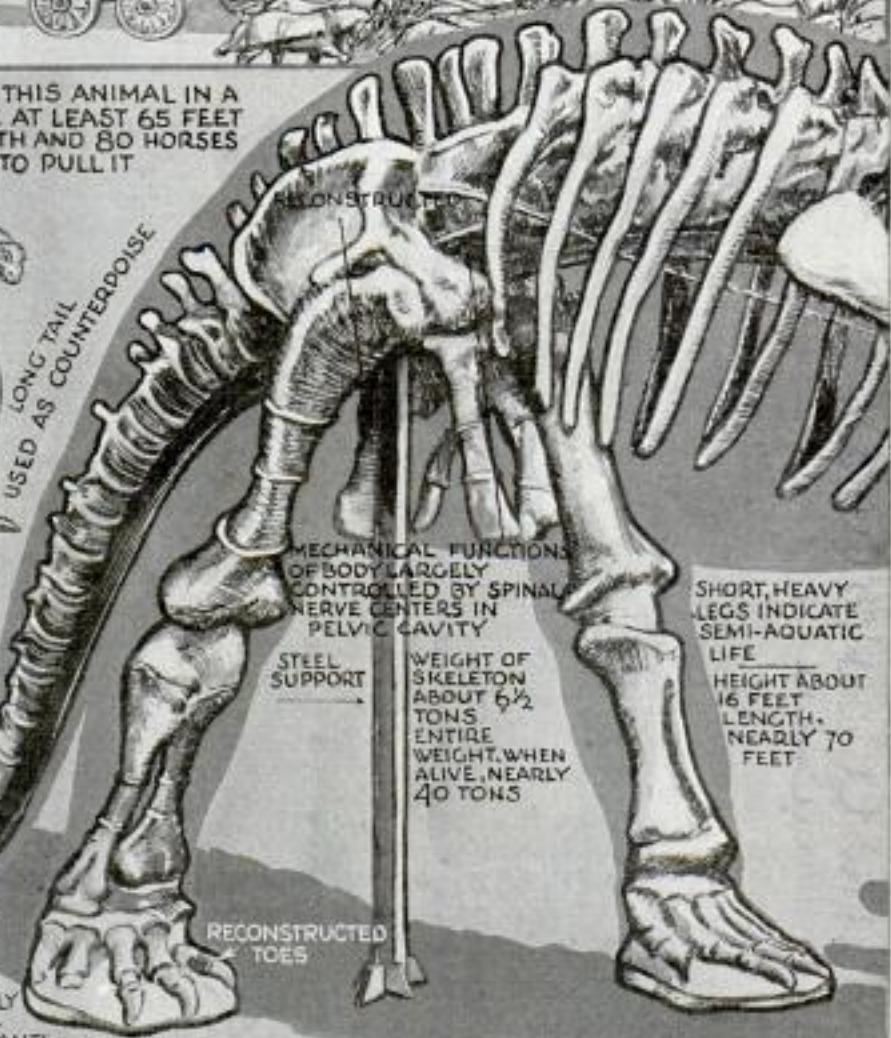
FOR 100,000 YEARS THE DINOSAURS-TO WHICH FAMILY THE BRONTOSAURUS BELONGS-DOMINATED THE WORLD

CONTINUATION OF TAIL RECONSTRUCTED



CLAWED FEET PROBABLY USED IN UP-ROOTING PLANTS

HIS NEAREST LIVING RELATIVES ARE THE OSTRICH AND CROCODILE



MECHANICAL FUNCTIONS OF BODY LARGELY CONTROLLED BY SPINAL NERVE CENTERS IN PELVIC CAVITY

STEEL SUPPORT

WEIGHT OF SKELETON ABOUT 6 1/2 TONS
 ENTIRE WEIGHT, WHEN ALIVE, NEARLY 40 TONS

SHORT, HEAVY LEGS INDICATE SEMI-AQUATIC LIFE

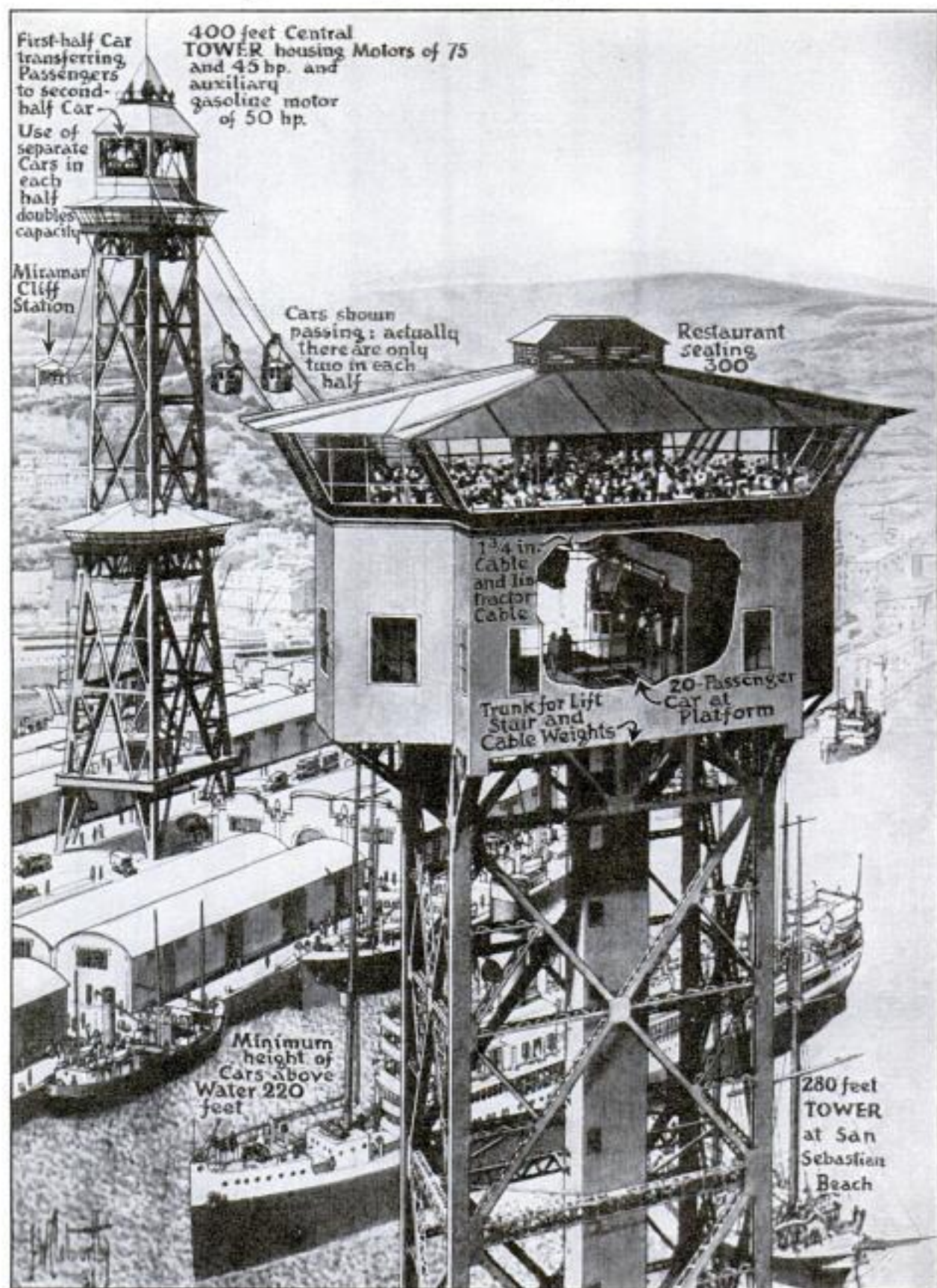
HEIGHT ABOUT 16 FEET
 LENGTH, NEARLY 70 FEET

RECONSTRUCTED TOES

Brontosaurus Excelsus, or Thunder Lizard, Which Roamed the Earth Millions of Years Ago; the Bones Were Collected in 1881 in Wyoming and Partly Mounted in 1901 for Yale's Exhibition

a1609

Aerial Ferry to Speed High Over a Harbor



Air Tramway That Will Link the Cliff Section of Barcelona with the Water Front and San Sebastian Beach, a Favorite Resort on Which the Tower in the Foreground Stands

© S. W. Clatworthy

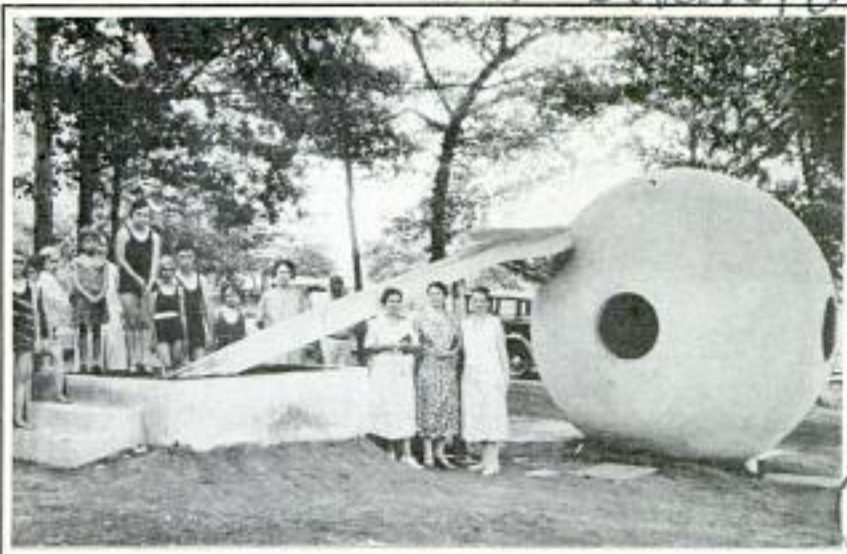
54, Chibblesdale Road,
 Streatham, London
 S.W. 16. Eng.

Copyrighted material

a 793 a1708 C. J. Isoric, Isoric's Place, Mt. Vernon, Ill. 779

COAL-AGE FOREST EXHIBITED IN MUSEUM

Visitors to the Field Museum in Chicago now can step backward in time some 250,000,000 years and see the earth as it looked in the coal age. Museum workers, after years of careful study, have restored a luxurious carboniferous forest with its gigantic and peculiar trees and plants just as they appeared in the past. Not only the trees and plants which were destined to turn into coal are seen, but also the primitive animal life of the period, including dragonflies with a wing spread of more than two feet and cockroaches nearly four inches long. These things have been restored in natural size and lifelike aspect after a scientific study of fossil specimens of the plants and insects, found for the most part in the vicinity of Mazon, Ill., and after careful measurements had indicated the group which each fossil represented.



Huge Hollow Golf Ball of Concrete Which Serves as a Refreshment Stand and Supply Booth for Players on a Miniature Course

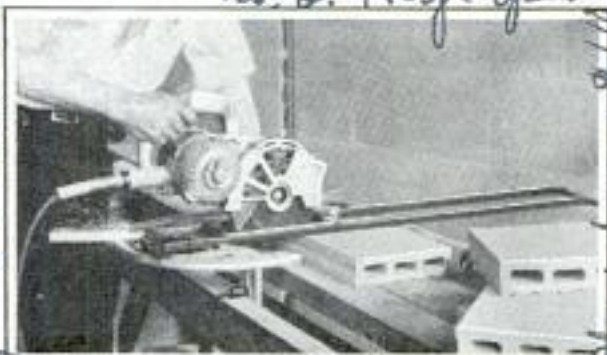
Constructed by owner

BOOTH IN CONCRETE GOLF BALL FOR SERVING PLAYERS

Constructed of concrete, a huge hollow golf ball serves as a refreshment and supply booth for players on one miniature course. The ball, ten feet in diameter, is equipped with electrical refrigeration and lighting and contains a soda fountain, cash register, golf clubs and balls, and other equipment. The course is so arranged that the player sinks his putt on the eighteenth hole, and the ball rolls into one of several compartments inside the concrete ball, bringing him a prize.

SPEED SAW THAT CUTS STONE IS EASILY PORTABLE

Marble, tile, stone, slate and similar building materials are not too hard for cutting with an electric handsaw now on the market. An abrasive disk is used in this operation, but the saw, which runs at high speed, also can be used for regular work with saw blades. The implement is easily portable.



Electric Handsaw with an Abrasive Disk Which Cuts Marble and Similar Building Materials

AUTO CHAIN INSTALLED IN MUD WITHOUT USE OF JACK

Automobile chains now can be installed in the mud or snow after the car has stalled without the use of a jack by employing an appliance which attaches to the chains. The chain is slipped over the top of the wheel and down as far as conditions will allow. The chain appliance, resembling a double pair of ice tongs with curved points, then is attached to the mud chain, inside and outside the wheel and the loose ends are looped over an end of one of the hooks. The appliance is then pulled tight, after which the chain is held in position and the car can be run until a convenient place is found to fit the chains in the regular way.

An automatic sunshine dispenser emits ultra violet rays when a coin is deposited.

cheap. portable electric machine, 134 S. Calygonia

no. 2. High Speed

chain saw

Wapak. d no. 7522 made in Pittsburgh Pa.

*176 7
Berland
Berland
Alma. reb
The Alma Hospital
Alma
Alma*

Q1402
780

Words Go in Japanese and Come Out English



Clock Face in Japanese Characters, and Operator Translating Message into English

Repeated demands for the correct time by her fellow countrymen who do not speak English resulted in the translation of clock numerals into Japanese by a girl employe of a telegraph office which handles messages between the United States and the Orient. The clock is unusual because it carries twelve numerals while Japanese clocks have only six. For transmission to Japan, the operator takes messages in Japanese and send them into the main office in English on a teletype machine. The message crosses the Pacific in this language and is translated back on reaching Japan.

GULF STREAM GETTING WIDER AND PUSHING ARCTIC BACK

Evidence that the Gulf Stream has increased in extent to an unusual degree this year was uncovered by investigators aboard the U. S. patrol boat "General Green," which has returned from four

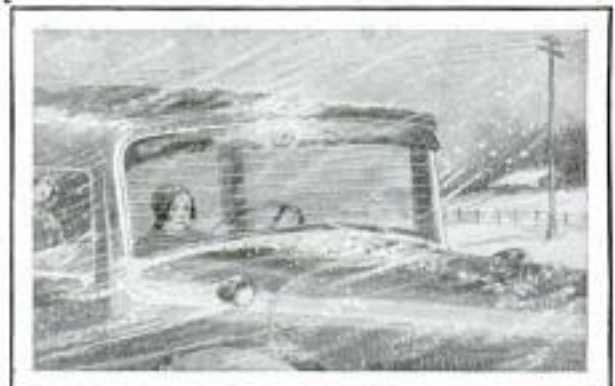
months of exploration in the north. Cold arctic waters had receded much farther than usual, it was found, and but very few icebergs were seen. Encroachment of the stream was found on both the eastern and western slopes of the Newfoundland banks, and temperature at one point was higher last year.

ROCKET BOMB TO CHASE PLANE IN ATTACK

Invention of a bomb propelled by rockets, launched by sound vibrations from an enemy plane and guided through the air by similar vibrations, is announced in San Diego. The inventor foresees such bombs placed in launching cages whenever there is danger of aerial attack. The bomb, once in the air, would be guided by "electric ears," causing it to twist and turn and follow the aircraft, but at higher speed than the plane. A simple contact detonator would explode the bomb the second it touched its quarry in the air.

WINDSHIELD HEATED BY WIRES MELTS SLEET AND SNOW

Fine wires, imbedded in a windshield of special plate glass, are connected to the car's battery and thereby heated so that they melt snow and sleet, and the wiper has nothing but water to remove, even in the coldest storms. In addition to this safety feature, the glass is of a non-shatterable kind that does not endanger car occupants with flying fragments.



Wires inside Windshield Heat the Glass and Keep It Clear in Snow or Sleet Storms

Christian Science Monitor
8/17/31

Proter Islands Co.
220 Sixth Ave.
New York

San Francisco Examiner 8/16/31

Q1402

Research Laboratories,
RCA Victor Co.

233 Broadway, New York

781
91659

EARTH MOANS LIKE AN ANIMAL AND IS HEARD ON PHONE

That the earth has a distinctive moan or wail of its own, not produced by leaking power currents or other explainable causes, recently was demonstrated when Mother Earth's cries were heard on the telephone. In experiments with military field telephones, in which the return current runs through the ground and spreads out in circles, it was thought possible this spreading circuit could be tapped by stakes driven into the ground. This was done, and a powerful amplifier connected to the tapped circuit. Conversations were heard easily enough, but a peculiar moan and wail also was present. Many additional observations were made at various points, and all explainable phenomena were ruled out as the result of them.

Cmd Echhardt

91682

PIANO AND HARP ARE COMBINED IN COLLAPSIBLE INSTRUMENT

Combining a collapsible piano and a harp into one musical instrument, a Los Angeles inventor has made what he calls a "golden harp." When assembled, it looks like a small piano with an aluminum body. By simply attaching a soundboard and removing the keyboard, the instrument is converted into a harp.



"Golden Harp" Looking Like a Small Piano and Combining Tones of Both; It Is Collapsible



Courtesy Union Gas & Electric Co. Operating High-Voltage Switches While Protected from the Flash by Leather Suits

Cincinnati Ohio

SAFETY SUITS PREVENT BURNS FROM HIGH VOLTAGES

Safety suits of white chrome leather instead of asbestos compounds have been adopted by an electric power company for high-voltage switchboard operators. The suits are simple in design and require but two fasteners. A hood is an integral part of the costume and is fitted with a "skirt" to protect the wearer's face from burns and also to prevent him from inhaling flame. The helmet has a glass eyepiece mounted in the leather. At extremely high voltages, the greatest element of danger lies in the flash of fire during short circuits or other troubles, rather than in the mere handling of the current, and it for such emergencies that the suits have been developed.

The Popular Mechanics' Bureau of Information offers its free service to all readers of this magazine. Names and addresses of manufacturers, and dealers in articles described, and any other details in our possession, will be promptly furnished.

*Dr. Charles W. Presley,
1133 Hyperion
Los Angeles, Calif.*

U.S. Daily
8/18/31

a 1698



George Washington's Face on a Hillside; Note Space at Right of the Head Where a Brief History of the Nation Will Be Inscribed

WASHINGTON'S FACE IS CARVED ON GRANITE HILLS

George Washington's face, carved into solid granite 300 feet high in the Black Hills of South Dakota, is taking form under the direction of Gutzon Borglum, the sculptor, as a lasting memorial. Images of Jefferson and Lincoln also will be carved on the rock, a task which will take about five years.

SPEED OF PLANES INCREASED GREATLY IN THREE YEARS

Trends toward greater speed for airplanes were marked in the last three years, according to the department of commerce aeronautics bureau. The average high speeds of airplanes approved from 1927 to 1930 showed a steady increase between the approximate limits of 101 and 137 miles per hour, but, from the third quarter of 1928 to the end of 1930, there was

Auto Topics 8/8/31

never a time when the average top speed dropped below 117 miles an hour. At the same time it was noted that average landing speed followed exactly the same trend.

a 1730

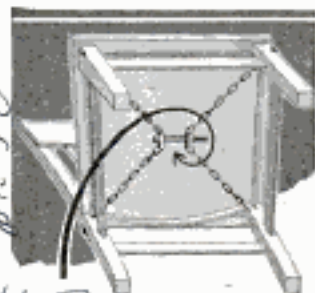
COTTON COVERING FOR CURING OF CONCRETE

Instead of covering concrete with burlap in the first twenty-four hours of the curing process, a number of contractors have reported the use of cotton fabric with excellent results. The cost is said not to be higher and the curing equally good if not better, because the cotton holds more moisture than the coarser burlap. An estimate, based on the reports of the government as to the amount of concrete construction by states and counties, indicates that more than 100,000 bales of cotton would be consumed, while, if its use were extended to cities and other political subdivisions, more than 300,000 bales could be taken out of the market each year.

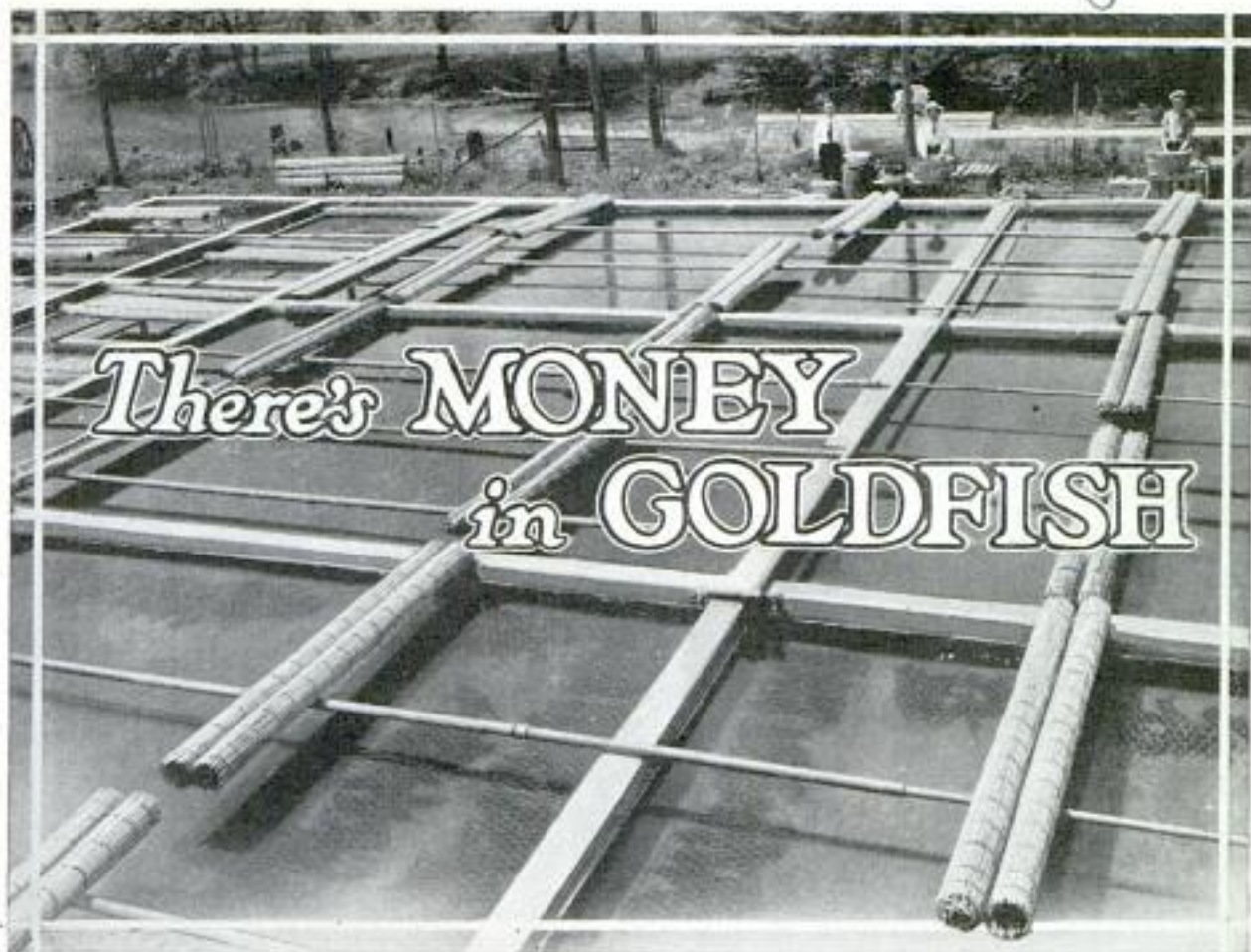
Article by John W. Hornsby, 6/24/31
See 20

CHAIN BRACES FOR CHAIR LEGS ELIMINATE WABBLING

Chairs or beds that wobble because glue or screws give way, can be quickly repaired by the use of a chain brace the pull of which is placed on the outside corner of each leg by means of angle-head bolts. From each leg a section of chain extends to a turnbuckle through which equal pressure can be exerted on all the legs so that the piece of furniture will be tightened permanently.



The Wittliff Furniture
Co. 12810 Superior
Ave. Cleveland Ohio



There's MONEY
in GOLDFISH

Breeding and Hatching Pools Where Fancy Goldfish Are Raised; Water Is Piped into These Pools Where Millions of Bright-Hued Fish Are Grown for the Market Each Year

THE saying "poor fish" cannot be applied to the 5,000,000 inhabitants of Kaicha Matsunaga's sixty-acre hatchery on the banks of the Karitan river, near North Branch, N. J., for these pedigreed pets lay eggs that hatch into the fancy goldfish destined to luxuriate in America's most sumptuous garden pools and fish bowls.

Matsunaga and his partner, Masakichi Kashiwa, created both the supply and demand for fancy goldfish in this country. Ten years ago, perfect specimens of lionheads and orandas were hardly seen outside of aquaria. But these enterprising Japanese have made such breeds available to all wishing to invest from \$5 to \$150.

Lionheads top the market in the fancy goldfish trade. They range from two inches up to about seven inches in length, are roundish in body, and stub-nosed and short-tailed. The head is a brilliant red, which seems self-luminous under water. It is a clumsy swimmer, wriggling comically when retreating from danger.

In Japan, fish fanciers take great pride in their lionheads, and among the specimens exhibited at the annual show, the prize winner may command the fabulous price of \$1,000. The value of prize goldfish is determined, first, by the perfection of shape, which includes its swimming form; secondly, by the specimen's development, and last by the shape and development of the head. The head is the most important factor to consider.

Matsunaga also has sold orandas for \$150, but this variety differs from the lionhead in many respects. They have long lacy fins and tails, and swim with the utmost grace. They range in color from reddish gold to creamy white.

Ten years ago, Matsunaga relates, he was an importer and exporter in Japan, more interested in his hobby of raising goldfish than in business. Soon the hobby took complete possession of him and he gave up his business to stake a small fortune to import 4,000 fancy goldfish, including fantails, nymphs, shubunkins, to-

matsunaga's

*Japanese Goldfish
Hatchery Co. Inc.
North Branch N.J.*



Above, Feeding Cooked Oatmeal to Goldfish; Left, Collecting Valuable Specimens from the Pools

in the world. Forty-five acres of the property are under water. The fish swim in 400 rectangular pools arranged in series, each pool measuring sixty by eighty feet. It requires fifteen to twenty men to carry on the work. The company deals with more than 1,000 goldfish wholesalers, who supply individuals with practically all the fancy goldfish bought in this country.

While generally looked upon as a very sensitive creature, the fancy goldfish does not mind ice-cold water. Indeed, it prefers a low to a high temperature. Matsunaga reports that in winter the pools are covered with eight inches of ice, but he does not know of a fish which has suffered from cold. A hole in the ice suffices to replenish the oxygen in the water. Food is also lowered through a hole.

The feeding of 5,000,000 goldfish involves the full-time labor of seven men. The diet consists of two items, cooked oatmeal, and a species of bug, called the daphnia, which is fed alive. The bugs are grown on the grounds, but the oatmeal comes from the grain markets.

The oatmeal flakes are mixed with water and cooked until the water boils and

escapes, calicoes, veil-tail telescope calicoes, orandas and lionheads. Then he approached a steamship company with an amazing proposition: to transport these fragile, sensitive creatures from Japan to New York, halfway around the globe. Only 500 survived the voyage.

Later Matsunaga selected a place on the Raritan river, where the stream is only thirty feet wide, and unpolluted by city refuse. He dug ponds, pumped water from the stream and started a circulation system through a series of galvanized-iron pipes. Out of the original 500 specimens, he already has raised about 20,000,000 fancy goldfish, of which you may see specimens almost anywhere in America.

Today he has the largest breeding place for fancy goldfish in this country, if not

*a 1745 The Speed Aquaplane Co
785
New York, Staten
Island, N.Y.*

the batter reaches a thick consistency. In all respects, save for seasoning, it resembles the oatmeal eaten by us for breakfast.

Winter feeding eases the attendants' work considerably. The fish are fed only twice a week, and then on reduced rations of about five tons per week. Only breeders and left-overs are boarded during the winter, since most of the spawn is sold during the summer and fall. In all, the winter population rarely exceeds 1,500,000.

In early spring the torpid fish grow active, and during May and June they are occupied in breeding. This, of course, is their most important function and they are aided in every possible way by their attendants. The bottom of the concrete pool is covered with a special variety of water fern and covered with a chicken-wire netting. This composes the "nest." Almost as soon as laid, the eggs are transferred by attendants to a hatching pool, for goldfish have a way of eating their eggs. And that accounts, says Matsunaga, for their inability to breed abundantly in natural watercourses.

laminated panel board

**AQUAPLANE FOR SLOW SPEEDS
FOLDS UP FOR CARRYING**



Portable Aquaplane Which Is Light in Weight and Folds Up so It Can Be Carried Easily

Buoyancy sufficient to keep a 200-pound rider afloat at slow speeds is one advantage of a portable aquaplane which is made in two pieces for easy carrying. The two parts are clamped together with turnbuckle bolts, while the aquaplane comes strapped together with a carrying handle and a kit containing four turnbuckles and a tightening tool. The buoyancy is obtained by the hollow construction of both parts of the plane, while there is an upward flare at the bow which keeps it from ducking, and splashing the rider.

**INDIAN DESIGN TO CAUSE SLEEP
AIDS INSOMNIA VICTIMS**

By following the black line in a peculiar Indian design, insomnia sufferers cannot keep from going to sleep, some of them say. Tests by persons afflicted by wakefulness show that the design, which was

a 1744



Indian Design Which Insomnia Sufferers Say Induces Sleep; They Follow the Black Lines

drawn by ancient Indians as an insomnia remedy, is hard to follow three times without falling asleep.

no further info

**HIGH-SPEED CAMERAS PICTURE
ESCAPING AUTO BANDITS**

High-speed cameras have been used with success recently in Scotland Yard in obtaining picture evidence that has resulted in the arrest of escaping automobile bandits. In one instance, a police car equipped with such a camera obtained a picture of a speeding auto, occupied by bandits who had robbed a jewelry store, which showed enough of the driver and of the car to make identification possible. In another case, a flashlight was used with a high-speed camera to make a picture of riders in a stolen automobile. This picture likewise resulted in arrests.

a 1770

Flying Jure

pend

Carl Wilkins

91204

Carl Legel don Benja Owens Jr
42. Le Roy M
Akron Ohio
CHEMICAL

Reprinted by Sam Brown



PLAIN CARDBOARD



are! If desired, you can use a handkerchief instead of the cardboard, stretching this on a frame or placing it on a table or chair while you produce the Hand of Blood.

IN India, there once lived a yogi or holy man. He denied himself all worldly pleasures and devoted his life to the poor. He had no name. He spoke no language. The only sign which marked his journeys throughout the country was the imprint of a human hand—the "Hand of Blood."



--AND THEN--



SODIUM SALICYLATE SOLUTION

CARDBOARD



THE HAND OF BLOOD

You don't believe it? Consider. Examine this sheet of cardboard. Witness that I wash my hands to remove any trace of grime or dirt. Now, look! It's the red hand, the hand of blood as performed years ago by that holy man of India.

All of which, of course, is a "lotta applesauce"—merely the colorful "patter" which accompanies this excellent bit of chemical magic. To prepare for the trick, you paint or spray a square of corrugated cardboard with a solution of sodium salicylate. The water into which you dip your hand is a solution of iron-ammonium sulphate. That's all there is to it.

You exhibit a square of cardboard which looks exactly like any other square of cardboard; then, you plunge your hand in the chemical solution which looks exactly like water; then, you press your hand on the cardboard. And there you

Perhaps the most pleasing of all tricks depending upon chemistry or chemical reaction is the familiar water-to-wine effect in which a glass of water is made to change into wine and then back to water again. The change has a score of variations. Three of the most popular color combinations—water to wine to water; water to ink to water, and water to sherry to water—are pictured at the top of the opposite page. All three feature simple chemicals which can be obtained inexpensively at any drug store.

Let's start with the water to wine. You will need three glasses. The first of these contains the original water, in which has been dissolved a half teaspoonful of sodi-

MAGIC

um carbonate. The second glass holds a few drops of phenolphthalein solution. The third glass houses a few drops



water and in it dissolve a little iron-ammonium sulphate. Put a few drops of tannic-acid solution in the second, and a few drops of strong oxalic-acid solution in the third. If you pour from the first glass into the second, the liquid will assume the color of black ink; if you pour this ink-colored fluid into the third glass, it will change back to the color of water. The non-chalant gesture, in this case, is to dump the final

of tartaric acid dissolved. Now for the magic. By pouring the water from the first glass into the second glass, you will get a beautiful shade of red; by pouring this red mixture into the third glass, you will get clear water again. Both changes are instantaneous. The water at the conclusion of the effect is perfectly clear and may be imbibed with more or less freedom.

Three glasses again. Fill the first with

mix into the kitchen sink since it would be rather destructive even to a magician's stomach.

Once more three glasses. Put plain water in the first; a few drops of tincture of iodine in the second, and a few drops of sodium sulphite or hypo solution in the third. That's your water-to-sherry-to-water. But don't drink it.

The power of fire is strong, yet it can-

a1204



not burn a lump of tablet sugar. That is, unless you happen to be a magician. In that case, you would casually rub some cigaret or cigar ash on the sugar, as shown in the photograph, thus giving it sufficient timber to flare up quite readily.

Here's an "egg-citing" one: You exhibit two tall glasses, both filled with water. A spectator selects two eggs from a dish and writes "sink" on one egg and "suspend" on the other. And that's what they do. The performer mutters the magical words, and the two eggs sink or swim according to the legend. The real secret, of course, is that eggs can hear as well as human beings and will do almost anything you tell them. Then, too, may be the fact that one of the glasses is half-filled with a strong solution of salt water has something to do with it. In preparing this glass, half-fill it with salt water made by dissolving as much salt as possible in boiling water. Then, fill the glass to the brim with clear water, pouring the fresh water slowly down the edge of the tumbler, as shown in the picture.

Did you ever bounce a soap bubble? Take a piece of square laundry or Castile soap and dissolve a one-inch section into a pint of hot water. Add one-half tea-

spoonful of gum arabic and one teaspoonful of glycerine. Then, add another pint of water—cold this time in order to cool the mixture. Bubbles blown with this solution will bounce on wool or on a soft felt hat. Not just once either, but fifteen, twenty or thirty times. And how that glycerine makes them sparkle! An odd little conceit is to blow one full of cigaret or cigar smoke. When it finally goes "boom," you have a dead imitation of a bursting gas bomb. And, if you want a real boom, blow a few with a pipe containing a wad of gasoline-soaked cotton, and touch them off with a match.



THE FLOATING EGG



FRESH WATER

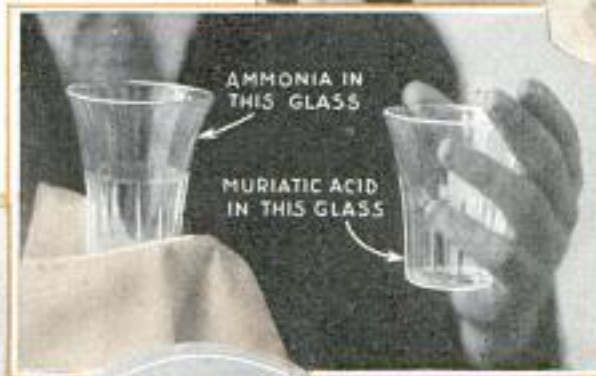
SALT WATER



"Old Man Water" and "Old Man Fire" had an argument. And O. M. W. drew a line. And he dared O. M. F. to cross it. Old Man Fire flared up. He rushed forward. But—lo and behold!—he cowered back as he approached the magic line. He couldn't cross it. You do it with a piece of paper. You draw a light pencil line across it, about halfway. You dip one end of the paper into a strong solution of household washing soda, holding it so that the penciled line is just above the surface of the fluid. You let the paper dry. You erase the penciled line, but not so thoroughly that you cannot locate it again. When doing the trick, you redraw the line and apply the match.

Of course, it is the unprepared half of the paper that burns and this must be held downward in presenting the effect.

Take a piece of fairly coarse paper and rub it with ferric ammonium sulphate in dry form. If you draw or paint on this paper with a solution of tannic acid, the picture will turn out black although you are apparently drawing with clear water. Magical enough as this is, the "piece de resistance" comes when the performer rubs a dry blot-



former exhibits two glasses which he covers with a handkerchief. Standing a few feet away, he puffs a cigaret and wafts the smoke toward them. After a



minute or so of this, he removes the cloth and shows the glasses to be filled with smoke which billows out when the two tumblers are separated. The "how" is absurdly simple. You will need two clean glass tumblers. Into one of these put a few drops of muriatic acid, and give the glass a rotary motion so that the liquid will cover the bottom. Into the second glass put a few drops of strong liquid ammonia and give this glass a rotary



ter over the picture and causes it to vanish entirely. Oxalic-acid solution does the latter part of the trick, the blotter being soaked and dried a number of times in and out of this fluid until it is thoroughly impregnated with the magic ink remover.

Would you like some trick matches? Paint a ring about one-half inch below the head of an ordinary safety match with sodium silicate or water glass. Let it dry. When the match is struck, it will flare up beautifully but go out at the exact moment it is needed. Again, dip the whole head in the water glass solution. When the match is struck, it will sputter fiercely and give up a great cloud of smoke, but nary a sign of a light.

Here's another smoky one: The per-

former exhibits two glasses which he covers with a handkerchief. Standing a few feet away, he puffs a cigaret and wafts the smoke toward them. After a minute or so of this, he removes the cloth and shows the glasses to be filled with smoke which billows out when the two tumblers are separated. The "how" is absurdly simple. You will need two clean glass tumblers. Into one of these put a few drops of muriatic acid, and give the glass a rotary motion so that the liquid will cover the bottom. Into the second glass put a few drops of strong liquid ammonia and give this glass a rotary motion also. And the trick is finished. As the gases form dense smoke at short range, keep them apart until they are to be covered with the handkerchief.

MOVIE FLOORS TO SLOPE UP? .

Floors in movie theaters should slope up instead of down, a theater architect declared recently before the Society of Motion Picture Engineers. He argued that the audience would have a better line of vision and would not have to tilt the head back to see the upper part of the screen.

Ben Schlanger

91750

Science Service
12/22/21

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790

Cont. Christopher Spang
c/o Air Press Agency
66 57, Fleet St London
E.C.4
Eng



Model of Admiral Nelson's Historic Flagship "Victory," Launched Recently; It Participated in a British Naval-Week Celebration

MODEL OF NELSON'S FLAGSHIP SAILS THE SEAS TODAY

Admiral Nelson's flagship "Victory" again sails the seas in model form. The model of the famous vessel recently was launched at Portsmouth and later participated in a British naval-week celebration.

MAN'S SPEED LIMIT ATTAINED AT SIX MILES A MINUTE?

Has the virtual limit of man's speed been reached? Aeronautical experts in Europe are asking this question after seeing the racers produced by England for the 1931 Schneider trophy race. The last ounce of speed has been wrung out of these frail structures of steel and alumi-

num, the two Supermarine planes, which will travel over six miles a minute. Huge superchargers pack over 2,000 horsepower into the twelve-cylinder engines whose maximum vertical dimension is less than three feet. Wings have been reduced until they will not sustain the aircraft at under 100 miles an hour. The cockpit is so cramped that the pilot must be measured for it, pontoons are reduced in size until they only just float the aircraft when at rest, and are used both as radiators and fuel tanks. Every projecting rivet is streamlined to reduce air resistance, yet the magic figure of 400 miles an hour is, experts believe, still out of reach. And the factor which is putting it out of reach is not a matter of engine power or aerodynamic design but simply the problem of getting rid of surplus heat. The British racers are virtually flying radiators. In order to dissipate the heat, fuselage,

wings, tail and float covering all possess double, corrugated skins. Between the skins, the hot water and oil circulate, to be cooled by a 360-mile-an-hour draft. In these racers engine power is almost entirely used in overcoming the friction of the air over the streamlined surfaces of the airplane. If any more engine power is added, more area must be provided to get rid of the excess heat, so the extra engine power will be wasted. If, on the other hand, the skin friction of the airplane is reduced by lessening the surface area, the engine power will have to be stepped down, or the engine will overheat. In order to get more power, with reduced air resistance, the Italians have designed aircraft with two engines, one behind the other. It is feared, however, that this

Supermarine

Kansas City June 8/13/31

O. A. Zimmerman
Chief Engineer
Kansas City Bridge Co
POPULAR MECHANICS

a1707

avenue offers but little promise and that the difficulty of getting rid of the excess heat still remains.

PREHISTORIC ANIMAL'S TOOTH WEIGHS OVER FOUR POUNDS

a1690

Modern machinery, digging eighty-seven feet beneath the bed of the Ohio river, near Evansville, Ind., unearthed a prehistoric monster's tooth weighing four and one-half pounds. The tooth, which was found in what engineers call "cemented gravel," is nearly seven inches long and four inches thick. Experts classified the tooth as having belonged to a mastodon, a giant elephant which roamed the earth thousands of years ago.

pat. app

FATIGUE MEASURED BY METER AS YOU STAND ON IT

a1688

Whether you are tired or not, and, if so, how tired, is told by the "wobble meter," recently tested on passengers landing at a Washington airport. It resembles a "health scale" in form and tells the degree of fatigue by measuring the shifting of weight from one foot to the other when the person wobbles.



Measuring the Degree of Fatigue of a Woman Passenger Just Landed at an Airport

and by Mr. H. A. Mrs.



Snake-Proof Leggings of Light Metal. Made Like Hip Boots, for Travelers in Infested Areas

SNAKE-PROOF METAL LEGGINGS PROTECT WEARER'S LEGS

Snake-proof leggings, made of light metal, provide protection for the wearer's legs on hunting or fishing trips in reptile-infested regions. The leggings reach higher than the average snake can strike. So light is the metal, the leggings weigh less than if made of leather or rubber.

and Maston O'Rowe Mulberry, Fla

STEAM FOR COOLING RAIL CARS MAKES TASK AUTOMATIC

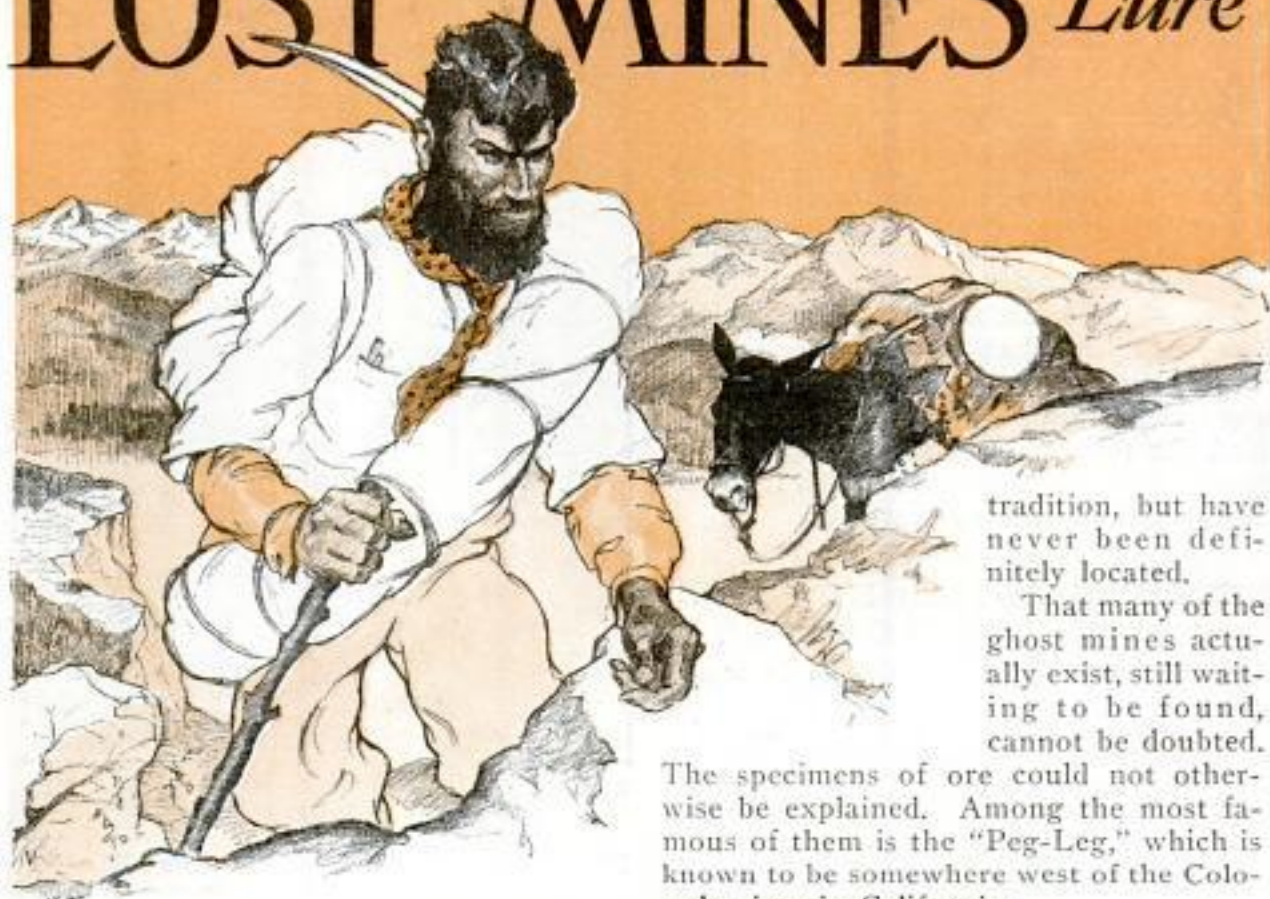
a1751

Steam and water are the only agents used in an almost entirely automatic cooling system demonstrated recently before railroad and Pullman officials. Depending on the well-established principles that water absorbs much heat in the process of evaporation and that the temperature at which evaporation will occur can be lowered greatly by reducing the air pressure above the water, the procedure is to inject steam into a tank of water so as to create a vacuum above it. Evaporation reduces the temperature to forty degrees, and it is run through coils over which air is drawn and blown into the car.

Science Service. 8/22/31

a 1491 Comb. Thomas & Stinson
Jr. 145 S Spring St
Los Angeles Calif

LOST MINES *Lure*



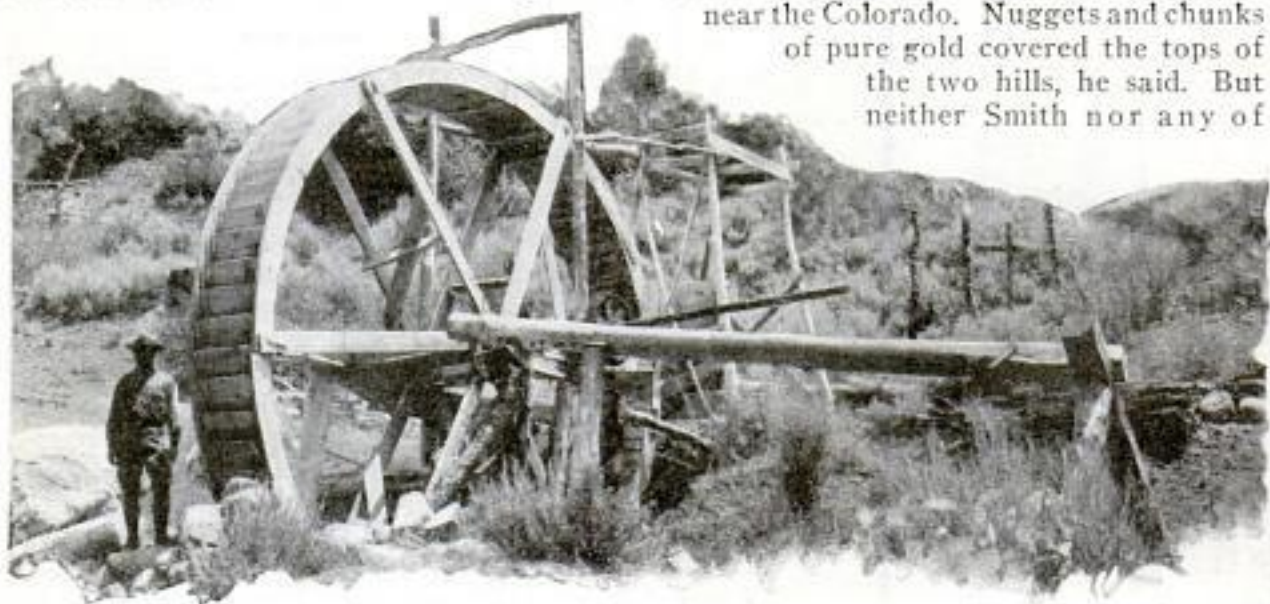
tradition, but have never been definitely located.

That many of the ghost mines actually exist, still waiting to be found, cannot be doubted.

The specimens of ore could not otherwise be explained. Among the most famous of them is the "Peg-Leg," which is known to be somewhere west of the Colorado river in California.

"Peg-Leg" Smith found the mine first. During the early days of the gold rush he wandered into the little desert town of Mojave with \$10,000 worth of black nuggets in his saddle bags. He picked them up, he said, on the top of two black buttes standing by themselves in a hilly region near the Colorado. Nuggets and chunks of pure gold covered the tops of the two hills, he said. But neither Smith nor any of

THE proverbial pot of gold at the foot of the rainbow has not as many seekers as the ghost mines that abound in legend of the southwest and in northern Mexico. For scores of years men have persisted in the search for the fabulous riches that are recorded in history and



Overshot Water Wheel at a Desert Oasis Used to Operate an Arrastra, a Primitive Milling Contrivance Designed by the Early Spaniards for Crushing Ore

© Fernie Always

Rec March 1935 - 392

a 1491

GOLD HUNTERS

the men who accompanied him on his return could find those buttes.

Another mine from which peculiar specimens have been taken is "White's cement mine." It is probably hidden away in the hills of northern New Mexico. White, an old prospector, arrived in Horse Head Gulch in Colorado in 1858 with specimens of a hard white clay containing free gold that as-



On a 25-acre site...
 Heat Thwarts Search For Lost Gold Hunter
 Indian Legend Also Helps to Shield His Secret: Dead, Arizona Fears.
 Phoenix, Ariz., June 27.—(AP)—
 Searching for...
 knowledge of a...
 combined today in defeat-
 ing the effects of those hunting in
 Arizona comes for A. Toak, 80.

sayed \$15,000 to the ton. The entire camp was stirred by the discovery, and White was forced to promise to reveal its location. He led the camp on a wild-goose chase for weeks, escaping a few hours before he expected to



Typical Prospecting Outfit, Top; the Desert Claims an Adventurer, Center, and Death Valley Scotty, Below

come upon the mine. Half the expedition perished in the search that followed. Three years later, White appeared in Salt Lake City with more of the white ore. Then he disappeared forever.

In spite of all the wealth that has been taken out of the Panamint mountains, the Funeral range, and the other hills that surround the awful region in California called Death Valley, some of the richest mines in the area are yet to be located. Among these are the Gunsight and possibly the Breyfogle, the first being a mountain of silver and the second a ledge of gold ore. Some believe that part of the wealth ac-

a 1491



the Spaniards worked in central Texas. Only a few of the diggings, admittedly the poorest, have been found. The Guadalupe mountains on the Texas-New Mexico border are said to conceal another storehouse of gold. The Spaniards abandoned the mine during the Indian uprising of 1860 and left no traces of their work behind. Although many have looked for the secret



of the Guadalupe, only one man ever found it. This man was "Old Ben" Sublett. For many years before his death, Sublett made trips into the Guadalupe, bringing back each time a load of metal. Untold riches, he said, were in a cave on the floor of a small canyon. The gold is still there.

Men are still searching for Yuma's gold in the mines of Arizona, in the Lost Nigger in Texas, the Mina Perdida, the Lost Padre, and others.



Front and Back of the Map, Showing Way to the Lost Breyfogle Mine; Typical Gold Hunter of the Fraser River, and Prospecting Outfit Leaving Oasis

Library Installed in Film Star's Home Shop



Two Views of a Home Workshop That Contains, Among Other Things, a Shop Reference Library

Collection of a shop library will help home mechanics, says Rod La Rocque, motion-picture actor, who operates his own workshop at his Hollywood residence. The actor says books and magazines have helped him, and points out that the best place for books on shop practice is right where the illustrated setups can be demonstrated. Mr. La Rocque's shop is fully equipped with a motor-driven lathe, an electric grinding wheel, a drill press, bandsaw, circular saw, jointer, anvil, machinist's vise and a complete assortment of tools. He advises amateur

mechanics to buy only good tools. Every phase of shop work is enjoyable to the actor, who says that he built most of the furniture for his summer home, that he is interested in model making, silver chasing, oxyacetylene welding, and builds all his cameras, telescopes and microscopes. To him, the real thrills of the home workshop lie in the problems involved in setups and in working to close tolerances and limits, such as turning camera parts with precision in the lathe.

FISH FRIGHTENED BY SHADOWS AND NOT BY NOISE

Contrary to popular belief, noises do not disturb fish, and anglers do not need to keep quiet while fishing. This is the conclusion reached by Henry W. Fowler, curator of fishes and reptiles of the Academy of Natural Sciences, Philadelphia, who has decided that shadows, particularly moving shadows on the water, frighten the finny creatures instead of noises. Oil-burning trawlers have reported poor catches when great volumes of smoke leave the funnels and cast a shadow over the water. Most people who make much noise while fishing also move about considerably and Mr. Fowler believes that their shadows, rather than the sounds, account for poor luck with such anglers.

Eckhardt

Interviewed by John H. Sheehan of South Bend Lathe Works, 426 E. Madison St. South Bend, Ind. 91715

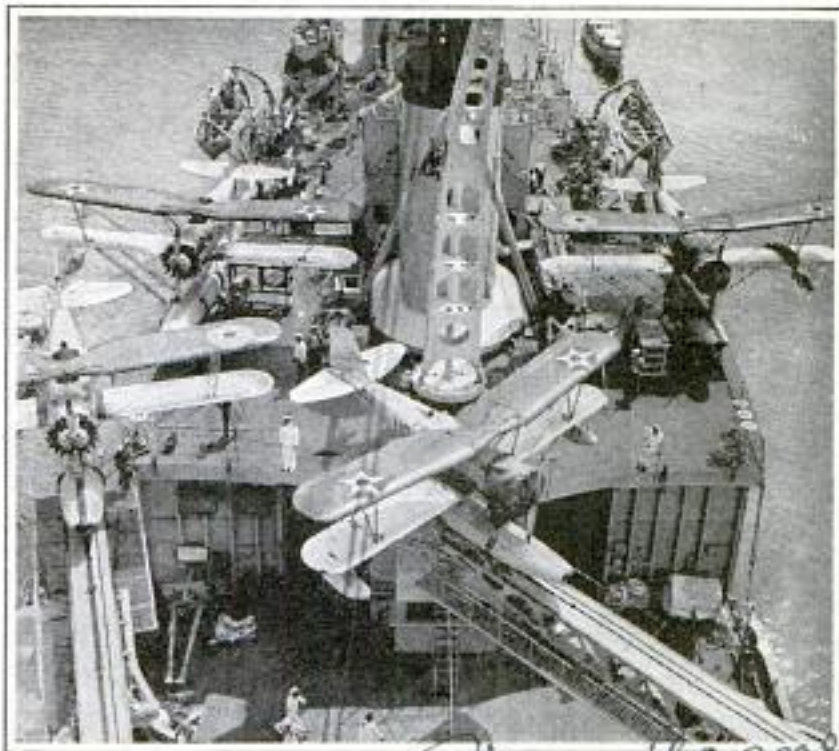
Cherry - 541 W. W. Working 91768

91719.

91643

MUSIC MADE WITH MERCURY TUBES AND TOY PIANO

Controlled entirely by a tiny piano, a radio "organ" recently was demonstrated by the General Electric company in a Schenectady theater. The organ producer box was fitted with eight Thyatron tubes, each of which was tuned to produce a particular tone in the octave. One of the peculiar characteristics of the Thyatron or mercury tube is that direct current is put into the tube and alternating current comes out. Frequencies can be made to vary widely, according to the resistances used in the circuit. In the toy piano-organ, the eight tubes are made to produce eight different frequencies. Half tones and additional octaves could easily be added, using one tube for each tone. Each of the Thyatron tubes is kept continuously in operation, and the keyboard of the toy piano is connected to the plate, or output, circuit of the tubes. When a key is depressed, the current from that tube flows into the amplifier. Any combination of tones or chords may be played at the same time.



Scout Planes on the Deck of the "Houston," the Flagship of the Asiatic Fleet; Four Catapults Launch These War Birds

WAR BIRDS OF ASIATIC FLEET SHOT FROM FLAGSHIP

Navy scout planes are shot from the flagship of the Asiatic fleet whenever necessary to keep Admiral Charles B. McVay, the fleet commander, in touch with conditions in war-torn China. Four catapults keep their noses pointed out over the water from the U. S. S. "Houston," the admiral's new flagship.

SOIL CHEMISTRY NOT CHANGED BY LAST YEAR'S DROUTH

Farmers who believe that last year's drouth affected the chemistry of the soil in such a way as to improve this year's crops are mistaken. Officials of the weather bureau attribute abnormal crop growth this year to contemporary weather conditions, and not to improvement of the soil. The past summer was warm, and rainfall in the Atlantic seaboard and eastern states was heavy, conditions which promoted rapid development of all vegetable life there. The fact that disproves the theory of soil change is that, while the eastern and southern states had well developed crops, those of the corn belt and the west, where abnormal dryness prevailed this year, again were below the average.

J. B. Kincer

service done 12/12/18



Radio Organ Controlled by a Tiny Piano, the Tones Being Produced by Thyatron Tubes

a 1474 Carl Ls. H. Slacy
4639 Montgomery Ave
Bellesda Md

The WAR on FUR



Beaver Is King of Fur Animals and Poachers Have Extended Operations as Far as the Arctic Circle

from the game commission of Alaska.

A custom cutter intercepted the "Star." Passengers and crew—even the ship cat—were held on board until the federal raiders unearthed what they sought, a cache of \$20,000 in beaver pelts traveling under the alias of dried fish and packed in special cases for that purpose. The shipment of 1,105 pelts was trapped by poachers during the closed season and sent to the United States via the underground smuggling route.

Several weeks later, port policemen at Seattle, through a tip from the game wardens, stopped another coastal steamer from Alaska. The quest was a long one. The usual hiding places were bare of booty. It was only after fittings and fixtures were dismantled and partitions removed that secret compartments were disclosed between decks where \$10,000 worth of illegal beaver pelts were found and confiscated.

When the gas steamer "Ruby" was inspected by custom officials in northwest-

"SEARCH S. S. 'Star,' arriving tomorrow, and confiscate contraband beaver skins," ran a radio message received by the custom office at Seattle, Wash.,

BOOTLEGGERS



Catching Live Beaver with a Net; Wolves Are Most Profitable to the Bounty Hunters

ern waters not so long ago, 100 beaver skins were brought to light concealed by expert fingers behind a false bulkhead.

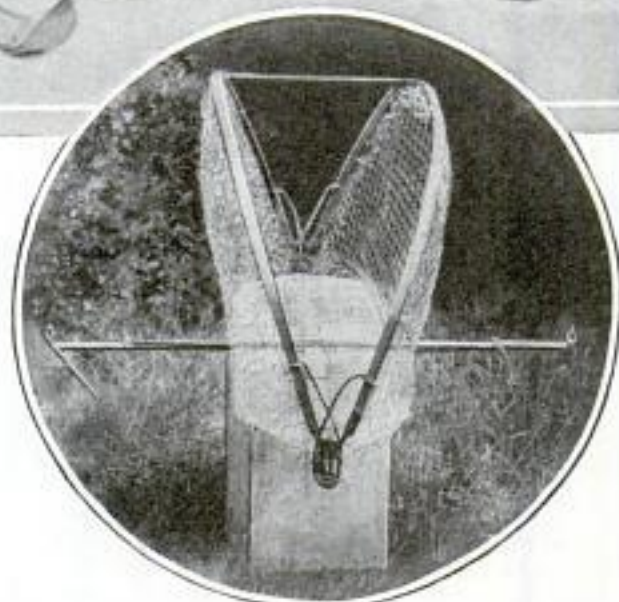
And now that the guardians of Pacific coast ports are on the watch for smuggled furs until entry by boat is almost prohibitive, pelt poachers are taking to the air. Organized gangs, in communication by radio with the underworld, charter airplanes operated by unscrupulous pilots and run the contraband to the mainland where they are shipped to dealers in St. Louis and New York.

It is not even necessary to go to Oregon, Washington or Alaska to find poachers. They ply their trade within one night's ride of Chicago in northern Wisconsin and the upper peninsula of Michigan. Game gangsters there trap beaver persistently. They maintain central storage depots near the state lines. When they accumulate enough pelts, several truck loads start rolling by night, headed for St. Louis.

The business of fur hijacking prospers



in most of the states where mink, otter and beaver, as well as marten pelts, make robbing the poachers profitable.



Wisconsin Pays for Wolves and Thousands from Other States Are "Bootlegged"; Poacher's Beaver Trap

The majority of states now protect beaver against legal trapping. This protection, however, is not ironclad. A loophole has been left, providing that the state game commissions can issue special permits authorizing the trapping of beaver on land where they are doing damage. Unscrupulous trappers locate beaver dams and then urge landowners to procure certificates from the state giving them authority to snare the beaver and to market their pelts.

The bounty bootlegger, who now operates in every state where attractive bounties are paid for the extermination of predatory animals and "vermin," is nothing more than a glorified poacher. His trade returns a good income unless he overdoes it and arouses the suspicions of county clerks and game wardens. Here is how the bounty bootlegger fleeces the county officials.

Several counties in Washington pay a \$5 bounty on bobcats. A gang of migratory crooks that specialized in bounty bootlegging began operations recently in Washington. They imported the carcasses of ocelots, small animals abundant in the southwest which resemble

bobcats, and presented them to the clerks in the different counties where bobcat bounties were paid. One trapper brought in 129 bobcats, collected \$645 and disappeared. The county clerk consulted a government hunter in that vicinity about the prevalence of bobcats in his territory. The hunter replied that he had not seen half a dozen bobcats in twelve months. That led to the abandonment of the bobcat bounty system.

Kansas paid about \$200,000 to a gang of bounty moonshiners who dealt exclusively in coyote bounties paying \$1 apiece. The gangsters had a contract with two

disreputable fur firms to supply them with coyote scalps for which they pay twenty-five cents each.

Pennsylvania is now a center of organized bounty bootlegging. That state pays \$15 on wildcats, \$4 on gray foxes and \$1 on weasels. There is no means of identification as to the origin of the scalps. Pennsylvania disburses fortunes in bounties for Maryland, West Virginia, New York, Virginia and Ohio predators smuggled into the state. Weasels come in even from Kansas and Nebraska.

Wisconsin pays a bounty of \$30 on adult female wolves, while Minnesota allows but \$15 and Michigan pays no bounties. Some of the Wisconsin counties bordering the Michigan and Minnesota lines pay bounties on from 500 to 600 wolves annually. South Dakota pays \$25 for each adult wolf killed between May 31 and August 31, while North Dakota pays only \$3.

AIRPLANE DROPS FOOD "BOMBS" TO PARTY OF PROSPECTORS

One party of prospectors in an isolated part of Alaska that is almost inaccessible is being kept supplied with provisions by an airplane that regularly "bombs" the party with food. The supplies are made up in containers shaped like bombs, and the ship flies above the camp, releasing the food bombs just as a war plane releases the destructive ones.



Airplane Carrying "Bombs" of Food and Supplies Which Were Dropped to a Party of Alaskan Prospectors



SCHOOL DESK AND SEAT MADE IN ONE ADJUSTABLE UNIT

School desks and seats are being combined into single movable units constructed on metal-pipe frames that give a modernistic touch. Both the desks and seats are adjustable to the size and needs of the users. The seat is on a swivel, and the desk lids lift and remain in any desired position, making it possible to transform the desk top from a sloping to a flat surface. There is also a disappearing reading easel. The seat back is made of two slats, the lower one having a limited pivot action, which automatically adjusts itself to the position of the occupant. If necessary, the book box in the desk may be replaced by a special box which accommodates a portable typewriter, the latter being hidden when the desk top is down.

☐ About 3,000 stars are visible to the naked eye, and about 1,500,000,000,000 through the best telescopes.

A 1053 *Com. Esarnett L Eshew,*
4581 Capriwald Ave
Chicago

MEMORY MASTERS -



ulated in your mind that you can requisition it at a moment's notice to aid you in negotiating any difficult piece of river—this is merely all in the day's work for the steamboat pilot.

Take any good pilot, blindfold him, and put him at some chance place on the Mississippi shore. Then remove the bandage from his eyes. The chances are he will cock his weather eye at the sun, glance casually along the shore, and tell you the exact location you have brought him to, such as Jones' Woodyard, Williams' Plantation, Bradford Landing or some other point. He can, if he is so minded, tell you

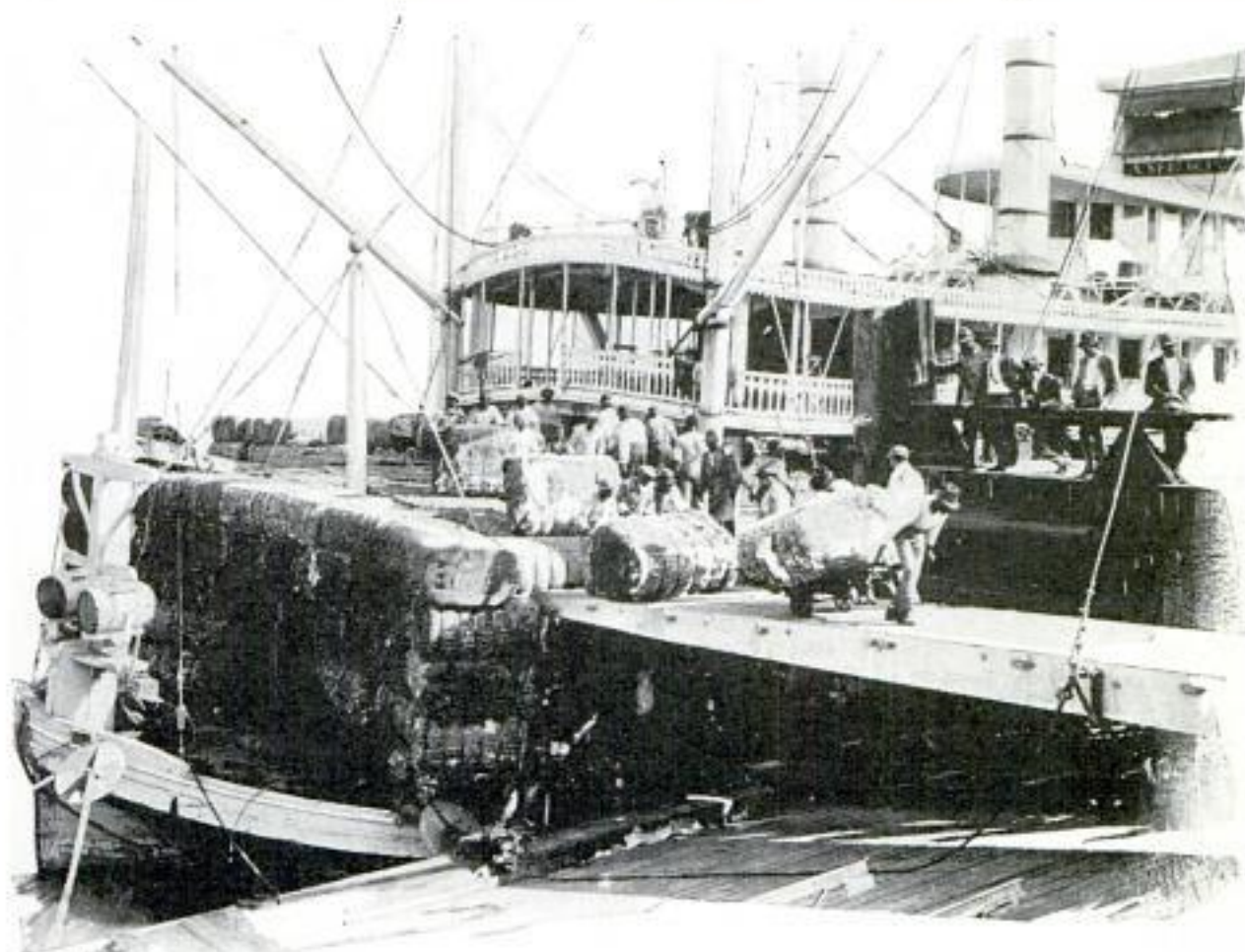
IMAGINE the task of "learning" the location of every tree, light and landmark along a 1,000-mile stretch of treacherous and ever-changing river, varying in width from a half to three or four miles, and you will appreciate what sort of a memory is required by a Mississippi river pilot.

To keep thoroughly "up" on the river, informed of its many changes, to know the snaky course of its channel so well you have a nodding acquaintance with every old tree, stump and wood yard on the shore, to be familiar with all the bends, reaches, sandbars, crossings, islands and towheads; and then to keep this information so perfectly tab-



Capt. Louis Migaud, Oldest Active Pilot on the Mississippi, Above, and Three Veterans, Captain Cooley, Owner, Pilot Migaud, and Mate Cotton

How Mississippi Pilots Whip Ol' Man River in Never-Ending Battle



The "America," Big Stern-Wheel Cotton Carrier, Unloading a Cargo at New Orleans; the "America" Is Owned by Captain Cooley and Piloted by Captain Migaud

exactly how far he is from every other point on the river. He can tell you the exact depth of water in the channel at this time, and at this time a year or a month or a week ago, and numerous other items of more or less apparent irrelevance.

But to the pilot all this information is extremely relevant, and he keeps it pigeonholed in that master memory of his. For the average man, learning a ten-mile piece of river in detail would be a gigantic task. Yet the run of a pilot varies from fifty to a thousand or more miles, and he has to know every foot of river in that run.

Pilots share their knowledge with one another. The pilot who is the freshest from a certain run can of course give the latest condition of the river and tell the channel changes that have taken place

within the last few days. He keeps a detailed report, and after each trip this knowledge is frequently made public so that other pilots may have the benefit of it.

Capt. Louis Calvin Migaud is the oldest active Mississippi pilot. Although not far this side of eighty, he is still clear of eye, steady of hand and his memory is still "posted" on the condition of the channel. For sixty years he has been standing his watch at the wheels of steamboats out of New Orleans.

He got his license in 1872, and since that time he has piloted so many steamboats that he cannot recall them all. He was on one of the largest of all the old-time Mississippi packets, the beautiful "Grand Republic," with her capacity of 500 passengers and 8,000 bales of cotton. He was on the "John W. Cannon" with

her lovely cabin, whose owner was also owner of the famous "Robert E. Lee" of race fame. And today he is at the wheel of the "Ouachita," a sturdy stern-wheeler.

"I'll never forget the look of the river at the time of that crevasse in 1889," he said recently while waiting to begin his weekly run. "I've seen the old Mississippi in all her different humors. And this one was the worst. The levee broke, up the river, at Bonnet Carre. And a deluge of water, as big as the river itself in ordinary times, was pouring through a wide gap in the levee and piling up over the farmlands and driving people out of their homes. I was piloting the 'St. James' up from New Orleans.

"You never saw a crevasse, did you? Well, if you had you'd never want to see another. And the noise it makes!—sounds sorter like you pulled the plug out of ten thousand bathtubs at once.

"I was bringing the 'St. James' along close to the bank opposite the crevasse when I saw smoke rising upstream. I picked up my glasses and looked, and it was the 'Katy.' She was one of the biggest boats on the river—finest cotton carrier you ever saw. She was booming toward us, fighting the current over near the side of the river where the hole in the levee was—too near it!

"Just then I heard the door behind me open. It was our captain.

"'Louis,' he says to me, 'there comes the 'Katy,' and do you know who she's

got on board? Jeff Davis himself.'" (You know, after the Civil War, Mr. Davis lived at his plantation, Briarfield, on the Mississippi.)

"As we looked, we saw the current catch the 'Katy' and swing her round, nose in to the crevasse. That big boat (she was about 350 feet long) bobbed around on the current like a chip. Then she went whirlin' away right into the crevasse, clean out of the river and over the fields hidden under the flood.

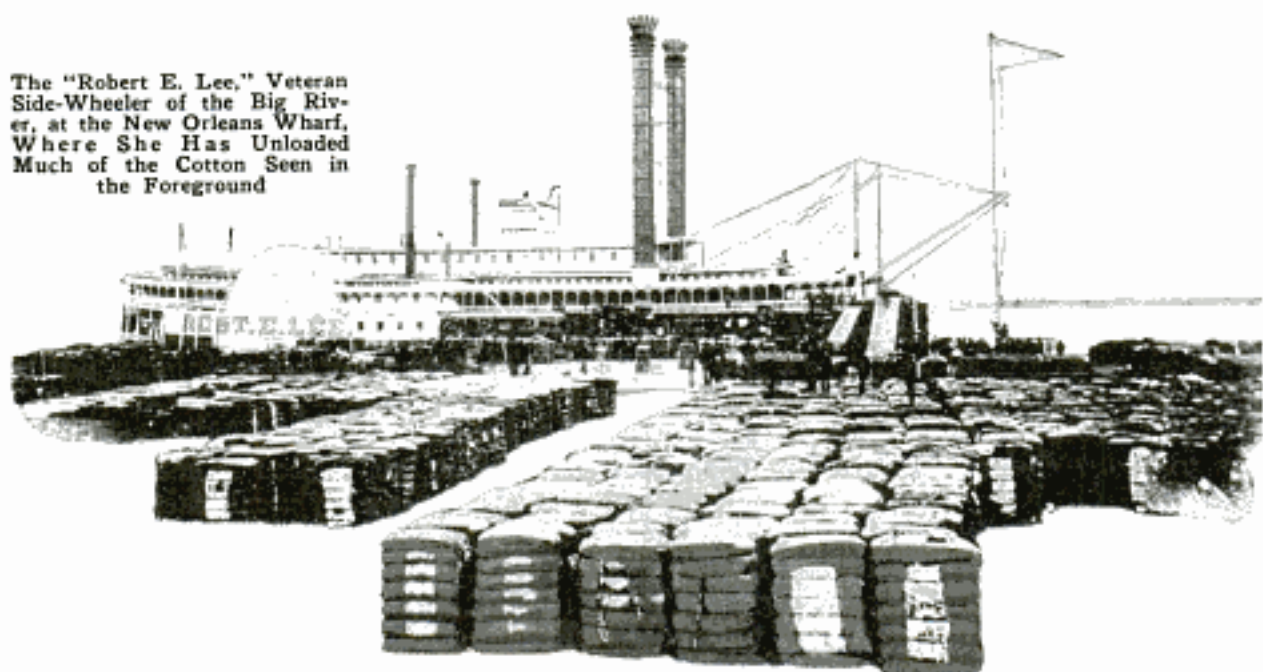
"Captain," I said, "I'm mighty glad I ain't pilot on that boat."

"'Well, Louis,' says Cap, as quiet as you please, 'we're going right out after her.'

"And we went after her too! Right spank out of the river and through the crevasse. A man couldn't do much steering in that water. A pilot just had to call his nerve into play, and go ahead. I reckon our passengers thought we were headed for perdition when they saw the old 'St. James' turn her bow out of the channel. But—well, anyway, we got Mr. Davis and every other passenger off the 'Katy' and came on down to New Orleans." Davis died a few weeks later.

Such an incident in the life of a Mississippi pilot was no unusual thing during the American steamboat era. A pilot accepted such things as a matter of course. Each trip he made was an adventure and contained new features and experiences he had not encountered before. Boys

The "Robert E. Lee," Veteran Side-Wheeler of the Big River, at the New Orleans Wharf, Where She Has Unloaded Much of the Cotton Seen in the Foreground





Beautiful Cabin of the Huge Steamboat "Grand Republic"; the Lacelike Ornamentation Is Hand-Carved Woodwork; She Was One of the Most Palatial Boats on the River

growing up at the towns and farms along the Mississippi came to admire and venerate the silent pilot before the wheel in the little glass-enclosed pilothouse on top of the topmast deck. By apparently casual movements of his hands, the pilot controlled the big steamboat and took orders from no one but the captain, and not always from him.

Piloting looked easy. A pilot loafed from one side of the wheel to the other, talking and apparently paying no attention to what he was doing. One boy who cherished an ambition to be a pilot wrote about it afterward and said he thought all a pilot had to do was to keep the boat in the river, and that wasn't much of a job because the river was more than a mile wide. But before long this boy found out different. He found that piloting is the most particular and highly specialized of all professions. Back of that casual confidence the pilot assumed, were days, months and years of wearing work, of training and developing certain qualities of character and personality so as to be able to assume full control of the movement of a great steamer with thousands

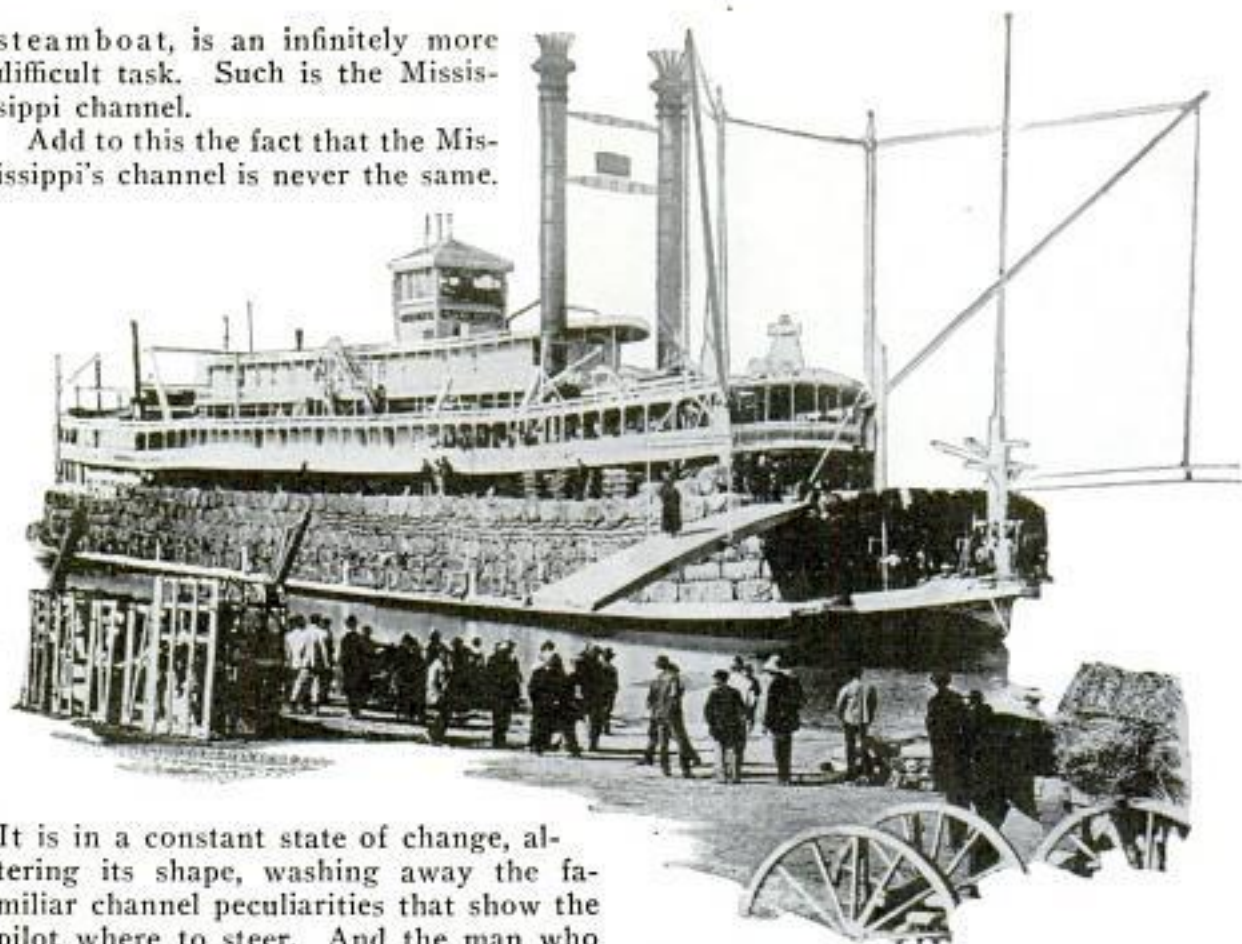
of tons of valuable freight and hundreds of lives.

The actual process of steering a boat is not particularly complicated. There is a tall pole rising from the bow of the boat called the jackstaff and another at the stern called the verge staff. The pilot sights along the jackstaff, "aiming" the boat at a certain shore mark ahead, and then sights behind over the verge staff, setting her stern on some other mark. That is known as "setting a boat in her marks," and that is where the thousands of government lights along the Mississippi—one in the head and one in the foot of every bend—are of invaluable assistance. Memorizing the lights is also one of the big jobs.

Piloting on the Mississippi system is different from other piloting. To steer a steamer over an ocean, a bay or a lake where there is plenty of water in the channel and where the charted lanes are always the same, is a big task. But to steer a boat through a channel that twists like a million snakes, that has innumerable shoals, sandbars and mud banks which in dry weather make it hard going for a

steamboat, is an infinitely more difficult task. Such is the Mississippi channel.

Add to this the fact that the Mississippi's channel is never the same.

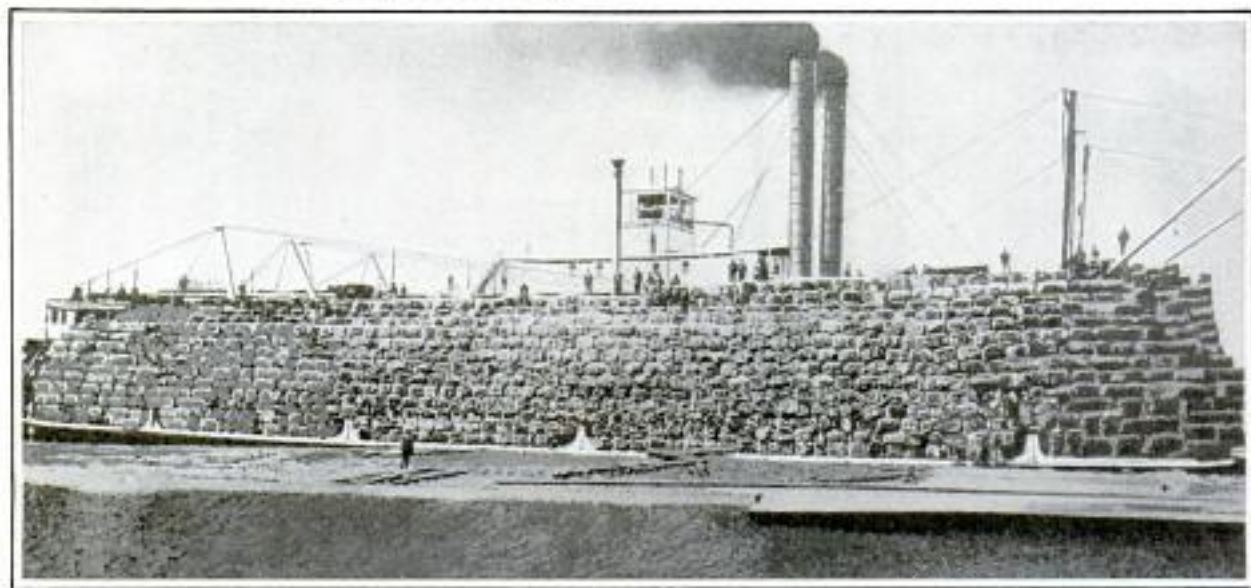


The Steamboat "Natchez" Sidling in to a Landing and Preparing to Unload Her Cotton Cargo

It is in a constant state of change, altering its shape, washing away the familiar channel peculiarities that show the pilot where to steer. And the man who can negotiate that channel, day after day, week in and week out, becomes a marvel of accomplishment. Yet that is what Pilot Migaud, and hundreds of other old-time pilots, had to do.

When a pilot speaks of "learning the river," he means that literally. He does not mean merely learning the general direction in which it flows, the cities and

towns and landings along its banks. He does not mean merely learning the thousands of government lights along the shores. Learning the river means all that, and means infinitely more as well. A pilot has to know the channel as a man knows his own front hall at home.



A Mighty Load of Cotton on a Mighty Stern-Wheeler, the "Henry Frank"; This Load of 9,226 Bales Is Said to Be the Largest Ever Carried by a Steamer on the Mississippi

AT General Electric Co
1811 Mela Park 807
Engineering Dept
CARD TABLE CONTAINS LIGHTS
THAT FOLD WITH LEGS

"Piloting a steamboat isn't what it used to be," resumed Pilot Migaud turning to the wheel of the "Ouachita," "In some respects it is harder. These young pilots on the rivers today are engaged in a different sort of steamboating. They are towing freight in barges, and doing a good business too. The river's coming back because there's so much freight to be pushed up and down between the cities of the north and New Orleans. Piloting a single steamboat is a mighty different thing from piloting a steamboat with a dozen barges sticking out in front of you, which is the kind of piloting that is being done on the rivers now. This new piloting is much harder. But then the government aids the pilot today, where it did not aid him in the old days. It keeps lights burning on all the river for him to steer by. It keeps the channels dredged out clean and removes the snags from the river. Also there is the new mechanical steering gear which relieves the pilot of the manual labor of turning a rudder. I remember how hard it was for me to turn the twelve-foot wheel of the old 'Grand Republic.' They all help make the work a little easier.

"But you take my word for it, as long as a man is a pilot on the Mississippi, he's got to be a marvel for memory. He's got to know the river. All the new appliances in the world won't do that work for him."

91847

THE MAN WHO "TAKES IT EASY" MAY DO THE MOST WORK

Those who can "take it easy" while they work may get the most accomplished, it was indicated in a report before a recent meeting of the American Psychological association. The report was delivered by Dr. G. L. Freeman, of Yale, who has studied the relationship between muscular tension and mental effort. He found that in very simple tasks, such as moving a finger back and forth, the output increased in proportion to the muscular tension, while with more complicated tasks, such tension often was a hindrance. When subjects competed for money prizes, both muscular tension and output were affected. Discouragement lowered both and over-encouragement increased tension but decreased accuracy.

Scene Service 9/5/31



Cleveland Ohio



Miss D. G. Connell Jr. and A. B. McHart

Collapsible Card Table Equipped with Electric Lights That Fold Under Like the Legs

Electric-light fixtures are contained in a folding card table, the use of which makes it unnecessary to rearrange lights when the table is set up in a room. Two diagonally opposite legs of the table carry the lights, which are placed on small sections of nickelplated pipe with thumb-screw joints for adjustment. The lamps are shaded by trough reflectors and are located below eye level so that the table is illuminated but the light source is invisible. Ash trays also form part of the equipment, and there is a receptacle for a cigaret lighter. The entire outfit can be folded, the light supports turning underneath like the legs.

NEW POSTAGE STAMP RECALLS BATTLE OF YORKTOWN 91818.

To commemorate the one-hundred-fiftieth anniversary of the battle of Yorktown, the post office department has issued a new two-cent stamp which is rectangular with a red background and a central design in black. The stamp bears the portraits of Rochambeau, Washington and De Grasse, and also the word "Yorktown" and the dates 1781 and 1931, along with its denomination.

Information Service

Dr. C. J. Driscoll
Western Iowa
POPULAR MECHANICS

Science Service 8/21/31

808
a1721

ELECTRICITY CUTS YOUR GRASS IN HOME LAWNMOWER

\$75.00

Electric Lawnmower That First
Combs the Lawn, Then Cuts the
Grass as It Is Pushed Along



patent

Electricity applied to the lawnmower now cuts grass for the tired business man, just as it helps the housewife using the vacuum cleaner. The mower is operated with alternating current and cord connection to a motor of one-eighth horsepower capacity. The lawn is first combed, like a barber combs his patron's hair before cutting it, by seventeen teeth protruding two inches in front of the machine. Then four revolving blades cut the grass. The blades are adjustable and covered by a protecting metal disk. A switch on the handle turns the current on and off.

BOYS' TOYS POWERFUL TOOLS FOR SEEKERS OF KNOWLEDGE

a1803

Small boys who hold burning glasses in the sun until a smoking hole appears in a piece of paper are using one of the newest tools of chemical research. The same principle, intensified by concave-mirror arrangements, is being employed to raise materials of which analysis is desired to intense heats, almost like that of

the sun's surface itself. Examples of similar nature were described at a recent meeting of the American Chemical Society. A bit of boyhood play, that of whirling a bucket of water without spilling a drop, has resulted in the development of ultra-centrifuges, building up forces as much as a thousand times that of gravity. The new molecular-beam method of analysis is reminiscent of the child's love of a fireplace or furnace in the back lot. Material to be investigated is placed in a furnace with a narrow slit in the wall, tormenting it with heat until the molecules come flying out as gas and then turning magnetic or other forces on them to see how they react as they rush by. Differences in nature of the substance under analysis are shown by differences in behavior.

a1671

MAN AND BOAT CARVED IN SAND SHOW SCULPTOR'S SKILL

Using only sand as a medium, realistic figures and scenes are being sculptured on Pacific coast beaches where many persons are becoming adept at this form of art and amusement. One of the unusual pieces of sand carving shows a dozing fisherman and his dog in an upright position in a boat on a lake of sand. Both the boat and figures are made entirely of sand, and a realistic touch is given by waves emanating from the fish line, indicating that the sleeping fisherman has a nibble.



This Dozing Fisherman, His Dog and the Boat Itself, All Have
Been Sculptured from Sand on a Bathing Beach

Herbert Taylor
Long Beach, Calif.

91743

Randley - Page, Ltd., 72

POPULAR MECHANICS

809

Victoria London, S.W. England

The First of the New Forty-Seater Air Liners



Drawing Room of a Forty-Passenger Plane Used by a British Airways Company; There Is Also a Bar, a Salon for Smoking, a Chart Room and Wireless Cabin and Pilot's Compartment

Air travelers will find real comfort for the first time in the forty-seater planes constructed for use on regular routes of an English airways company. Aft of the pilot's seat is a chart room and wireless operator's cabin. Behind that is a drawing room with spacious armchairs to accommodate eighteen travelers. A door from this compartment leads to a large bar and behind this is a smoking salon to seat twenty passengers.

Imperial

is then pushed into the hole to be mended. The flame of a match suffices to start the solder to melt.

BRAKE LINING GROUND ON SHOE TO MAKE PERFECT FIT

91759

Because of the scant clearance between brake shoe and drum in four-wheel construction, it is often necessary that the lining be machined on the shoe. To

SOLDER GENERATES OWN HEAT FOR MAKING REPAIRS

91820

Solder which generates its own heat, doing away with the need for a soldering iron, is now available for mending all kinds of metals and metalware. It is in the form of a stick or pencil and contains all the acid and flux necessary so that nothing else is required to make repairs. The pencil is held over a flame for a few seconds until the end begins to melt, which it continues to do by reason of the heat generated in the stick itself. The end



meet this need, a grinder is now available somewhat like the conventional bench grinder, but fitted with a rubber drum covered by a removable sleeve of emery cloth. When the emery is worn, a new sleeve is put on

the drum. Rests on the machine hold the shoe firmly while being ground.

Metal Products Co
1979 E 55th St.
Cleveland, Ohio
1810131

Albertson & Co. Inc.
St. Louis City
Mo.

Copyrighted material

A 1546-1911 Cont. Arnold H. Kneen,
187 Rockaway Parkway, Valley Stream
ny
How to SELL an



vention. "I have made money," he explained, "through the introduction and sale of my products as a manufacturer, not as an inventor."

Sounds discouraging to inventors without funds! But remember that Edison is a true pioneer in untrodden fields. The pioneer in most lines, if he remains one, may be poorly repaid. California miners of '49 went on to richer



Photos © Keystone View Co.

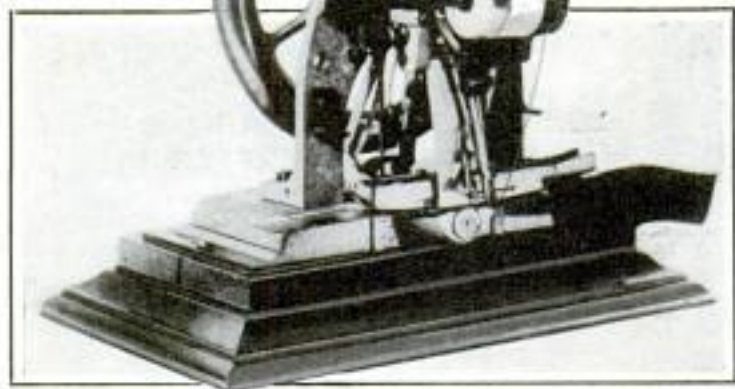
fields—and companies that worked over the gravel they left took out several billion dollars!

Why do some inventors fail to put over valuable ideas, while others, with far less useful patents, amass great fortunes?

Successful inventors all seem to have business sense. They foresee the uses of their inventions, even before they are perfected. They are able to sell the idea to friends, even strangers, and to hold their interest, often receiving financial aid from them. A great inventor must also be a great salesman, if he wants his discovery to be understood and welcomed in his own time.

Edison for many years has entrusted the business side of his inventions to others. Industries he founded pay out over a billion a year in wages alone. The best business sense is hired to direct them and to fight off "pirates."

But young Tom Edison had to raise



Method of Protecting Battleships from Torpedoes, an Example of What Not to Invent; Below, Howe's First Sewing Machine

"WHY are you not the richest man in the world?" was the question recently put to Thomas A. Edison. It was a logical query, for Edison may well be called the master inventor of all time. He has laid the basis for industries valued at many billion dollars.

Edison replied that, while he has taken out some 1,200 patents, the cost of his labors and that of fighting for his claims has exceeded all the profits from his in-

INVENTION

capital in the beginning. No one realized that this experimenter was destined to be one of the outstanding figures in human history, changing the whole current of civilization with his electric light, phonograph, motion pictures, storage batteries, and other epochal inventions.

In his early years, Edison raised the money on which to live and experiment, by a unique plan of "inventing to order." He undertook for a given sum to develop devices that people needed, and he rarely failed.

This plan, of course, put



© W. K. I. Dickson

Form No. 114
WEEK ENDING SEPT. 17 1912

No. 1
NAME.

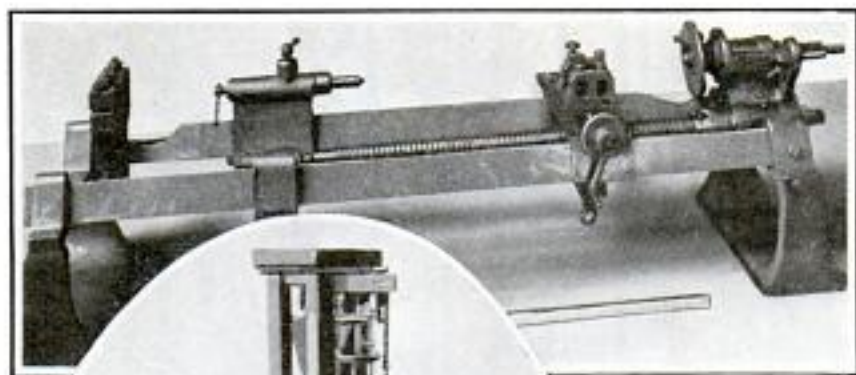
THOMAS A. EDISON.

DAY	MORNING	NOON	NOON	NIGHT	EXTRA	EXTRA	TOTAL
	IN	OUT	IN	OUT	1	2	
		12:58	3:25	6:21	8:11		
		11:29	1:40	7:02	8:03	12:29	
9-45	1:03	2:10	6:34	7:58			
	1:13	2:01	6:10	7:54	10:14		
8-30	2:20	1:49	7:30	8:51			
	1:23	1:52	6:14	7:42			
	1:02	1:50	6:18	7:58			
TOTAL TIME <u>112 HR. 6 MIN.</u>							
DATE.....							
TOTAL WAGES FOR WEEK \$.....							

The Tremendous Industry of Edison Is Shown in His Work Sheet—112 Hours of Labor in a Week!

him on his mettle, for only a man with rare confidence and resourcefulness would undertake to invent something without knowing whether he could solve the problem or not. He succeeded so many times, however, that his prestige grew rapidly.

Variations of inventing to order are often found today. Many concerns hire designers, and sometimes men with ideas but no mechanical skill hire firms to perfect their models and inventions. Sometimes an inventor enlists the aid of a man with funds, or a man with merely an idea may obtain the services of a trustworthy inventor and go "fifty-fifty" with him on the profits.



© British Crown

© Keystone View Co.

Maudslay's Original Screw-Cutting Lathe, Above, and a Sewing Machine from France That Predated Howe's

The teletypesetter, a remarkable device whereby a single typesetter may operate a thousand linotype machines by wire in any number of cities, began as the idea of Frank E. Gannett, publisher of Rochester, N. Y. Although he was told that he was seeking to do the impossible—how many inventors are told that!—he kept the idea alive until he met an inventor familiar with all phases of printing.

Charles F. Burgess was a college professor when he decided to invent and build dry batteries, having found one day that he could not buy what he wanted for a laboratory experiment.

"I called in three of my best students," he related years later, "and told them I thought a new dry cell could be built and sold, making profits that could be used in developing other items."

What an idea—a college professor and his students going into business to make

money for further research! Most of us would have predicted early and total failure. But the four men raised \$9,000 between them, and today the company does an annual business of over \$5,000,000.

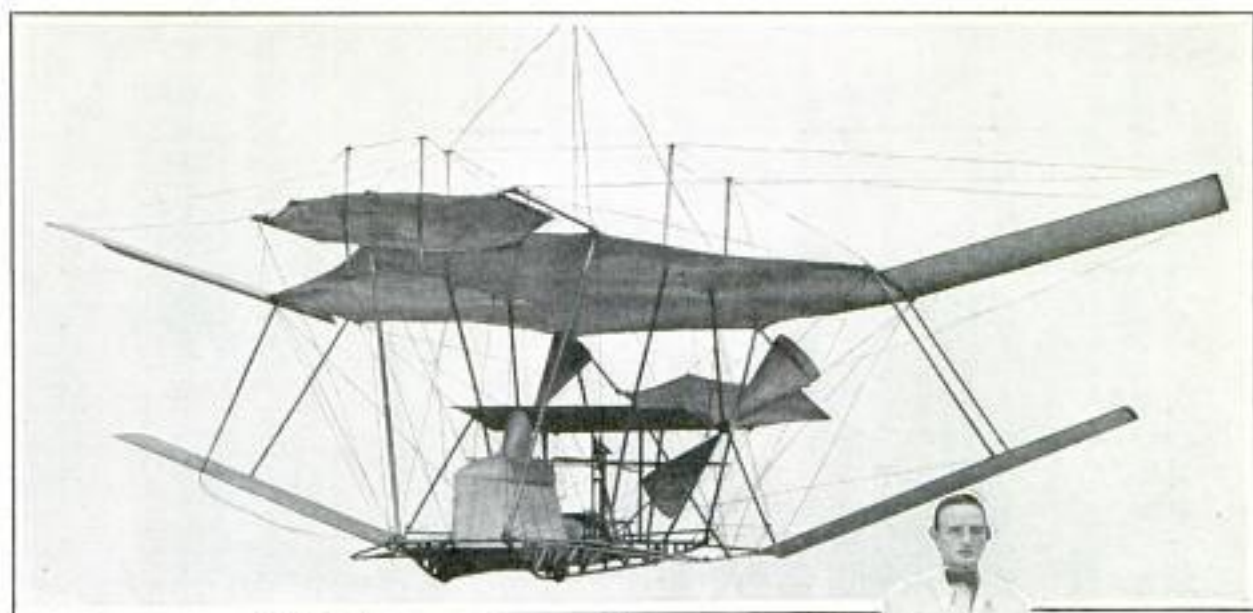
Armstrong was a student, with the college man's chronic need of capital, when he worked out his notable feed-back circuit that brought radio to millions of homes. His father not only declined to finance his experiments, but ordered him to spend his time on something more useful.

When George Westinghouse patented his first invention—a mechanical car replacer, devised after George had stood for two hours and watched a train crew replacing derailed cars—his father declined to aid him. But George had friends who helped him start on one of the most remarkable careers the world has seen. Westinghouse combined mechanical genius with business acumen—a combination that scarcely ever fails to bring wealth and fame.

Similar to Edison's career is that of another widely known creator of new things, who can sell as well as invent. As a lad of ten years he flouted general advice, like Edison, by choosing invention as his life-work. He set a high position as one of his goals—he would be no less than chief engineer to Thomas A. Edison himself.

Miller Reese Hutchison got the job. Holding it for nine years is proof enough of his mechanical and technical skill plus resourcefulness. But Hutchison had already developed another and rarer talent, among inventors—the ability to convert his patents into money. Over \$400,000,000 worth of products invented by Hutchison have been marketed.

"I decided that to be a successful inventor I would have to be a technical man," said Doctor Hutchison. "I had to know how to use the technical advice of others. So I enrolled for an electrical and mechanical engineering course. Summers I spent in machine shops, foundries and factories of all kinds. There was plenty to learn about machines and mate-



© British Crown

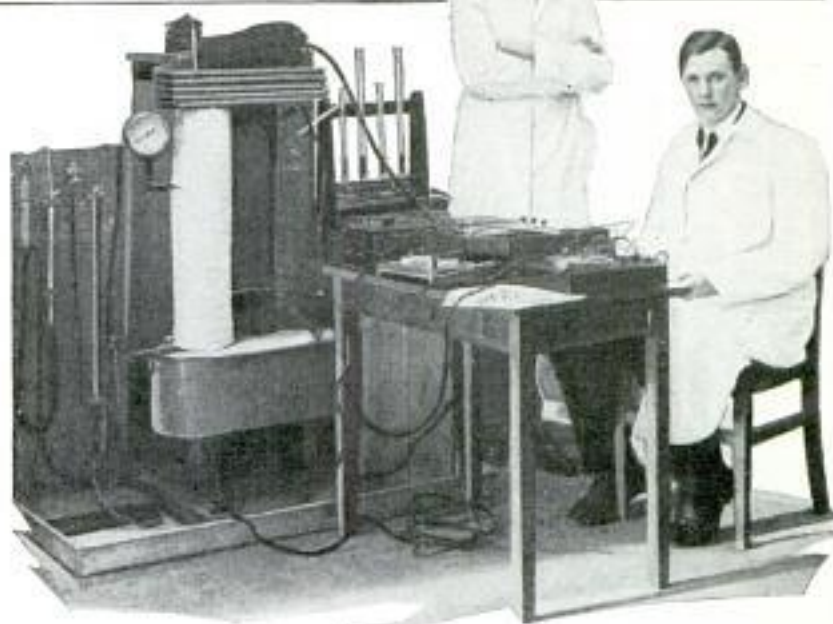
Model of Maxim's Flying Machine, 1894, and at Right, Stockholm Students Who Solved an Abstruse Scientific Problem and Made a Fortune

rials and processes, even in those days.

"Before I started to college, my father, in the wholesale and export grain business, gave me a year's wonderful education in his field. I learned how to look at things through a financier's eyes. It became clear that even when I had invented, patented and produced some needed thing, someone would have to be paid—and paid well—to put it on the market and induce people to buy it. I had a friend who was a deaf-mute. Some such incident starts most inventions. I determined that I would enable my friend to hear, feeling certain that, when I had succeeded, there would be tens of thousands of partly deaf who would be glad to pay for a mechanical ear."

Starting work in an old summer cottage on Mobile Bay, he quickly discovered that he knew nothing about the complex structure of the ear. Yet he was trying to solve a problem on which perhaps thousands had failed. He had to succeed in this, his first invention.

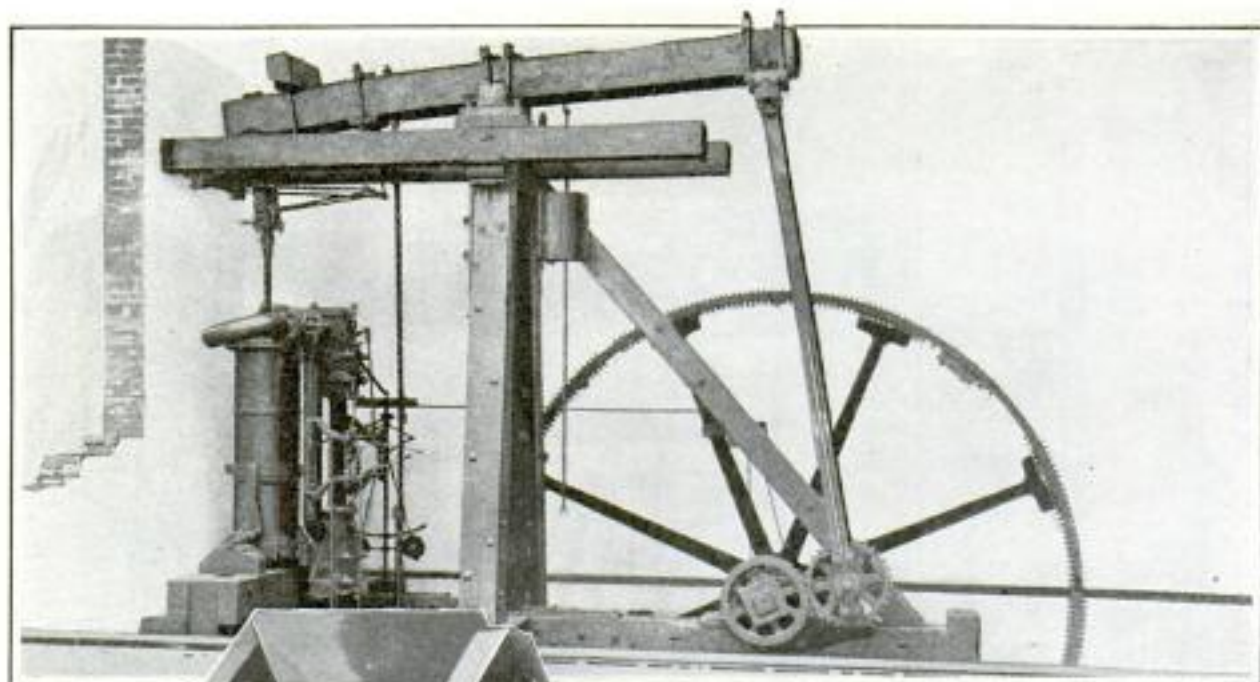
He enrolled for a year's course in medicine. Part of his laboratory work included dissecting dozens of ears. That was the only way to learn what he needed



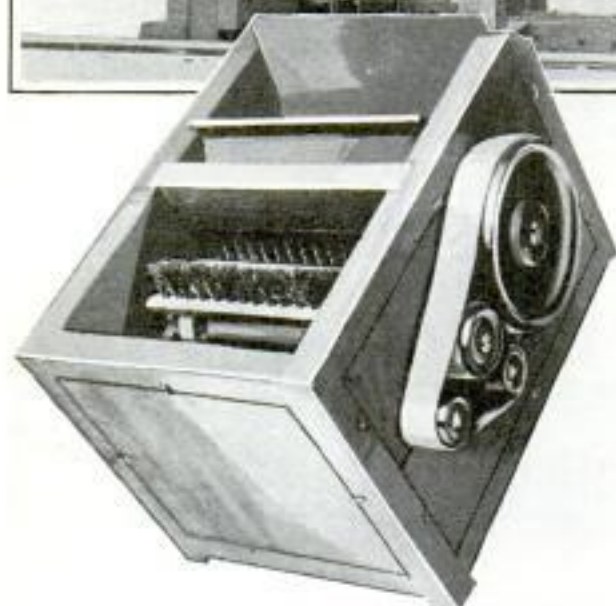
to know. He was back at work on his invention, delving deeply into the intricate problem, when the Spanish-American war interrupted his work. After it was over, he again tackled the problem of a mechanical ear. His acousticon was the first device of its kind to bring hearing to the deaf. An amazing number of them are in use today.

"On most of my inventions I had a partner who had a fifty-fifty break and a free hand on the business end," he continued. "But this scheme does not always get results. Sometimes I have had to invent some sales strategy. Thus, when I had invented and perfected my auto horn, I had to sell it to the public.

"My horn put life into absent-minded pedestrians. I knew it would save many



Boulton and Watt Rotative Beam Engine, 1788, and, at Left, Whitney's Cotton Gin



Photos © British Crown,

lives, as cars began to get more numerous and faster. But when I turned over all manufacturing and sales rights to a company, which sold none at all in nine months, I decided that selling those horns was up to me if I wanted to make any money. So I obtained the selling agency for New York, New Jersey and Pennsylvania.

"Some auto races were about to take place. When the cars were on the line awaiting the signal, their explosive exhaust deafened the drivers, so that they could not hear the starter's gun. Nor could they be called back after a false start without wasting time.

"I offered to stop these delays by providing a horn the drivers could not fail to hear. The race committee allowed me to set up a dozen of my horns, at my own

expense, in front of the grandstand. You could hear them for miles. As spectators came in for the race, I had a boy hand them a folder describing the horn.

"Before the end of the first race, we had sold 500. Nor were they sold for a song, either. The bulb horn then sold for \$3.50. Mine cost \$35. With methods like this I sold over 5,000 in thirty days.

"I had previously invented another electric horn, not so good but cheaper to operate, and far better than the bulb. Though I had patented this cheap horn, I let others infringe without a word. I was trying to wean auto owners away from the bulb, now really dangerous.

"One day Chief Croker, head of the New York fire department, asked me to install one of my horns on each piece of fire apparatus. I declined, explaining that such a device, if it happened to get out of order, might be unable to warn people on a dash to a fire, and thus someone might get killed.

"I suggested that one of the new hand-driven sirens would be much better. The men, with nothing else to do, could grind out a whale of a noise with one of them. Probably the chief wondered why I was boosting a rival. But I had a scheme.

"The chief installed a siren. Traffic scattered before him—he had a clear street for blocks. He had them put on all fire apparatus, and the men got a great

91799 Bendix Automatic Corp. 815
 105 W. Adams Chicago
**AUTOMATIC CLUTCH FOR AUTOS
 OPERATED BY ACCELERATOR**

kick out of grinding out a shrieking whine on the way to and from a fire.

"But the chief quickly realized that it would be useless if other drivers were using it. An ordinance was passed, limiting its use to fire engines, police patrols and ambulances. Soon my competitor was doing a land-office business, selling sirens for these uses all over the country. I claimed no commissions on that business. But there his market stopped, while I had all the millions of motor cars for my horn.

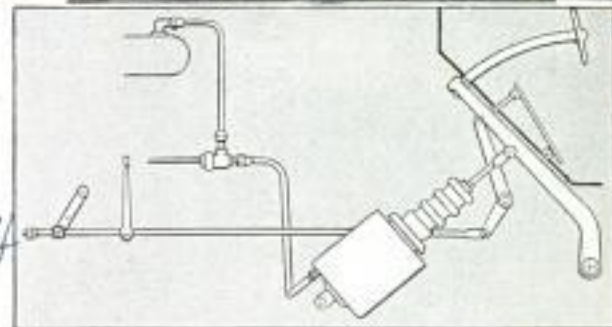
"The money received from the horn helped finance other inventions. Most of them I have sold outright or on royalty, often helping to commercialize them. I always work on things for which there is a crying need."

**SUBMARINES SINK OLD CLIPPER
 TO MAKE A MOVIE**

Forty miles off the coast of San Diego, three submarines recently opened fire on the old three-masted clipper "Bohemia," and sent this famous ship to its grave. In spite of terrific explosions which shot smoke more than 1,000 feet in the air and tore away the stern of the vessel, the stanch boat remained afloat for more than twenty minutes after the submarines had done their work. The Yankee clipper was sunk during the making of a moving picture, the spectacle being filmed as the boat went down, stern foremost.



Blowing Up a Yankee Clipper during the Making of a Movie; Three Submarines Fired on the Old Boat



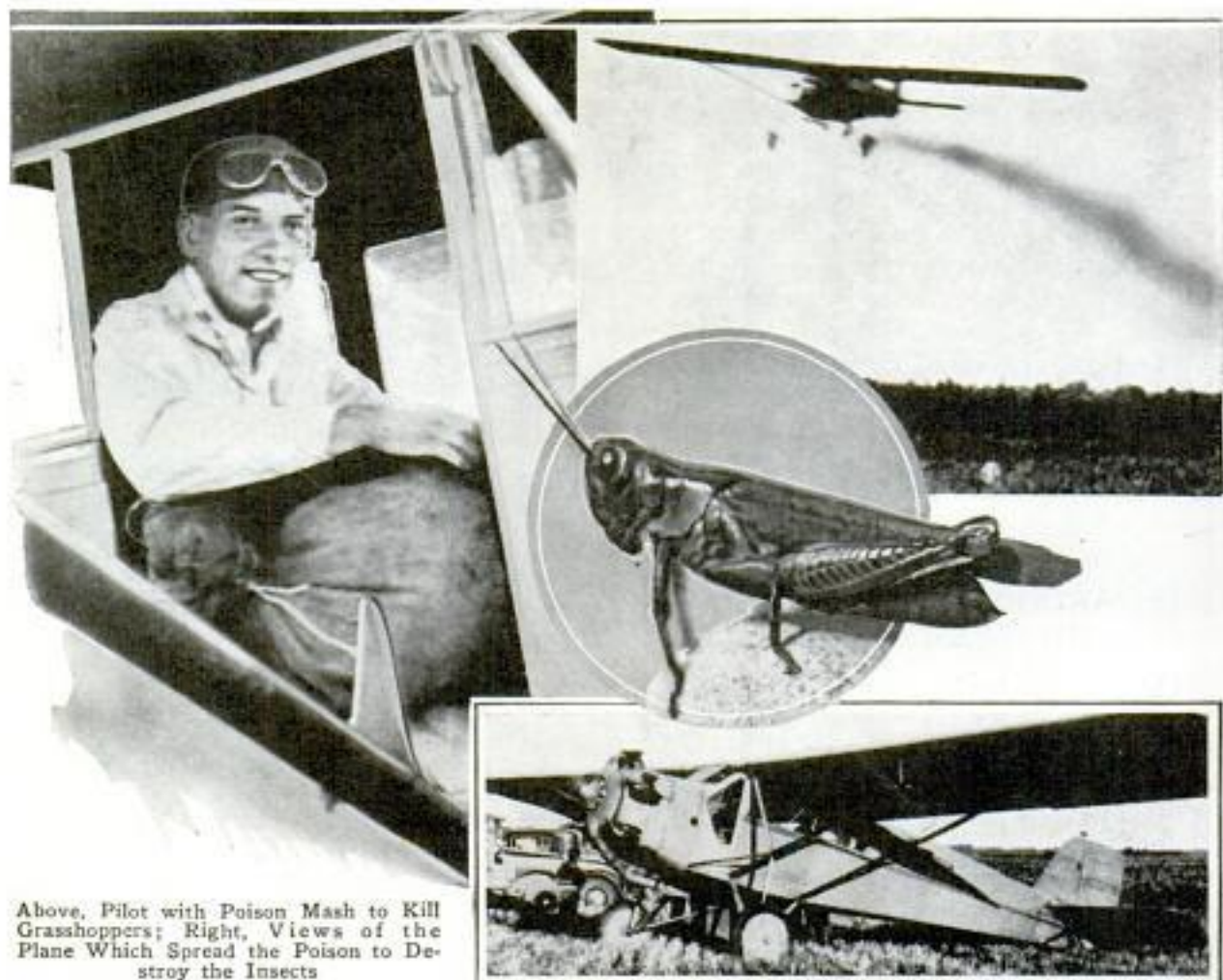
Automatic Clutch Control Which Disengages When the Foot Is Lifted from Accelerator

Automobile drivers need no longer touch the clutch pedal in starting, stopping or shifting gears. A clutch control is being produced which disengages the clutch when the driver lifts his foot from the accelerator, and engages it again when the accelerator is depressed. The system operates by means of a vacuum created in the intake manifold by engine suction when the accelerator is released. This vacuum draws a piston, which actuates mechanism that pulls down the pedal and disengages the clutch. The vacuum is dissipated when the accelerator is pressed down, opening the throttle. The device fits cars having a foot throttle, and gives the sensation and advantages of free wheeling, while at the same time providing easier driving and more efficient clutch operation. The driver can return to conventional control by merely moving the hand throttle to the point where it starts to push down the foot throttle, thus complying with the law in states demanding complete driver control.

*Ord. Chev. 19.50
 other cars higher*

9 17 61 Cont. Robert McIsaac
Amaha Bee news
POPULAR MECHANICS
Amaha helr

Plane Kills Grasshoppers by Poison Spray



Above, Pilot with Poison Mash to Kill Grasshoppers; Right, Views of the Plane Which Spread the Poison to Destroy the Insects

Grasshoppers were fought with airplanes in Iowa when horses, tractors and automobiles all proved too slow to cope with the menace. When the hoppers invaded western Iowa, the state hired an airplane to exterminate them, and the ship helped curb the insects along highways, drainage ditches and roadside weed patches. The farmers fought the pests with poison bran mash in their fields, and

the airplane used the same material in killing them. The craft carried 400 pounds of the mash aloft at a trip and, with this load, sprinkled an area about fifty feet wide and more than a mile long. One county after another was sprayed with the poison, which killed the insects in one to five days. The mash was mixed with water and molasses until it was heavy enough to fall in the desired area.

"MAGNETIC EYE" IS DETECTIVE THAT HUNTS ELEMENTS

Combining the speed of light with magnetism to detect elements in solutions as infinitesimal as one part in 100 billion, the "magnetic eye" recently was described before a meeting of the American Chemical Society. It was discovered by the method's originator that every one of the ninety-two elements that constitute the

earth reacts differently to this combination of light and magnetism. Substances to be sought, such as gold in sea water are placed in a liquid. The liquid is put in a magnetic field and light passed through. While the light is practically extinguished by the elements in the magnetized liquid, each element takes a different fraction of time to do its job of extinguishing, thus revealing its presence and also the quantity.

a 1805

Discovered by the Fred Allison, Dept of Physics, Alabama Polytechnic Institute Auburn, Ala

Chicago post 9/1/31

91582

LAKE MAY CONTAIN CAPTAIN KIDD'S TREASURE

Preparations are being made to drain a deep lake on Haute Isle, in the Bay of Fundy, in the belief that its waters conceal fabulous wealth in gold and gems hidden by Captain Kidd, world-famed as a pirate. A marble slab recently was found near the lake on which was gouged a chart of the body of water and, among other things, an inscription reading: "R. Kidd. Five fathoms east and two fathoms deep." The inscription is said to tally with the location of the treasure given by a member of Captain Kidd's crew. Several years ago the island was searched but no treasure was found. The latest venture involves draining the water from the lake which is two miles long and 300 feet deep in places. This island is not the only one in the area believed to hold treasure. Oak island, near by, is at present the scene of another search for the pirate's wealth and the Island of Manan, eight miles from the Maine coast, also is supposed to hold more of Captain Kidd's treasure. This treasure has been sought from the West Indies north to the Gulf of St. Lawrence, always without success.



Drawing of Surf Machine to Provide Artificial Ocean Waves for Swimming Pools; the Big Roller Is Operated by an Electric Motor

OCEAN WAVES MADE TO ORDER BY SURF MACHINE

Artificial ocean waves are provided for tanks, swimming pools, lakes and rivers by a patented surf machine run by an electric motor. The motor is on top of a chute from which a large roller is manipulated in the water. The size of the waves depends on the speed at which the roller is operated. It is claimed the artificial waves create no undertow, and the surf machine requires little space since it is less than three feet high. Swimmers are protected from the roller by a mesh fence in front of it. The surf machine can be constructed to fit the dimensions of any pool and the cost of operation is not high, since little power is required to run the roller.

Eighty-six women hold licenses as amateur radio operators in the United States and Alaska.

COPPER BUSHING ON WASHERS STOPS FAUCET LEAKS

Faucet washers fitted with copper bushings in the center are now available as one means of stopping dripping faucets. The bushing keeps the washer from splitting and the pressure of the screw is against the bushing and not the washer, thus assuring longer life. When the screw is tightened, the washer turns against the bushing, and dripping is prevented because the washer turns with the faucet.

Homer Goodwin Mfg Co
2888 W. 19 St
Cleveland, Ohio

Amos C. W. Keller, 165 7th Bldg
A. F. Siferle, 1475 Virginia U. Portland Ore

Control Box for Double-Button Microphone



THE microphone is perhaps the instrument least understood and most abused by the radio experimenter. For the current supply, batteries should be used. Best results cannot be obtained by alternating current from any source. Dry cells will last a long time in microphone use, owing to the very low current consumption. Current from a 6-volt storage battery may also be used, provided a suitable arrangement, such as a potentiometer or voltage divider is employed to reduce the voltage applied to the microphone. For best results never use more than 3 volts or a current of over 10 amp. per button; the less current used, the better for the delicate contact surfaces.

For long life and consistent service a means of checking button current is absolutely necessary. A milliammeter, connected in series with each button, therefore is highly desirable in the control box to be described, and jacks are installed in the circuit so that either side can be checked by the same meter.

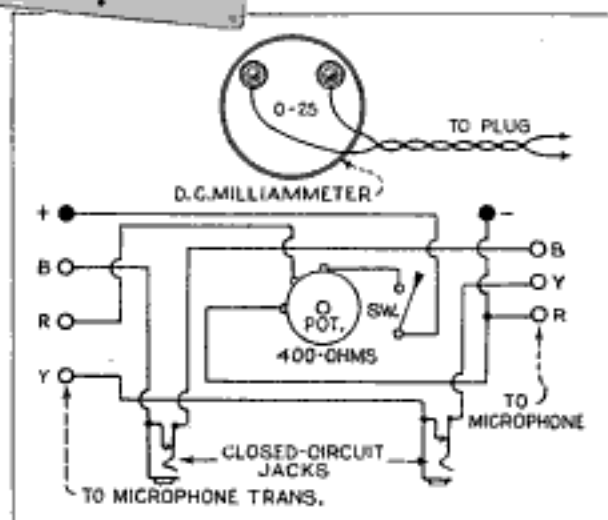
The box for the control unit should be

large enough to house it without crowding the parts. A metal stage shield can may be used or a wooden box lined with sheet copper as shown in the photo. In this case, a bakelite front panel was used which was shielded on the underside with a sheet of metal having cut-outs to clear the various binding posts and jacks. The leads from the milliammeter are brought out with flexible cord through the end of the box and terminate in an ordinary phone plug. This enables shifting of the meter from one circuit jack to the other.

The binding posts at the top are for the battery of four ordinary dry cells connected in series. The three binding posts at the right, as shown in the diagram, are connected directly to the microphone.

The posts on the left are connected to the input of the microphone transformer, which is usually housed in the transmitter as in the case of the speech amplifier described on page 822 of this issue.

The input terminals

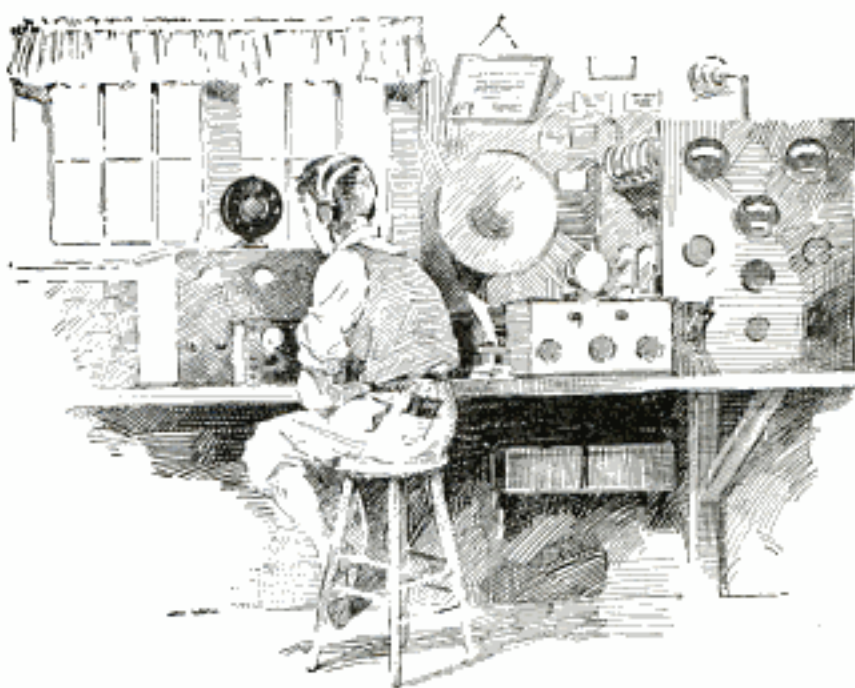


of the microphone transformer are numbered 1, 2 and 3, the center point 2 being connected to the lever of the potentiometer in the control box. Shielded cable should be used if the control box is to be placed any distance from the speech amplifier. To simplify the connections, the leads in this cable are colored red, yellow

and blue, the letters at the binding posts on the control box indicating these colors. Red is the center or negative side, and at the microphone this terminal is grounded to the case.

It will be found desirable to use a combination potentiometer and battery switch as this unit will prevent the possibility of closing the switch with the potentiometer full on, and also breaks the circuit when the potentiometer is in the off-position.

All microphones should be mounted in an upright position, and it is highly important that they be protected from mechanical

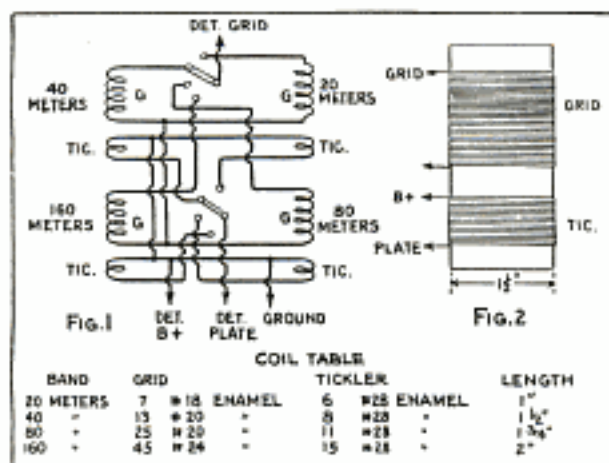


vibration. Small coil springs or rubber bands are used for this purpose.

Switches Shift Short-Wave Coils

Two four-point inductance switches may be used to replace the group of plug-in coils in a short-wave receiver if the coils are connected as shown in Fig. 1. This tuning unit covers the short-wave bands from 15 to 200 meters. Four coils are used of which only one is in the circuit at a time thereby eliminating dead-end losses. The coils are wound as shown in Fig. 2 on thin bakelite or cardboard tubing, according to the chart below. The values shown are for a tuning condenser with a maximum capacity of .00014 mfd. and a type 201-A detector tube. If a screen-grid tube is employed

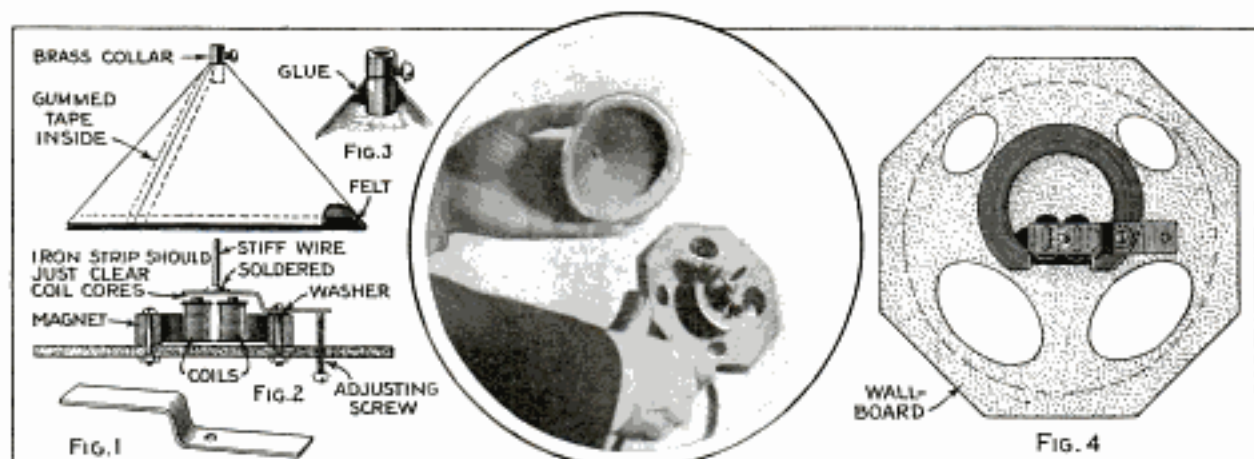
as a detector, one to five turns should be added to the grid windings, and after the set is in operation, a turn at a time should be removed until the tuning range is correct. The turns on the 20 and 40-meter grid coils are spaced slightly, but the same coils for the 80 and 160-meter bands are close-wound. The ticklers are wound $\frac{1}{8}$ in. from the grid coils without spacing. The leads are soldered to terminal lugs mounted on the coil forms with short machine screws. The coils are mounted on a 4 by 4-in. bakelite panel by means of short metal angle brackets with the grid ends up and the switches are mounted on another panel of the same size, supported by brass posts 3 in. long.



Brackets from Old Condenser Plates

Brass plates from discarded variable condensers may be cut up into angle brackets of various sizes and other metal parts for radio sets. As these plates are lacquered, they should be sandpapered or filed before being employed for electrical contacts.

☞ For further information on any radio construction article write to the radio department; this service is free.



Construction Details of Homemade Cone Speaker Suitable for Installation in Car; Photo Shows the Completed Speaker with the Cone Removed

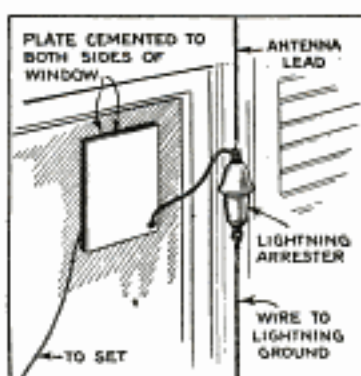
Homemade Speaker for Car

An inexpensive speaker, suitable for use in an auto radio installation, may be made from odds and ends usually found in the radio experimenter's junk box. The speaker unit is obtained from an old headphone and the cone is made from heavy paper; a disk 6 in. in diameter being required. The paper is cut and lapped to form a cone the apex of which should extend about 1 in. above the top of the coils for best results. A strip of iron, $\frac{1}{8}$ in. thick, $\frac{1}{2}$ in. wide and 3 in. long, is bent, as shown in Fig. 1, to fit above the coils as in Fig. 2. A piece of stiff wire, at least 2 in. long, is securely soldered to the iron strip in an upright position. The tip of the cone is cut off to take the brass col-

lar which is held in position with heavy glue, as shown in Fig. 3. This collar is made from a short brass rod, drilled lengthwise to take the upright wire, and a hole is drilled and tapped in the side for the setscrew. The narrow strip of felt around the bottom of the cone is to cushion it from the base. This baseboard is cut from a 6-in. square of wallboard with cutouts as shown in Fig. 4. A small hole is drilled in this board for the adjusting screw. The leads from the receiver unit may run through one of the larger holes. The cone is placed over the unit with the upright wire through the collar. The wire is then cut even with the top of the collar, and the setscrew is fastened so that it holds the cone snugly against the base.

Simplified Antenna Lead-In

Drilling window glass, to bring in the lead wire from the antenna, is tedious, and there is always the risk of breaking the glass. The same efficient insulation and results may be obtained, however, by cementing two brass or aluminum plates, about 2 in. square, one on either side of an upper corner of the window glass as shown. This may be done with collodion or other colorless cement. If aluminum plates are used they must be



drilled for machine-screw terminals as this metal is difficult to solder. These plates act as an antenna series condenser, coupling the antenna to the receiver. Owing to the condenser action, a longer antenna may be used if desired without lowering the efficiency of the receiver.

Temporary Receiver Installation

Any modern receiver can be operated temporarily by connecting a wire from the antenna post to a radiator or water pipe. It is not necessary, however, to provide any connection to the ground post.

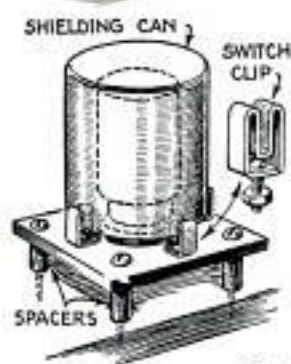
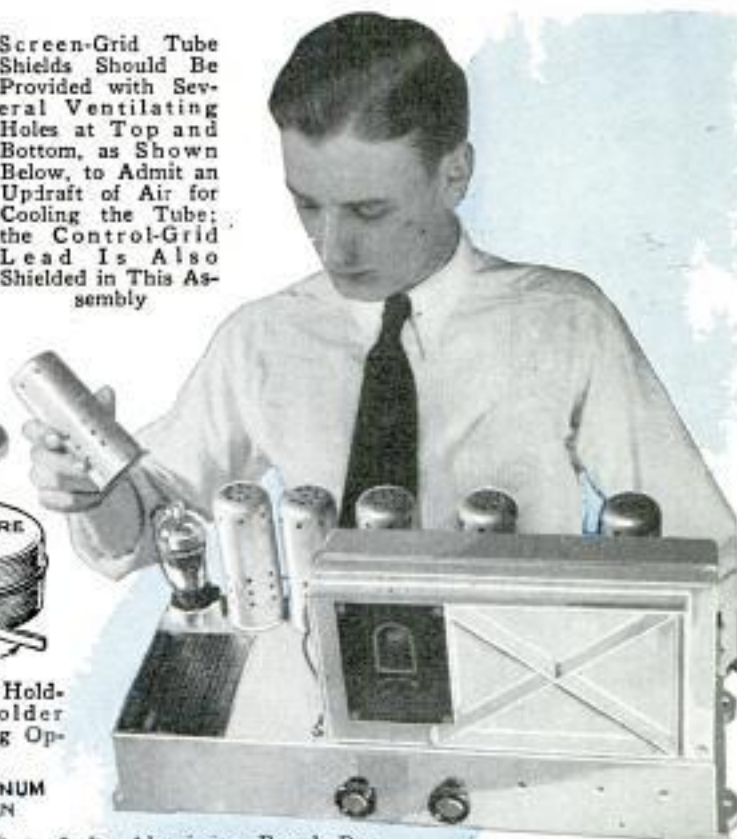
Blueprints covering radio construction articles in past issues can be obtained for 25 cents each; material lists are always available without charge.

Practical Ideas for the Radio Experimenter



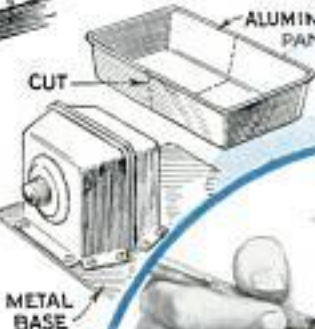
Insulated Terminal Support and Choke-Coil Mounting for Type-852 Transmitting Tubes

Screen-Grid Tube Shields Should Be Provided with Several Ventilating Holes at Top and Bottom, as Shown Below, to Admit an Updraft of Air for Cooling the Tube; the Control-Grid Lead Is Also Shielded in This Assembly



Handy Method for Holding Flat Strip Solder during the Soldering Operation

Above, Clips from Old Knife Switch Make Quick-Detachable Mounting for Plug-In Coil Shields; the Elevated Base Is Handy for Bread-board Layouts



Left, Aluminum Bread Pan Cut to Make Shield for Short-Wave Receiver



Handy Soldering-Iron Holder for the Experimenter



Above, Tips for Plug-In Coils; Right, Well Soldered Connections Important in Multi-Range Voltmeter Assembly



General Utility Switch of Tumbler Type Mounted Directly on Dry Cell

note 9/18/25
9/18/26



Left, Aluminum Spreaders for Cage Antenna; Right, Hookup Wire with Woven Metal Shield



Belden Mfg. Co. Western An Chicago
2 300 A

Charles F. Jacobs.
279 Park Place
Brooklyn, N.Y.

Lead in spools 2 1/8"
5 1/4" ana 7" diameters
10.00 per doz
6.00 " 1 doz

Lubliner Condenser Co
4377 Bronx Blvd
New York

Practical Antenna Suggestions

The current received by your outdoor antenna, regardless of its type, travels on the surface, and so stranded enameled wire is desirable. If plain copper wire is used, make sure that the surface is bright and clean. If badly tarnished it should be replaced. It has been found that merely wiping the insulators free from soot greatly increases the strength of distant signals. Carbon tetrachloride, a common household cleaner, will quickly remove all grease, soot and dirt. It is important that all joints in an antenna system be carefully soldered. One wire, from 50 to 100 ft. long, depending on the type of receiver, is all that is required. This should be elevated at least 30 ft. above the ground for best results; also it should be remembered that the length of the lead-in wire is figured in the overall length of the antenna.—J. B. Bayley, Jersey City, N. J.



Listening for Metallic Specks Imbedded in Condenser Insulating Paper

Testing Filter Condenser Paper

The long strips of paper tissue that go into the making of filter and by-pass condensers must be free from metallic or foreign particles. These troublesome specks are usually too small to be detected by the naked eye, and, if not located, will result in a defective condenser. The simple listening-in method, indicated in the photo, has been found effective. The condenser paper is unwound and rewound and passed between two brass contact rollers in circuit with a direct-current source and a pair of headphones. The operator slowly turns the winding crank and listens for the clicks caused by metallic or conducting specks.

Chicago 330 S Wells

An Electrical Hair Trigger

The slightest mechanical or electromagnetic influence controls powerful electric current by means of this small vacuum contact. It is claimed to eliminate most of the complicated and costly apparatus heretofore required for operating electrical equipment by delicate means. Properly applied, especially in conjunction with simplified light-sensitive cells, this relay has many possibilities for the experimenter. The accompanying diagram shows the operating details. It is rated to handle 6 amp. at 220 volts, or 1,320 watts, on continuous load.

Chicago 111 W Monroe

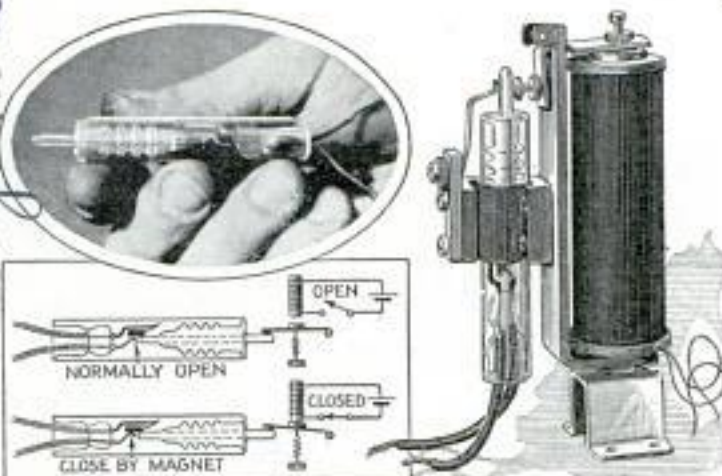


Photo Indicates Comparative Size of the Vacuum Contact; Right, Mounted for Operation by Standard Telephone Relay

Improving Vibrator Chargers

An old vibrator battery charger, that had been in service for a period of years, was greatly improved from the standpoint of efficiency and interference in the following manner: A new set of points and armature were obtained from the factory at small cost. These were substituted for the old parts, and the armature was moved 1/8 in. nearer the pole of the actuating magnet and adjusted in the usual manner. After this change, the charger was more stable, and sparking at the points was practically eliminated. A small filter in the power line will take care of any remaining interference that may be picked up by the receiver.

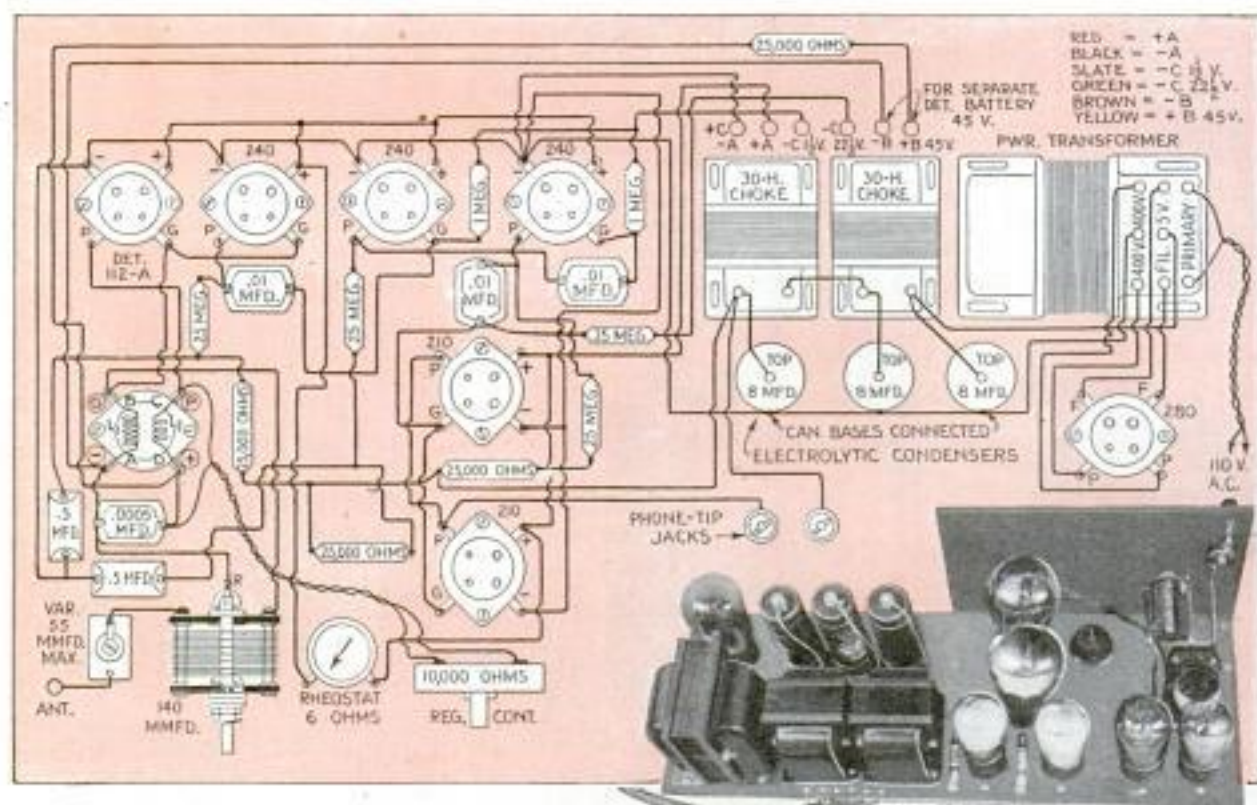
Burgess Battery Co
295 Madison Ave
New York

Home Made TELEVISION Advanced

By C. A. BRIGGS



TO SEE the artist you are hearing on the broadcast program is now quite common in several metropolitan localities. This does not necessarily mean that television has arrived in its complete and final form, but experimenters, living in or near these cities, are obtaining some very good results. Some are making their own scanning devices but the average experimenter is confining his efforts to the design and construction of a suitable short-wave receiver for television signals. Such a receiver is quite different from the usual short-wave type, and the one to be described contains



Above, Portable Television Transmitting Scanner for Picking Up Living Subjects; Below, Simplified Wiring Diagram and Photo of the Completed Receiver

RECEIVER of Design

several new and interesting features.

Two tubes divide the action of the ordinary detector, and it will be noted that the grids of these two tubes are tied together. The plate supply from the separate B-battery does not pass through any transformer circuit in reaching the tickler coil or plate of the first tube. The second tube has its plate supply connected through the resistance element for the audio or television output. This power supply is built into the receiver and consists of the usual full-wave rectifier and an efficient filter system employing electrolytic condensers. The audio tubes in the first and second stages are of the "high-mu" type best suited for resistance-coupling, and the last stage consists of two type-10 tubes in parallel.

The filament supply is obtained from a 6-volt storage battery, the full voltage being applied to the filaments of the last two tubes. The filament supply for the other tubes in the set is regulated by means of the 6-ohm rheostat. The switch for the 6-volt battery and the 110-volt a.c. supply are mounted directly on the experimenter's bench.

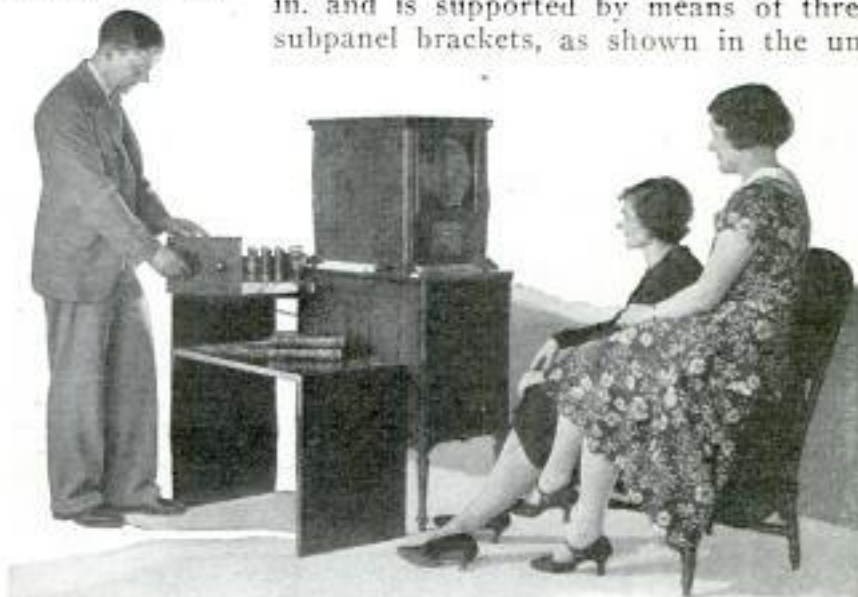
The simplified wiring diagram is given on page 824, each instrument being shown in its relative position as viewed from the front. All of the wiring, with the exception of the leads to the tuning condenser and regeneration control, are under the subpanel. The photo at the lower right gives



a rear view of the completed instrument with the tubes in position.

This typical experimenter's layout is not intended for a cabinet installation, although the panel arrangement may be altered as desired.

The bakelite subpanel is $\frac{3}{16}$ by 7 by 19 in. and is supported by means of three subpanel brackets, as shown in the un-



Above, Studio Group for Sight and Sound Program; Below, Receiving the Television Signals in the Home

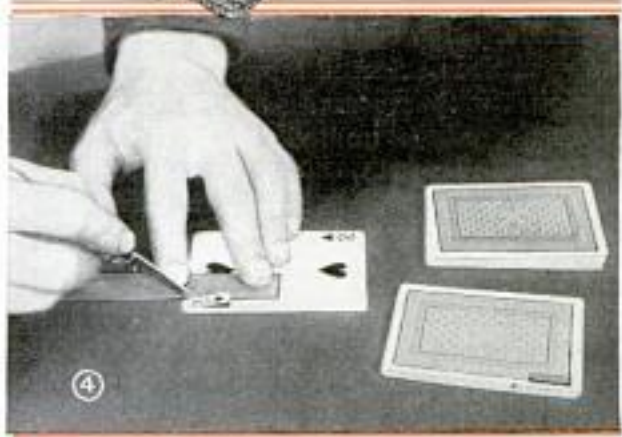
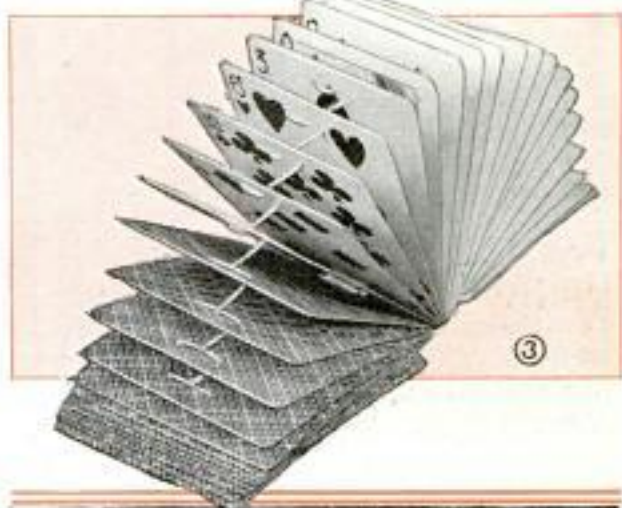
AMATEUR MECHANICS



TRICKS *with Cards* are EASY

YOU can make your own trick-card decks—decks that tumble in a beautiful cascade from hand to hand; that enable you to divine any card selected, and that change color, etc. For the divination trick, take 26 cards from the deck of 52 and cut a small piece from the upper left-hand corner of each, as shown in Figs. 1 and 4. Now, place the unprepared cards on top of the cut cards. Divide the pack in half and give the unprepared cards to a spectator who selects one and places it anywhere in the half deck you are holding, care being taken not to let him see the cut portions. Then bring the deck to your forehead, as in Fig. 8, and, by looking through the cut portion of the pack, you can easily sight the selected card and call its name.

A "self-shifting" deck is one that enables the performer to mechanically move any selected card to the top or bottom of the deck, although, to all appearances, the selected card is placed in the center of the pack. To make such a deck, get two decks exactly alike. From one select 26 cards over a wide range. These must be cut short by trimming down about $\frac{1}{4}$ in. with a paper cutter, fitted with a block to serve as a guide, as in Fig. 6. If a paper cutter is not available, use a sharp pen-



knife and a straightedge, rounding the two corners of each card with a pair of small scissors to conform to the uncut



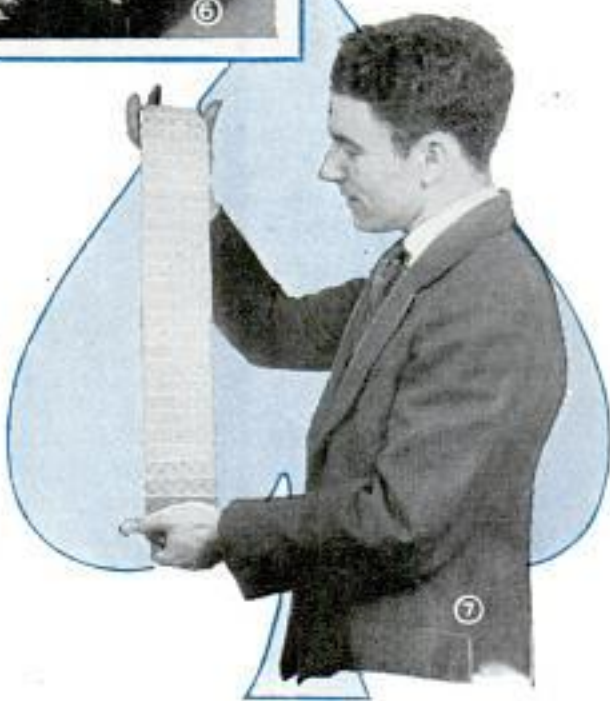
corners. Now, from the unused deck of cards, select duplicates of the cards just prepared. Assemble both sets as follows: Lay an uncut card, face up, on the table and on top of this place the duplicate prepared card. Continue this procedure throughout the deck. Riffle the deck, with the cards face down, as shown in Fig. 5, and request a spectator to insert his finger into the deck as you riffle. He does this and then removes the card thus selected from the pack. Although the performer has not seen the card selected, he immediately calls out its color and denomination! The secret is simple. Because of the short cards, the deck will fall in pairs when it is riffled, only the long cards being caught by the finger. In reality only 26 cards are shown. Behind each of these cards, which the spectator sees, are the duplicate short cards. When the spectator divides the pack with his finger, the performer simply cuts the pack at this point, placing the upper package on the bottom, and thereby bringing the duplicate of the selected card to the bottom of the deck. After



that, it is a simple matter to sight the card.

And now for the popular color-changing deck. In this, the performer exhibits the cards by riffling the deck, showing that the cards are all different. The backs are blue. And then the backs of the cards are suddenly red, while the pack is composed wholly of black cards! Such a deck is made up from two decks, one blue-backed deck and the other red-backed. From the blue deck, select 17 cards with black faces. These cards should be cut short as described for the self-shifting pack. From the red-backed deck, also select 17 cards with red faces. Now, paste these two sets of cards together at the lower edges, in pairs, a blue-backed card and a red-backed card, both cards face down as shown in Fig. 10. The top card

in each of the 17 sets is the blue-backed, black-faced short card. Now, make up a set of 17 cards—red backs and black faces. Arrange the deck as follows: Place one of the double cards, face down, on the table. On top of this place



one of the single cards. Then follow with another double card, next a single, and so

on until the pack of 51 cards has been completed. The pasted ends of the double cards should all face the same way. The top card of the deck should have no face; it is double-backed, red on one side, blue on the other, made by pasting a red and a blue card face to face. Start the trick

"string" as in Figs. 2 and 7. Take about 32 cards, and, with a safety pin and one card ruled as a guide, punch six holes in each card, as shown in Fig. 9—three holes in each end of the card, about $\frac{1}{4}$ in. apart, and approximately $\frac{3}{8}$ in. from the edge.



with the blue side of the double card turned up. Riffle the cards loosely from the face to the back, and both red and black cards will appear. Now, riffling in the same manner, from the face of the deck to the back, but turning the deck so that the spectators can see the back of the deck, you can show all the backs to be blue. Then fan the deck, and the spectators will be surprised to see only black cards. While the deck is fanned, and under cover of the spread-out cards, secretly turn over the double card so that the red-backed side is outward. Now, by either riffling the cards from the pasted end or by fanning the deck as before, you can show all of the backs of the cards to be red.

Next comes a deck which you can

Then take a fairly large needle and thread it with a single 5-ft. length of strong white linen thread, the end of which is knotted. The six holes in each card are designated by numbers 1, 2 and 3 at one end and 4, 5 and 6 at the other, 4 being directly under 1, 5 under 2, and so on. Holding the first card face up, push the needle through hole 3. Bring the needle back through hole 1, and then push it through hole 2. Pick up the next card. Push the needle through hole 3 again, back through 1, and then through 2. Thread the whole pack of 32 cards in this manner, leaving about $\frac{1}{2}$ in. of thread between each card. Thread the holes marked 4, 5 and 6 in a similar manner. The ends of the thread will be exposed on both the top and bot-

tom of the deck, and to cover this up, two additional cards should be used, one being pasted to either end. The completed



For the Color-Changing Deck, Cards Are Glued Together Near the Edges

deck, when placed on the table will appear as shown in Fig. 3. By holding the deck in your right hand, cards facing the palm of the hand, you can shower them down to your left hand, 2 ft. below. Again, you can spread the cards neatly along your left arm, and by simply dropping the arm cause all of the cards to neatly cascade into your left hand. Be sure to make these trick decks with the same-pattern back so that you can secretly substitute one deck for the other.

Jack Removes Parked Car from Tight Places

The next time you find your car parked in a tight place between other autos that are locked and cannot be pushed, try this method of getting it out: Take the jack and raise the front end as high as possible, then push it toward the center of the street until it falls off the jack. Repeat this until the front end is clear of the car ahead.

Box Fitted with Casters Makes Movable Storage Chest

Almost any wooden box of good size and sound construction can be fitted with casters at the corners and covered with cretonne, or other material, to make an attractive and easily movable storage chest for the attic. By fitting the box with a hinged and padded lid similarly it will serve both as a window seat and a storage chest.

Screen Wire Helps Prevent Roof Fires

The risk of roof fires can be reduced considerably by the use of a frame covered with $\frac{1}{2}$ -in.-mesh wire screen, on a frame about 16 in. square. Stretch the wire over it, leaving one side open so that it can be inverted over the chimney, and securely fastened.

Sack of Hardened Cement Serves as Dog's Bowl

If you have part of a sack of cement left over from a small job and it becomes set or hardened, you can use it as a feeding bowl for the dog or other pet. Chisel out the center of the lump and you will have a receptacle that cannot be easily upset or broken.—Floyd Mix, Chicago.

Muslin Wicks Water Flowers

Plants can be watered by means of 1 or 2-in. muslin wicks, a suitable weight holding one end in a bucket of water while the other end is pegged near the roots of the plants with toothpicks. The bucket should be set on a box so that its bottom will be higher than the flowerpots. The strips should not touch each other as this would cause the water to go to a few of the plants, leaving the others dry. A saucer is placed under each pot to catch surplus moisture. A bucketful of water will supply the plants with sufficient moisture for several days.—George Pommer, Jr., South Minneapolis, Minn.



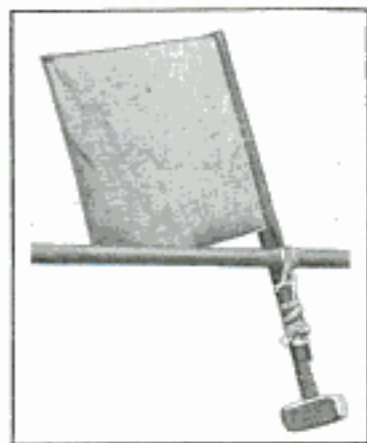
Muslin Wicks Can Be Used to Water Your Plants While You Are on Vacation

Tests for the Purity of Linseed Oil

Pure linseed oil should have a light yellow color. A greenish color indicates that it has been made of unripe seed, and if placed on the tongue, will have a bland taste, turning to bitter. The presence of either rosin or mineral oil gives it a nauseating taste. When rubbed briskly between the palms, it should have an odor of flaxseed. If rosin was used as an adulterant, a faint odor of this will be present, and the same holds true if oil was added. A good test is to place a drop of linseed oil on a piece of black japanned tin; if any mineral oil is present it can be detected by a bluish iridescence when held in a strong light, sometimes extending in a ring beyond the drop. Pure linseed oil will not congeal until its temperature drops to 18° below zero F. The presence of adulterants can thus be detected, as rosin freezes at 7° F., and rapeseed oil at 25° F. Another test is to fill a glass bottle with the oil to a depth of about 2 in., adding 3 or 4 drops of sulphuric acid. Then shake the bottle. If the mixture becomes dark brown and siruplike in a few minutes, the oil is pure.

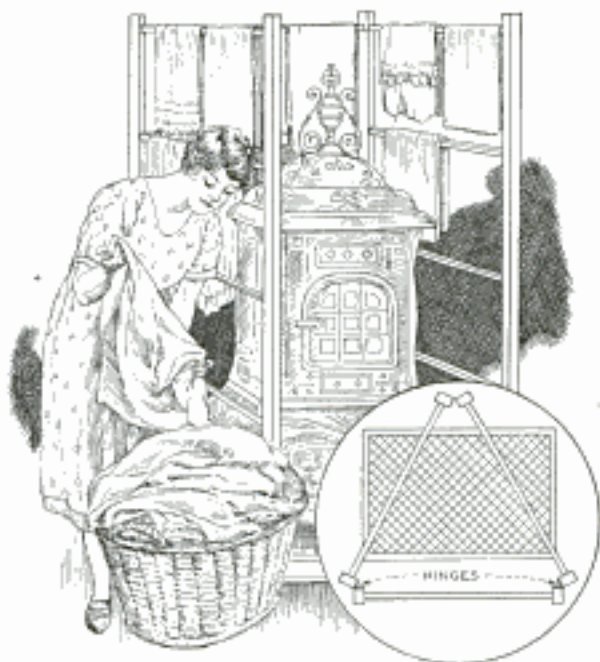
Warning Flag Held Upright by Sledge Hammer

Red warning flags, used in road-construction work, are sometimes rather difficult to keep in upright position when fastened to pipes. Tie the flag stick to a sledge hammer and to the pipe as shown, and the weight of the hammer will keep the flag upright.



Frame with Casters for Your Scrub Pail

Pushing a scrub pail around with the end of the mop handle is better than carrying it. To do this, make a wooden frame for the bucket and fit it with three casters evenly spaced around the bottom.



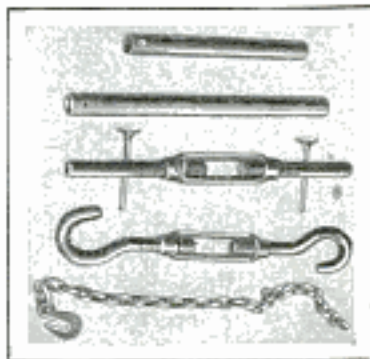
By Using a Folding Rack Your Clothes Can Be Quickly Dried Indoors as Shown Here

Folding Clothes Drier Fits Stove or Furnace Register

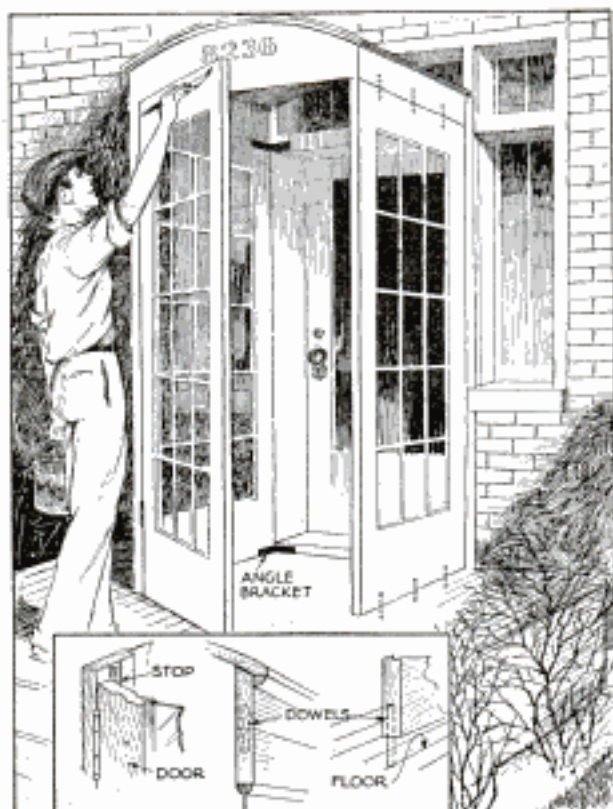
Clothes can be dried around a stove or over a furnace register by using a sectional rack. The sections consist of $\frac{1}{2}$ by $\frac{3}{4}$ by 36-in. crosspieces nailed to 1 by 1-in. uprights, 72 in. long. By hinging them together, the rack can be quickly set up, and when folded, occupies little space.—Homer I. Jones, Freeport, Ill.

Turnbuckle Converted into Small Jack

Contractors, farmers and auto repairmen will find this jack and puller useful in their work. The tools can be made from large turnbuckles, such as those used on bridges, which can be obtained at junk yards or iron-supply houses. One is fitted with hooks bent on each end for use with a chain, while the other has holes drilled in the shanks for pins. Pieces of pipe of varying lengths can be slipped over the ends so that you can handle it easily in any position with little effort.



Collapsible Storm Vestibule Quickly Erected



This Collapsible Storm Vestibule Consisting of Four Parts Can Be Assembled Quickly.

Here is a storm vestibule consisting of two large sash, a glazed door and a top, which can be assembled or taken down in a few moments. Dowels are used to hold the sides to the floor and top, as indicated, while angle brackets, attached to the inside edges of the sash and to the door frame of the house, give the inclosure sufficient rigidity. The door is fastened to one of the sash by means of loose-pin hinges which can be quickly taken apart when the door is removed. Suitable latch and door handles should, of course, be provided, and, if desired, an additional hook on the inside.

"Shadow-Stenciling" Wall Borders Gives a Pleasing Effect

"Shadowing" the border on stenciled work adds to the beauty of the work and is very easy to produce. Mix the stencil glaze or paint a trifle heavier than, and about twice as dark as, the finished color is to be. Place the stencil on the wall or object to be decorated and paint it in the usual way, after which the stencil is

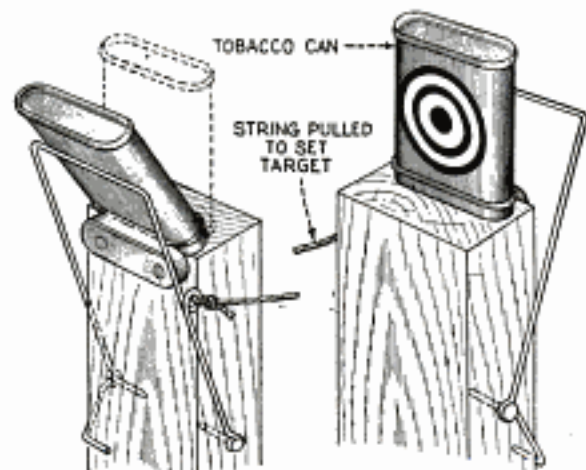
moved with both hands to a position about $\frac{1}{8}$ in. lower and toward the right, or $\frac{1}{8}$ in. higher and toward the left. While holding the stencil firmly, wipe out most of the color which shows through the openings. The effect is a darker line or shadow on one side of the design. With a little practice, you will be able to obtain surprisingly fine results.

Using Heavier Tubing for Auto Windshield Wiper

Rubber tubing that is regularly supplied for windshield wipers usually deteriorates in a short time, especially in warm climates. A length of hose such as is used on your tire pump, will last almost indefinitely and costs only a few cents more than the windshield-wiper hose. If it is too large to make a snug fit on the connections, first apply adhesive tape.

Air-Rifle Target from Tobacco Can

In order to discourage haphazard air-rifle practice by his boys, a Wisconsin father made a hinged target from an ordinary tobacco can. It was mounted on top of a post by nailing the cover onto the back of the post so that a shot from the rifle would tip the can over. To reset the target, a length of twine was run from the position of the firing line to a stout wire bent and hinged to the post by means of a nail on each side. The hook on the end of the wire prevents it from dropping back too far, and a pull on the string resets the target.



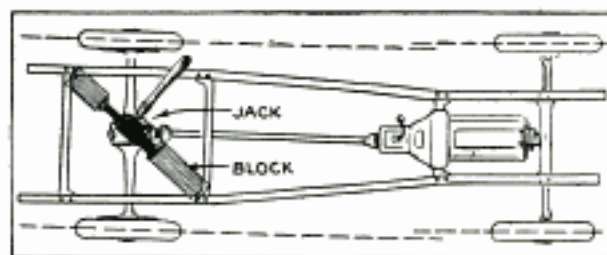
A Target That Can Be Reset with a String Aids in Discouraging Haphazard Air-Rifle Practice

Rubber Hose Holds Detachable Legs of Tripod

Camera tripods that have detachable legs, often drop off when moving the camera for a different view. This can be avoided by pushing 1-in. lengths of rubber hose, of the proper diameter, between the legs at the upper ends. This serves as a wedge and keeps them tightly in position, while the natural friction of the rubber makes it hold securely.—Melvin Kennard, Gasport, N. Y.

Alining a Shifted Auto Frame

Side members of auto frames that have been shifted out of their proper alinement, can often be forced back by placing a jack diagonally across the frame as shown in the illustration, blocks being used if necessary. A string is stretched along the side of the car parallel to the wheels. The frame is then



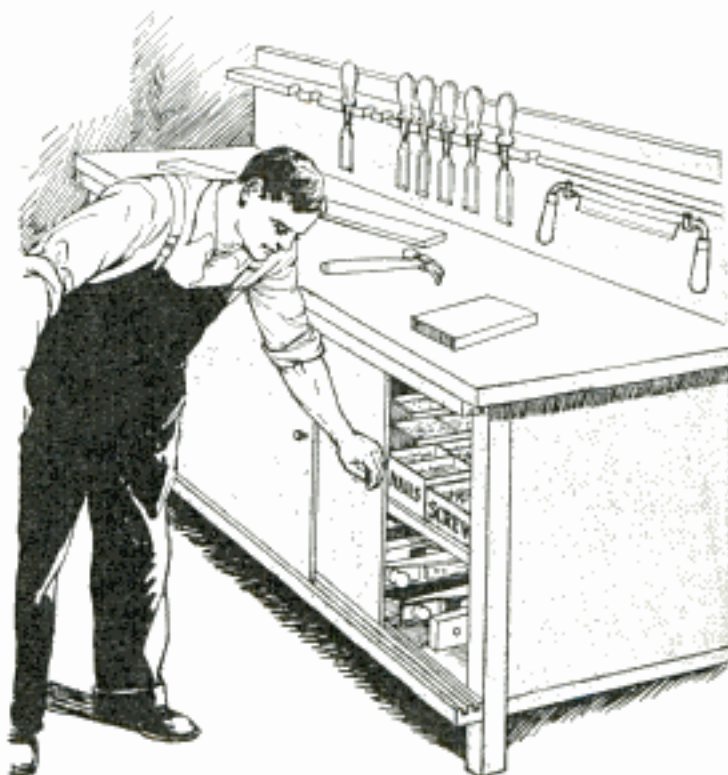
Auto Jack and Two Blocks of Wood Can Be Used to Aline Shifted Auto Frames

forced back until the wheels line up perfectly, a slight additional pressure being applied to compensate for the spring of the frame.

Salt Preserves Odor of Roses

Odor in roses and other aromatic plants can be preserved by using salt, which will force the juice out of the petals. Take 1 lb. salt and 1 lb. of rose petals or other plants and rub them together until the mass is reduced to a paste, after which it is tightly corked in a bottle and set in a cool place until used. This method will preserve the odor for several months.—Delmar S. Whited, Kansas City, Mo.

Paint strained several times after mixing will cover more surface.



Sliding Doors Fitted to the Front of Your Workbench Will Provide a Clean Storage Place for Tools

Door for Workbench Shelf Keeps Out Dirt

Sliding doors fitted to the front of a workshop bench will keep dirt, shavings, etc., out of the boxes and tools stored on the shelf underneath, and will also make the bench look neater. The doors may be either plain or paneled, and are arranged to slide in grooves cut in two lengths of 2-in. stock, one at the top and the other at the bottom of the bench.—Anthony Siers, Jr., St. Paul, Minn.

A Wire Holder for Bird Nests

It is a simple matter to make nest holders for your birdcage from steel wire. A hook, shown in the detail, is first bent in the middle of the length of wire to hook over a perch, after which the wire is bent to fit around the nest. The ends are shaped to form clips which slip over the cage bars and will not come



loose until pinched together.—Earl B. Forrester, Arlington, Mass.

Steps in Auto Ramp Save Space on Small Lots



Steps May Be Combined with an Auto Ramp on a Sloping Lawn Without Sacrificing Space

Combining steps with an auto ramp, a property owner, who had an unusually small lot, accomplished quite a saving of his lawn, as the combined steps and drive did not occupy more space than ordinarily used for the drive alone. Properly landscaped, the small strip of lawn that would have been used for steps, greatly improved the appearance of the home.

An Illuminated Fish-Bowl Stand

Your fish bowl will be given a beautiful lighting effect when set on illuminated stand made as follows: Take a can large enough to hold a low-wattage electric lamp and cut a hole in the bottom for the light socket. Drill small holes around the side of the can



just below the top, for ventilation. Then cut a hole through the top of the stand, a little larger than the can, and tack the latter in place so the ventilating holes will come just below the underside of the top. Next, cut a circular recess in the top of the stand for a

piece of glass the same diameter as the bottom of the fish bowl. The recess should be deep enough to allow the glass to come flush with the top of the table. If there are no shells inside of the bowl, but a castle is used, the light appears to come from it, giving the bowl and fish a pleasing radiance.

How to Make Antique Sails for Model Ships

On models of ancient ships it is desirable to color the sails to produce the appearance of age. A good method of doing this is to dip the sailcloth, after it is cut to shape and sewed, in a khaki-colored solution made of hot water and a good commercial dye, which can be purchased at any drug store. After the sails have dried, mix a thin solution of turpentine and raw umber and apply this to the sails with a cheap atomizer. One or two applications of the spray should be sufficient, but more can be given if desired.—Harold Bodkin, Chicago.

Thumbtacks on Drawer Slides Reduce Friction

Drawers will slide easier if thumbtacks are driven into the slides as shown in the drawing. If the drawer fits too tight to permit the insertion of the tack, cut a little of the wood



edge of the slides to provide space for the tack head. When the drawer is large and binds by jamming against the sides, drive a couple of tacks in the upright guide as indicated.—G. Stuckey, Alexandria, La.

Wallpaper Roller Made from Caster

With an ordinary bottle, of the proper size to fit the hand, and a caster, you can make a roller for wallpaper. Fill the bottle with a plastic substance that will harden, such as plastic wood, and insert the caster shank into it while soft. This roller can also be used for applying adhesive tape.

MEDIEVAL

Wall Lantern *easily made of copper*

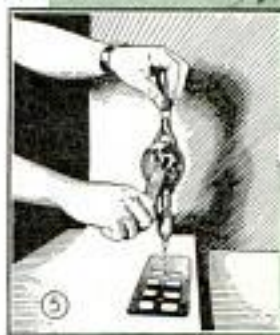
BY JOHN STEINKE

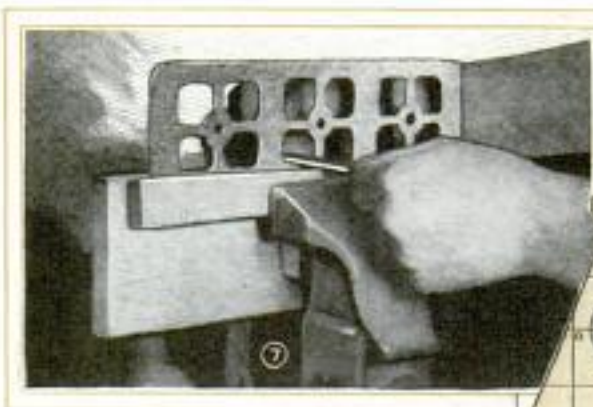


MEDIEVAL in design, this wall lamp uses electricity for illumination, and is appropriate in a hallway, porch or as an outside door light, while a pair of them over or beside a fireplace, add to the attractiveness of any room.

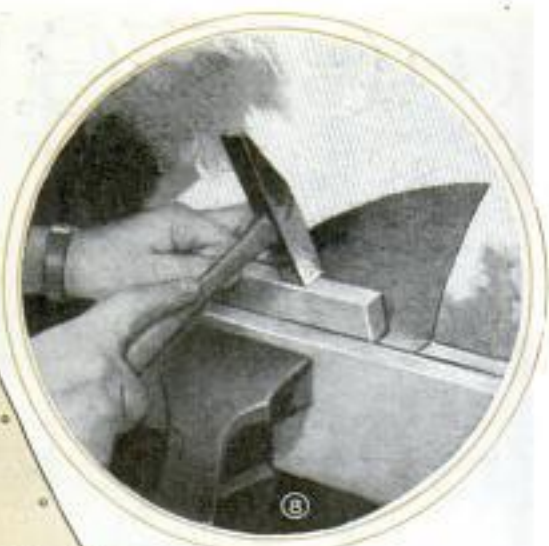
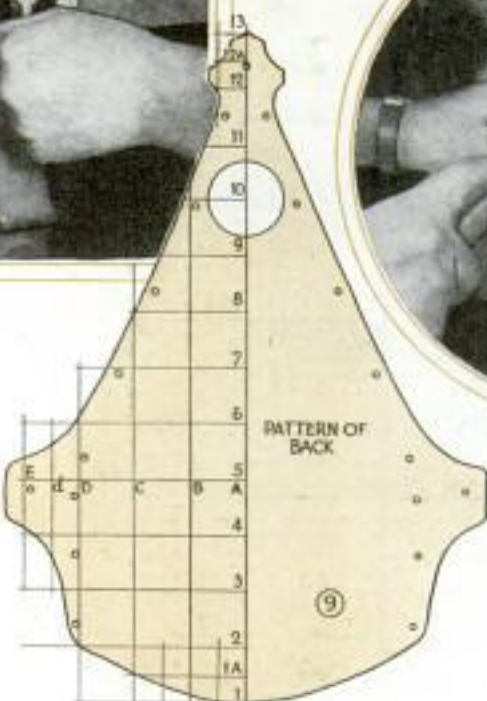
While the glass is the last thing put into the lamp, the dimensions of the latter are partly determined by the curvature of the glass, and it should therefore be obtained before the work is begun. The lantern shown in Fig. 3 was built to accommodate the glass obtained from a brown bottle having an outside diameter of 6 in. A variation from this size is permissible as the dimensions of the copper work can be changed to suit.

To cut the bottle, a narrow strip of metal, preferably copper, is tightly wrapped around it, seaming the ends. Run a hot tinned soldering copper with acid and solder around the strip, and the bottle will crack. After an attempt or two, you should have a glass cylinder which can easily be cut in half with a common glass cutter and the sharp, ragged edges can be smoothed with a file. The pattern of the back is first laid out full size on paper, following Fig. 9 and ruling off the paper in 1-in. and $\frac{1}{2}$ -in.





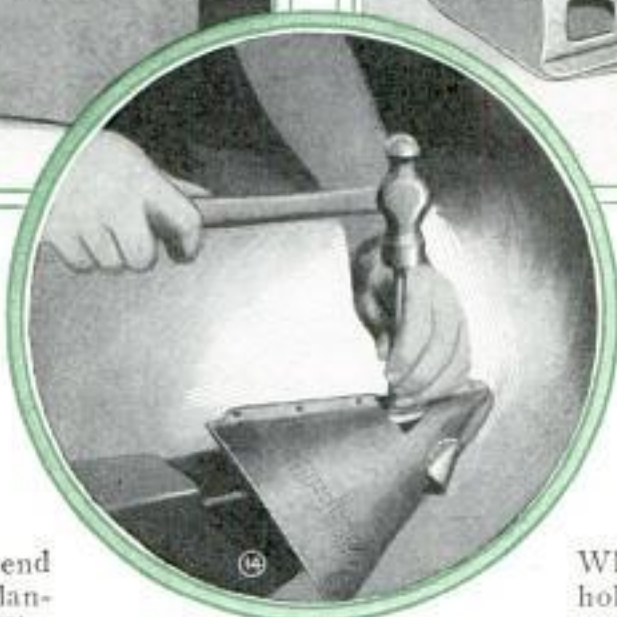
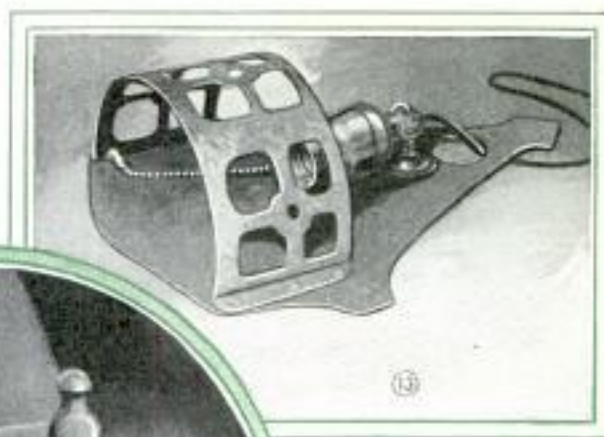
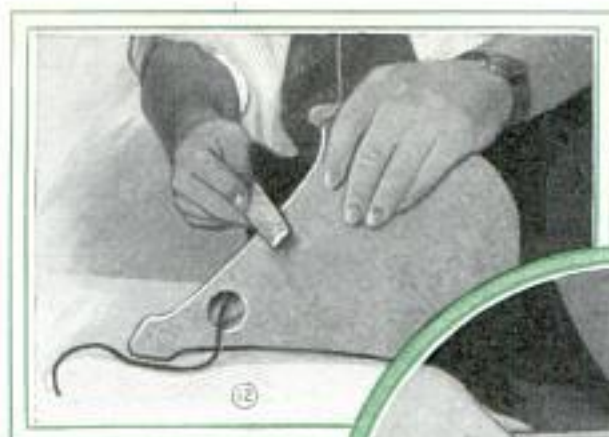
squares. Also draw out the full-sized pattern for the other pieces as in Figs. 1 and 2. A piece of sheet copper, 12 by 24 in. in size, will be sufficient. The lamp illustrated was made from 32-oz. copper. This may seem a little heavy but works and hammers nicely. You may use 24-oz. copper, but the 16-oz. size is too light. The next step is to trace the drawings on the copper, using carbon paper for this purpose. Retrace the carbon lines on the copper with pencil so they will not smear off, after which tin snips are used to cut the metal, as shown in Fig. 6. There are some sharp inside curves which will have to be cut as close as possible and then finished with a half-round file, as in Fig. 7. The design on the front bottom piece is drilled for inserting a metal coping-saw blade, as shown in Figs. 4 and 5. Jewelers' saw blades will also do the job and save some filing, but are finer and more likely to break. Use steady, even strokes and lean the saw forward a little. Also cut out the ventilation holes on the top cone piece and the hole on the back piece to pull the wire through. This is large enough so the wire can be pushed through it when wiring to the house.



After the design has been cut, you are ready to hammer both pieces of the front. Small ball-peen-hammer marks are better in this case than the larger planishing marks. On the bottom piece, avoid hitting the edges, and on the top piece, work from the center toward the edges. The metal will be stretched sufficiently on the latter piece so that it will overlap the bottom piece, although the measurements are the same. As hammering will curl and harden the metal, it will be necessary to straighten it out to anneal it, which can be done by heating the copper to a dull red and plunging it into water. Then use a mallet or a rawhide hammer to straighten and stiffen it. Transfer the dots from the drawing to the work



by means of a scratch awl, to provide a point to start a $\frac{1}{32}$ -in. drill. The bending is done over the edge of a bench, after it is nearly formed into a cone, the smaller end of which is hammered to shape with a mallet. To bend the edges of the cone, clamp it in a vise between boards and hit a piece of flat stock with a hammer as shown in Fig. 8. Straps are soldered on



the bottom piece, as in Fig. 10, to hold the glass in place. The straps can be formed into a half circle over a piece of pipe. Now take the back piece you have cut and hammer it on the lower end with a broad-faced planishing hammer, as in Fig. 11, or with the slightly beveled face on the big end of a ball-peen hammer. The purpose of using a broad hammer is to vary the marks and to suggest the reflecting surface used in old-time candelabras.

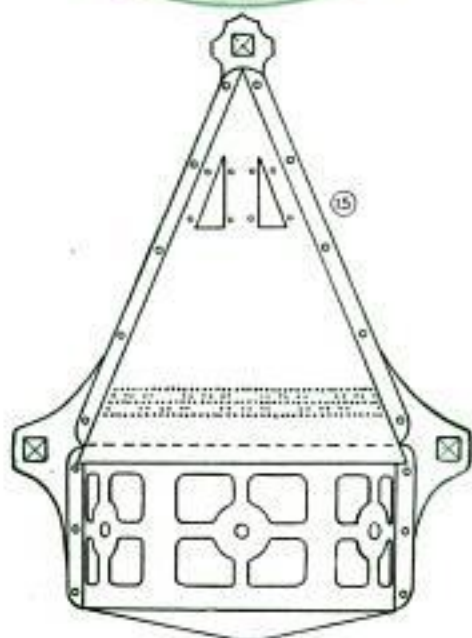
The lamp is now nearly ready for assembling. You can either drill the holes for the rivets or use a solid punch, as in Fig. 14. Drive it into either the end grain of a hardwood block or a lead cake. It is quicker than drilling and serves the purpose just as well. Use copper rivets, drawing them up with a regular rivet set. After you have drawn up a rivet, hammer it down with a ball-peen. This produces marks on the rivet in keeping with the rest of the job. With the bottom piece in place, attach the socket and wire it before the top cone is riveted on. Use a pull-chain socket attached with an angle fitting, as in Fig. 13. Put the ventilating hoods on the top cone before riveting it on the back. These will have to be ham-

mered to shape, as they are too small to be bent with the fingers. Be sure to hammer mark them before bending. Fit the top cone, with hoods attached, to the back piece.

When fitted, mark the holes on the back piece and rivet together. To provide a means of hanging the lamp on the wall, square caps are used at the corners. These are made by cutting a piece of copper, $\frac{3}{8}$ in. square, with a small cold chisel, and soldering to 8-32 brass machine screws.

Finish by filing down the rough edges as in Fig. 12. The copper can be darkened in keeping with the design by using a solution of sodium sulphide, about 1 oz. to 1 qt. of water, applying it with a brush or rag. Keep this off your hands; it will

not hurt them, but the black stain will remain for weeks. An easy way to get sodium sulphide is to buy one of the redeveloping tubes used in making sepia prints. Use the part of the tube marked redeveloper. After you have darkened the copper, take fine sand or emery paper and polish the high spots. Polish the bottom part of the back piece thoroughly to act as a reflector. Now go over the job with plain beeswax, heating the metal slightly when applying the wax.



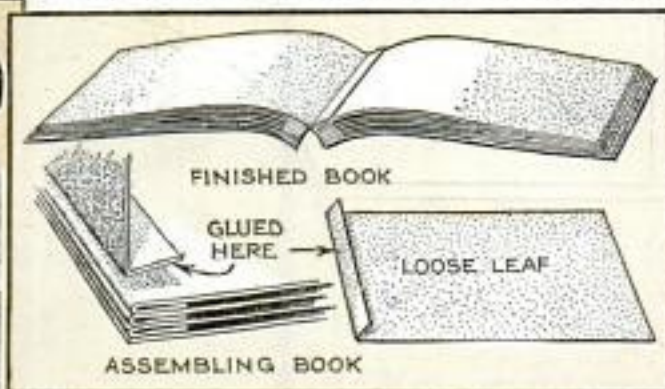
A Scrap Book Made from Wrapping Paper

There are frequent occasions when a scrap book or cheap photo album is de-

paper and cut them all to the required size. Each sheet should be about $\frac{1}{2}$ in. longer than the book, to allow for folding and gluing. The method of assembly con-



sired. Besides, children find great delight in pasting up pictures cut from magazines and newspapers. One method of making such a scrap book is shown in the photo and drawing. Get a number of sheets of rather heavy brown wrapping



sists in gluing the folded edge of one sheet to the one directly underneath, until a book of the required number of sheets has been built up. If you like to add covers, the use of rather heavy cardboard is preferable. It will be found a good idea to punch holes through the doubled edge of the assembled book, and also through the covers, after which they are laced together. In case you have a hand punch, each sheet may be perforated before gluing, care being taken to get all the holes in line.

Sponge Prevents Marring of Auto Wheels by Wire Brush

On some brushes used for washing the wheels of autos, the wire core extends beyond the bristles and mars the finish. Such trouble can be eliminated by wrapping a piece of sponge around the bared end of the brush and fastening it with a length of copper wire. This idea also helps to prolong the life of kitchen brushes when bristles have worn off at the end. —Darwin Harris, Grand Rapids, Mich.

Light Metal Uniformly Soldered with Lead Foil

Where uniformity is required in sweating a joint of light sheet metal, lead foil can be used. Clean the metal and apply a coating of soldering flux. Then cut a piece of foil to fit the joint, lay it over the flux between the metal pieces and clamp

them together. Heat the metal sufficiently to melt the foil and a strong joint will be the result.

Newspapers Aid in Practicing Show-Card Writing

Beginners in show-card writing will find a newspaper an inexpensive sheet for



Using Newspaper in Practicing Show-Card Writing

practicing. The column lines serve as a guide for the height of the letters, while the lines of type will show whether the letters are being made straight.

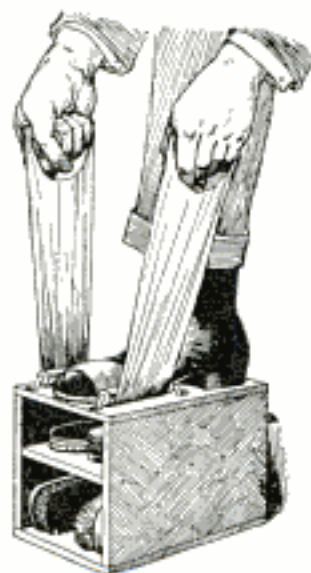
Packing for Hose Connections

When the packing in water-hose connections has worn out, a satisfactory substitute can be made by cutting $\frac{1}{8}$ -in. washers from a piece of hose of the same size. The washers should be cut smooth and of the same thickness all around so that they will fit tight in the connection.

Curry Comb Used to Scale Fish

An ordinary curry comb, which can be bought for a few cents from any hardware store, can be used for removing the scales from fish. The comb should be thoroughly washed and sterilized in boiling water before using it for this purpose. —Carol McArdle, Webster Groves, Mo.

Rollers Aid in Shining Shoes

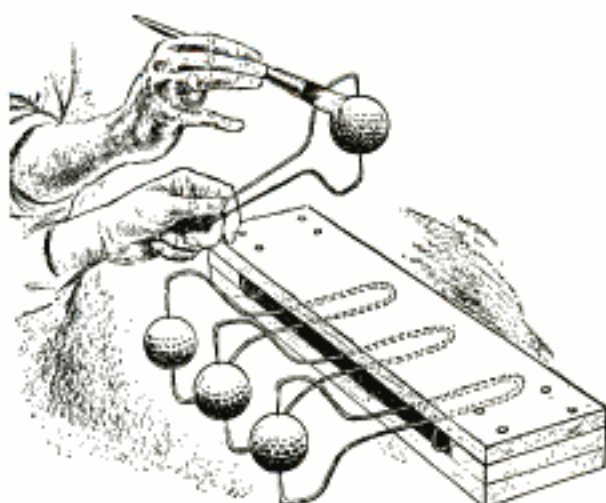


Rollers fitted on suitable shafts, and fastened to a box as shown, will provide an easy means of polishing your own shoes. Place your foot between the rollers and thread the cloth under them and over the toe of the shoe. If holes are cut near the ends of the cloth for hand-holds it can be gripped easily.

Paraffin Protects Vacuum Bottle

To prevent a glass vacuum bottle from breaking in its case, chip up some paraffin and melt it inside so that the bottle will be about one-quarter full. Do not pour in melted paraffin. The hardened paraffin will prevent vibration more effectively than the metal springs usually provided for the purpose. The top cap is replaced before the paraffin hardens.

Holder for Painting Golf Balls



Repainted Golf Balls Are Free from Blotches and Paint Drops When Using This Holder

Pointed at each end and bent to the shape shown, a length of fairly heavy galvanized wire makes a holder for painting golf balls that will not leave a dried drop of paint or a blotch on them. In use, the ball is held between the points and dipped into the paint, after which it is placed in a wooden holder to dry. This consists of two boards nailed to a separator at each end, small grooves being cut in the inner side of both pieces to hold the wire in the position shown. As the paint drains off the ball, it runs down the wire.

Pipe Cleaner Keeps Flag Straight

Small starched flags that are commonly used in cluster decorations are often rather difficult to handle as they have a tendency to roll back when unfurled. This trouble can be eliminated by wrapping one end of a white cotton-covered pipe cleaner around the flag staff and bending the other end around the outer edge. If the cleaner is laid along one of the white stripes, it can hardly be seen.



☞Olive oil of high quality is distinguished by its decided straw color.



Training

THERE is no doubt that every dog should be taught a few things beyond the basic law of cleanliness. Training the dog to lie down is simply

a matter of pressing him into that position, as shown in Fig. 1, while you voice the command. The action must be repeated until the dog learns to associate the command with the required action.

If your dog jumps up on other people, soiling clean clothes with his dirty paws, try the simple remedy pictured in Fig. 2. Every time he jumps up unbidden, step on his toes and give the command "down." A smart dog will then quickly appreciate the advantages of remaining on all fours. Training the dog to heel is very important, especially if you live in a small town where jaunts without a lead are permissible, but where traffic is dangerous, and the dog is not safe unless directly at your heels. To train him to take this position on command, walk him along with a short leash attached to his collar. Carry an old tennis racket in your hand. If he shows a tendency to come up too close, rap him gently on the nose with the racket. If he attempts to hang back too far, use the simple force collar shown in Fig. 4. This will not injure his coat nor harm him physically, yet it will always result in his coming along to escape the irritation provided by the blunt metal points.

In training a dog for draft purposes, the force collar is valuable as it will correct any tendency to hang back. A gentle tug



Three of the Most Desirable Things a Dog Should Know and Can Be Easily Taught Are to Lie Down When Told, Keep Off Your Clothes or Those of Your Guests, and Follow at Your Heels When Out for a Stroll, Especially Where Traffic Is Dangerous

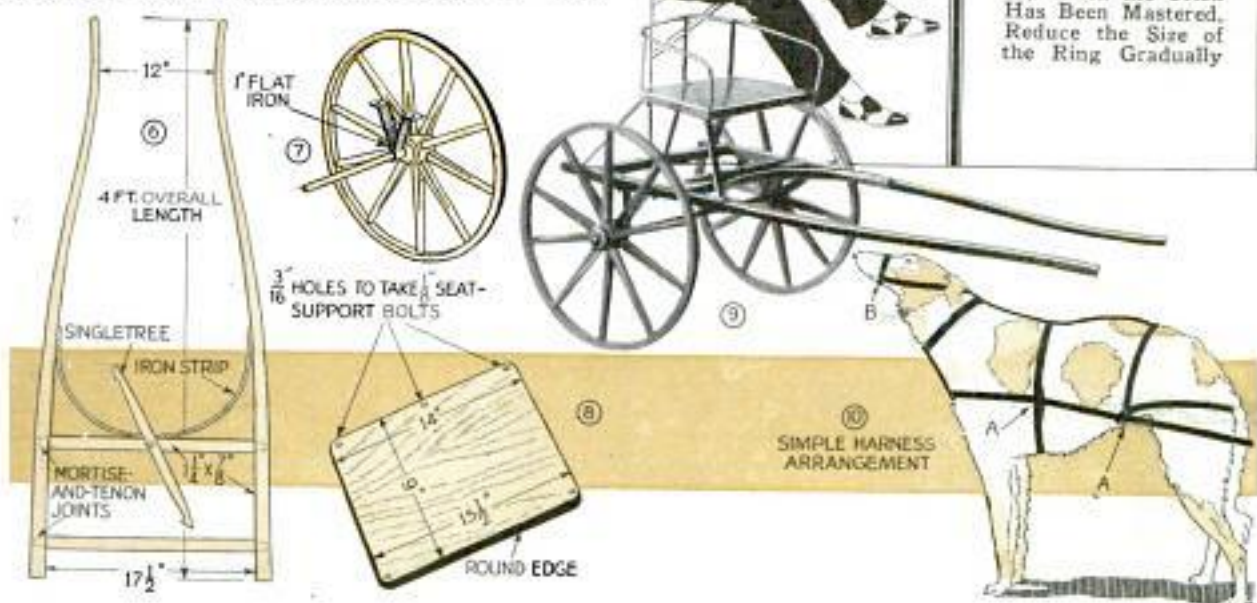
Training Dogs for Draft Purposes Has Great Value for the Youngsters



Your Dog

on the collar lead accompanied with the command "giddap" will soon convey the big idea to the dog. Since the average dog is more or less anxious to please, the rest is easy. Naturally enough, training is made less difficult if the proper equipment is used. A fair idea of dogcart construction can be obtained by studying Figs. 6 to 9 inclusive. For a harness, the simplified arrangement shown in Fig. 10 will give good results. Additional loops are provided at points A, to take the cart shaft on either side, while the reins are attached to a ring at point B.

Tricks can be taught by following a similar practice. The dog must be shown what is wanted. Of his own accord and with very little training, he will invariably jump through your arms, as in Fig. 11. To have him jump through a ring in the same manner requires much patience. It is useless to hold the ring high in the air and expect the dog to know what he must do on the command of "jump." Rather, the ring must be passed repeatedly over the dog, as in Fig. 12, and then a short jump must be mastered, the dog being pushed through. Once the dog gets the idea, the height of the jump is limited only by his activity. For this trick, best results are obtained by using a large hoop at first.





After the dog has become acquainted with the action, a smaller ring can be substituted. It has been demonstrated that a full-grown German police dog can pass through a 9-in. opening.

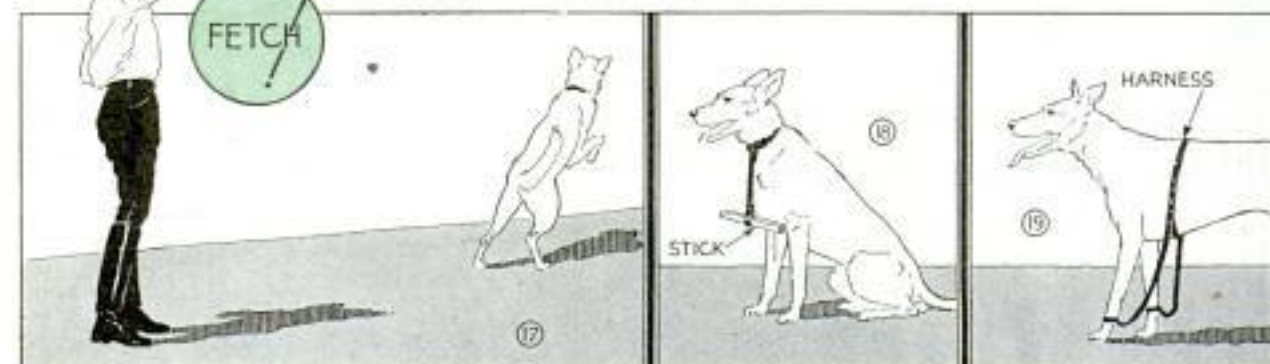
Other simple tricks, which every dog is taught to perform, are usually accomplished by kindness and petting. He will shake hands, sit up, ask for something, play dead, and do a dozen other tricks with very little prompting. Training the dog to retrieve is usually featured as a simple trick, yet it has a practical side in hunting, life saving, and many other fields. All in all, there is no more featured stunt in dog performance. It may be a person in a burning building, a newspaper in the village post office or simply a rubber ball or a stick, but the act of "fetching" is always the same. Often the dog will fetch on his own initiative, but even here training is necessary in order to bring home to

the dog the association between certain commands and certain actions.

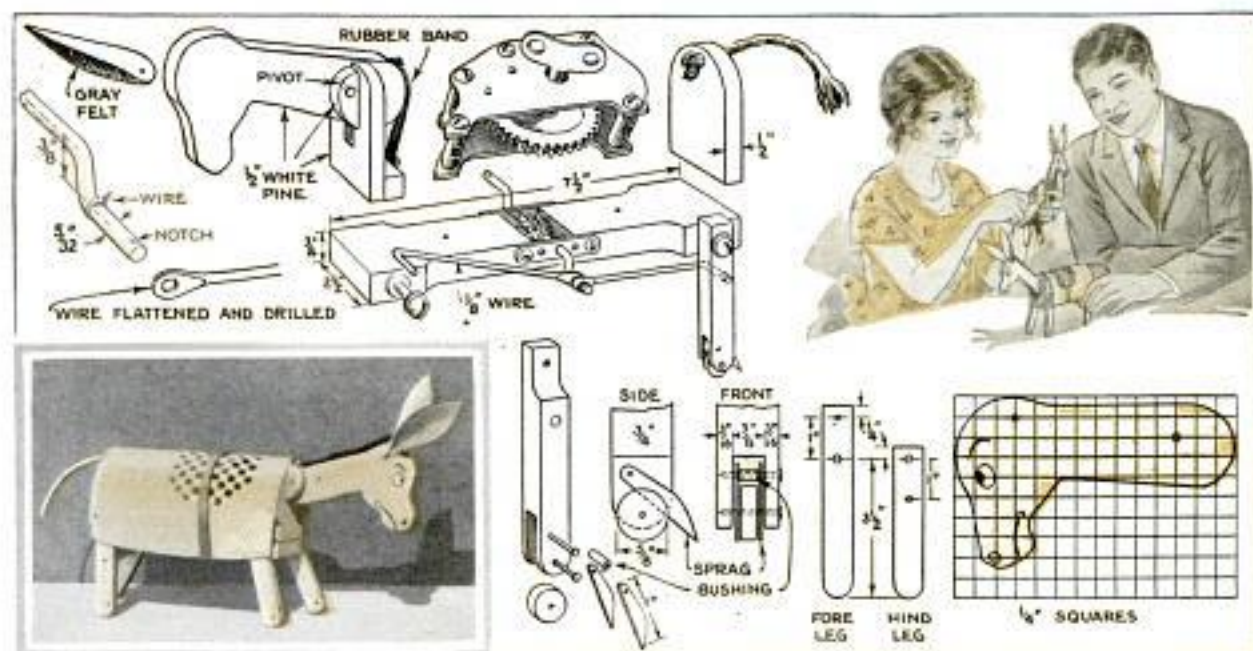


The usual procedure is to use a stick or a corncob. Present this to the dog, commanding "fetch" sharply. When he takes the stick, release your hand and command him to "hold it." After a brief while, command "give up" and take away the stick. These three actions are shown in Figs. 14, 15, and 16. If the dog is inattentive, use the force collar. After a brief period of training, the dog will return the stick under almost any circumstances. If the dog has the bad habit of running after

autos, just fasten a short stick to a strap on his collar, as in Fig. 18. The stick, banging against his legs as he runs, will soon cure him of chasing. Then there's the dog that persists in scratching the finish off your car, etc.; the cure is the simple harness shown in Fig. 19, which prevents him from stretching his legs out to the position necessary for exercising this habit.



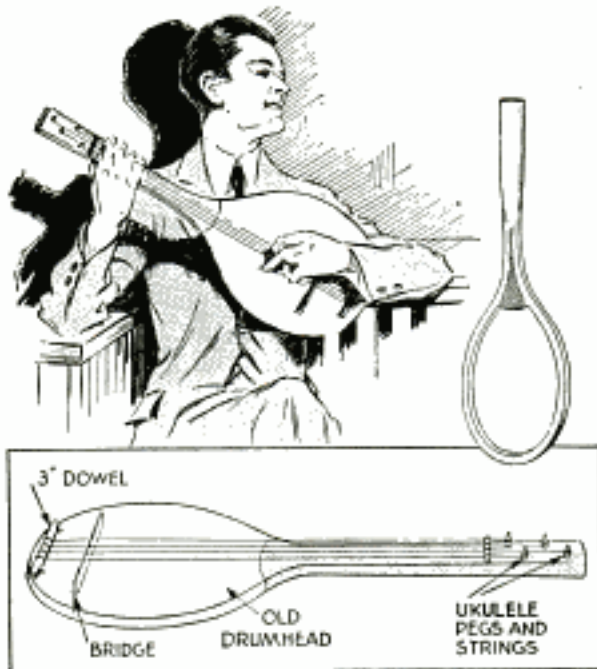
This Mechanical Burro Has an Amusing Gait



THOUGH it does not carry ribbons for looks at a county fair, this donkey, when wound up, certainly does ramble as if bound for the feed box after a six-day fast. A motor, such as was used in early cylinder-type phonographs, is obtained. Strip off all unnecessary parts to reduce the weight, and then pick up a pinion gear that will mesh with the large gear on the drum containing the spring. The pinion is carried on a $\frac{5}{32}$ -in. shaft with a crank formed at each end. The cranks have a $\frac{3}{8}$ -in. throw, and instead of being set opposite one another, they are 90 degrees apart. The reason for this is so that the legs will move forward successively. The pinion should be set in place before the crank is bent. For connecting rods to operate the legs, galvanized fencing wire, about $\frac{1}{8}$ in. in diameter, is used. Flatten one end and drill it to fit the crank without excessive play. The other end is bent to a right angle and inserted in a hole at the top of the leg. To hold the ends of the rods on the crank, notch the latter with a file and bind two turns of soft wire tightly around it. Bearings for the crankshaft are simply short perforated plates. Be careful in lining up this shaft so that the pinion meshes freely with the motor gear, without danger of the teeth "riding" under load while in motion. The fore and hindlegs are $\frac{3}{4}$ in.

square and are swung on round-head wood screws which must be a close but free fit. Washers should be placed on both sides of the leg. The foot mechanism consists of a small hardwood roller, to allow the leg to move forward without friction, and a sheet-metal sprag, or ratchet, to prevent it from slipping backward. If you have no facilities for making the rollers, take the wheels from small lead autos sold in ten-cent stores, using two to each foot. There are two sprags on each foot, and they are separated with a spacer made of tubing. The roller axle prevents their falling too far forward. Rollers and sprags must operate freely, but without too much play. Test the mechanism before building the body. The connecting rods should be the proper length to give each leg just as much movement back of the perpendicular as ahead of it, in other words, a perfect pendulum swing. The legs should not have too long a stroke: about $2\frac{1}{2}$ in. at the bottom of the roller is enough. The head is swung on a fulcrum and held erect by a rubber band inside the body. A piece of ignition cord, with the covering frayed at the end, makes a first-class tail, while the ears may be cut from gray felt. A piece of pasteboard is cut to serve as the back and is tacked or screwed in place. A saddle and band can be made of colored paper.

Musical Instrument Like Ukulele Made from Tennis Racket



Old Tennis Racket Fitted with Drum Head and Strings Gives Tone Similar to Ukulele

A musical instrument that has a tone similar to that of a ukulele can be made from an old tennis racket and a drum head. Remove the strings from the racket and sandpaper the frame smooth. Soak a drum head in water, stretch it tightly over the racket and tack it to the edges with upholstering tacks. Dress down the top side of the handle even with the drum head or sounding board, and round off the underside. Fasten ukulele strings to pegs fitted in holes drilled through the end of the handle and tie the other end of the strings to a 3-in. dowel rod which has been slotted at both ends. To form the tailpiece, take a discarded gut string from the racket, knot both ends and slip them in the slots, after which the string is slipped over the head of an upholstering tack driven into the end of the racket. The bridge is made from a suitable piece of thin stock.

Mercurochrome Tints Photographs

An amateur photographer has successfully tinted photos different shades of pink with mercurochrome, which can be obtained at any drug store. Dissolve 2 dr. of the mercurochrome in 16 oz. of ordinary developing solution and treat the negative in the usual way. Deeper or

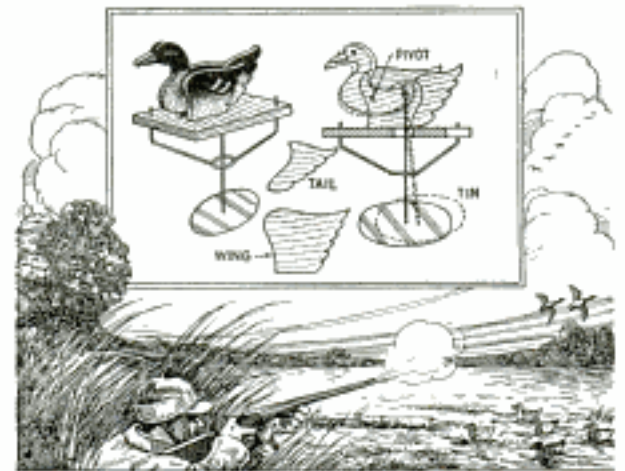
lighter shades of pink can be obtained by adding more or less of the mercurochrome. For pictures already finished, add mercurochrome to water and let the photo soak in this solution until the desired shade has been obtained.

How to Make Glossy Paint

Paint that will have a glossy finish can be made as follows: Mix equal parts of white lead in soft-paste form and linseed oil. Then add $\frac{1}{4}$ pt. of turpentine to each gallon of paint. If heavy-paste white lead is used, it will be necessary to use more linseed oil, stirring in a little at a time. When used as a priming coat, add enough linseed oil to give the desired thickness.

Animated Decoys Attract Ducks

Here is a decoy that has a lifelike head motion highly effective in attracting wild ducks. All the parts are cut from 1-in. wood. The tail is nailed between the wings, which in turn are nailed to a float or base of light wood. The head is cut to shape and pivoted between the wings as shown in the right-hand detail. A length of heavy galvanized wire, having a piece of tin fastened to one end, is suspended from the headpiece through a hole in the base. This serves as an agitator to move the head. A guide for the agitator is made by bending a loop in a length of wire which is fastened to the base. When the decoy is placed on the water, the ripples cause the float to move up and down, while the agitator remains motionless, resulting in movement of the head.

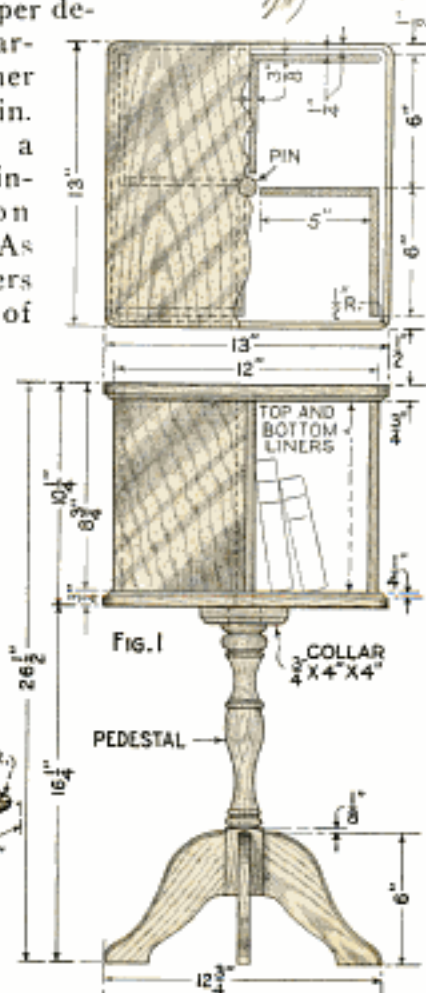
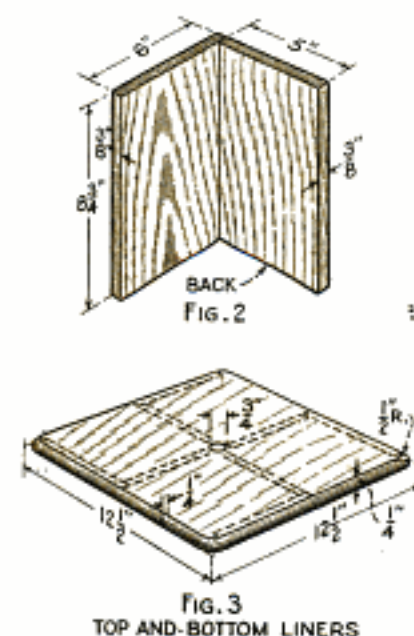
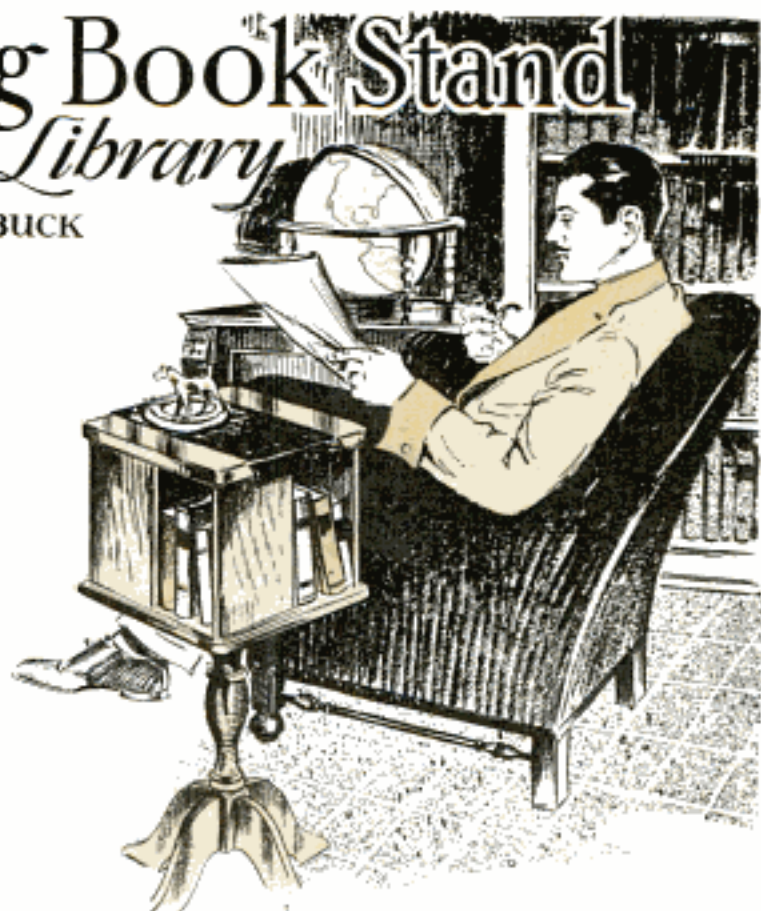


Ripples on Water Move Head of This Decoy Up and Down in Lifelike Manner

A Revolving Book Stand for Your Library

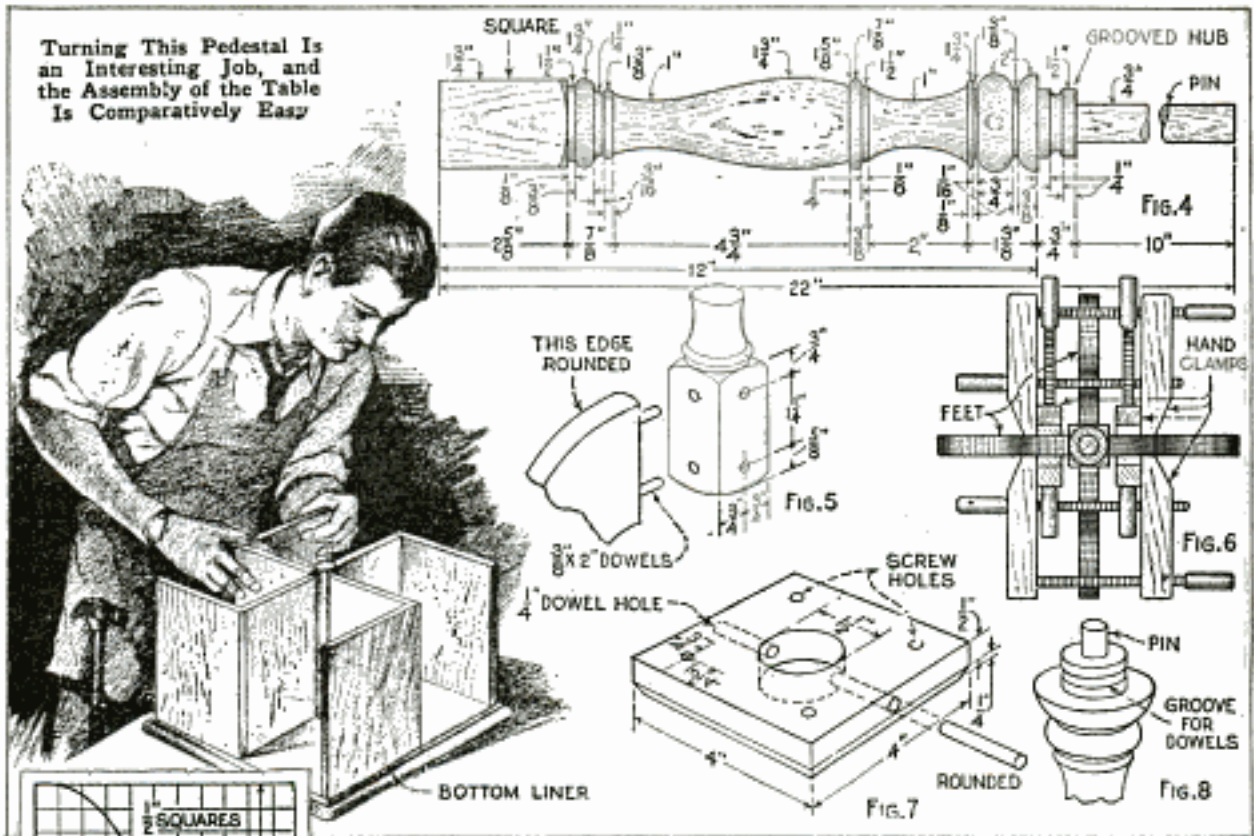
By R. O. BUCK

MAHOGANY and walnut are the best woods for making this revolving book stand, although maple and even pine can be used with good results. A woodturning lathe is needed to make the pedestal, while the feet can be cut out on a bandsaw. If these machines are not available, you can have the piece turned for you and do the curved sawing by hand. A piece of $\frac{3}{4}$ -in. stock, having an attractive grain, should be selected for the top, and another piece of the same size is used for the bottom. Square up and smooth these two pieces and round the corners to a $\frac{1}{2}$ -in. radius, as indicated in the upper detail of Fig. 1. The book partitions are carried on inner top and bottom liners, $\frac{1}{4}$ in. thick. Fig. 3 shows such a liner, and the dotted lines indicate how the partition pieces are arranged on it. As only the edges of these liners show, they may be made of



less choice stock than that desired on the exterior. They are simply two $12\frac{1}{2}$ -in. square pieces with the edges planed to a quarter-round and the corners rounded as indicated. Drill a $\frac{3}{4}$ -in. hole through the center of each.

The partition pieces, of which there are eight, are assembled in pairs as shown in Fig. 2. Care must be taken to get all pairs exactly the same size when finished. The table holds sixteen books of average size, four to each partition, allowance being made for some variation in height so that books as high as $8\frac{3}{4}$ in. can be housed. The method of assembling the cabinet part of the table is simple. Nails and glue are used to fasten the partitions between the liners. The next step is to fit the top and bottom. Before this is done, a $\frac{3}{4}$ -in. hole should be bored entirely through the bottom and half-



way through the top, care being taken to prevent the point of the bit from coming through the top surface. After this

has been done, the pieces are assembled with glue and clamped firmly together.

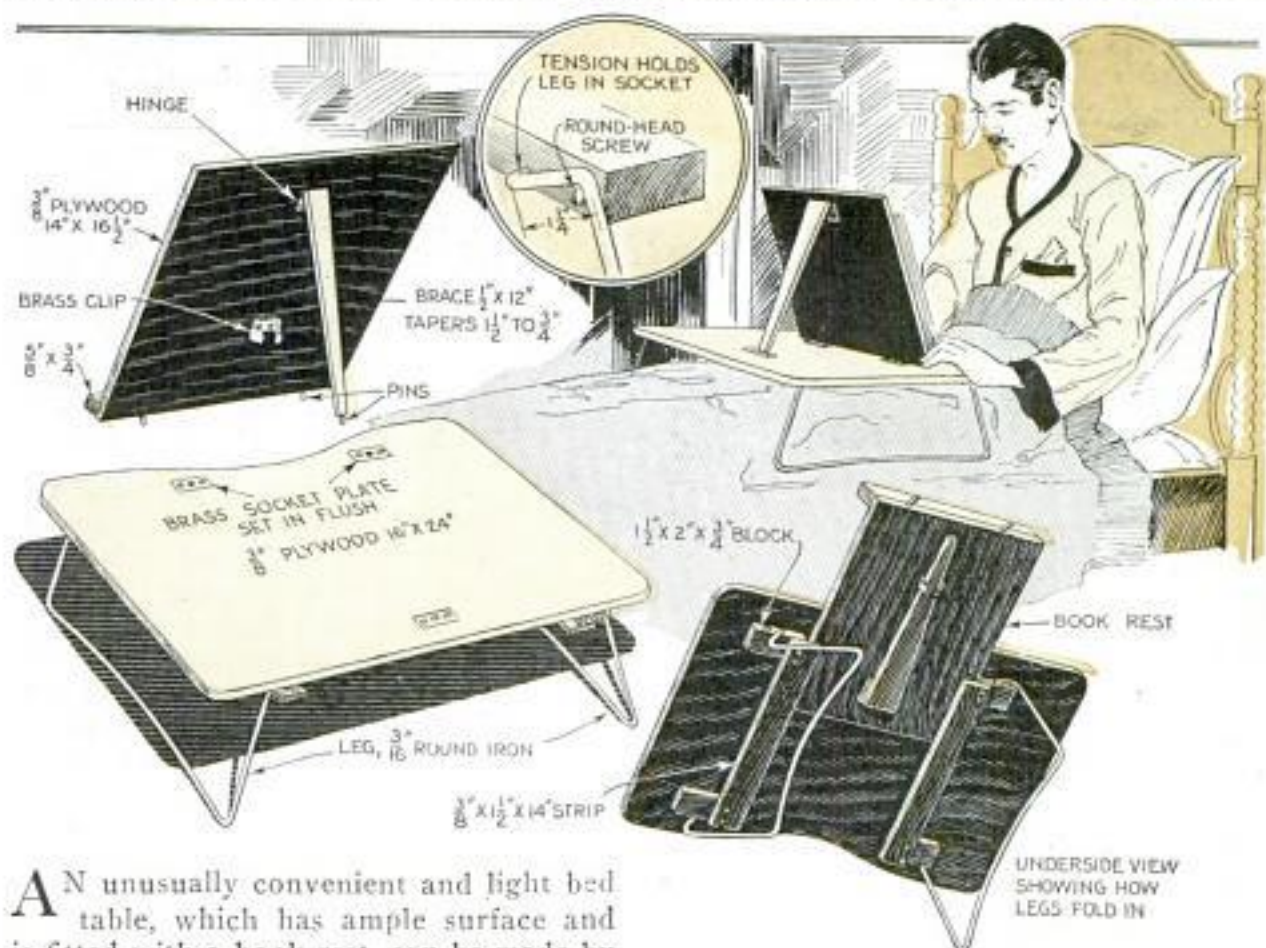
The turned pedestal, with complete dimensions, is shown in Fig. 4. Notice that the largest diameter of the squared part is only $1\frac{3}{4}$ in., while the rounded part is a full 2 in. After squaring up the stock and before it has been turned, the squared portion should be sawed and planed to size. The grooved hub and shaft, which form the upper part of the turning, carry the cabinet assembly on a pivot so that it can be revolved readily. In order to prevent the top from being lifted off, when the table is picked up, a square collar is screwed onto the bottom of the cabinet. The collar not only gives the shaft greater bearing surface but is provided with holes through which dowels are driven to travel in the grooves on the hub. The dimensions and construction of this piece are clearly shown in Fig. 7, while the detail of the hub is given in Fig. 8. Note

the groove in which the two dowels ride. The ends of these dowels should be rounded so that friction will be reduced to a minimum.

Fig. 9 gives the pattern of the feet. Lay out $\frac{1}{2}$ -in. squares on a piece of heavy cardboard to copy the pattern, after which it may be transferred to the stock. The grain of the wood should run lengthwise. Finish all edges with a plane and use a file and sandpaper as required. Fig. 5 shows the method of fastening the legs to the square part of the pedestal piece with a $\frac{3}{8}$ by $1\frac{1}{2}$ -in. dowel. The spacing of the holes is also shown. Care must be taken to bore these holes true and square so that the legs will fit well. After the dowel joints have been completed, glue up the four legs and tie with a rope, or better still put a pair of handscrews on the legs, as indicated in Fig. 6, and then clamp these together with another pair.

The table may be stained and varnished, or a very effective antique effect can be obtained by the use of water stain and filler if an open-grained wood is used, followed by repeated applications of a paste made of genuine beeswax cut with turpentine and applied just as you would ordinary furniture wax.

Plywood Bed Table Folds into Small Space



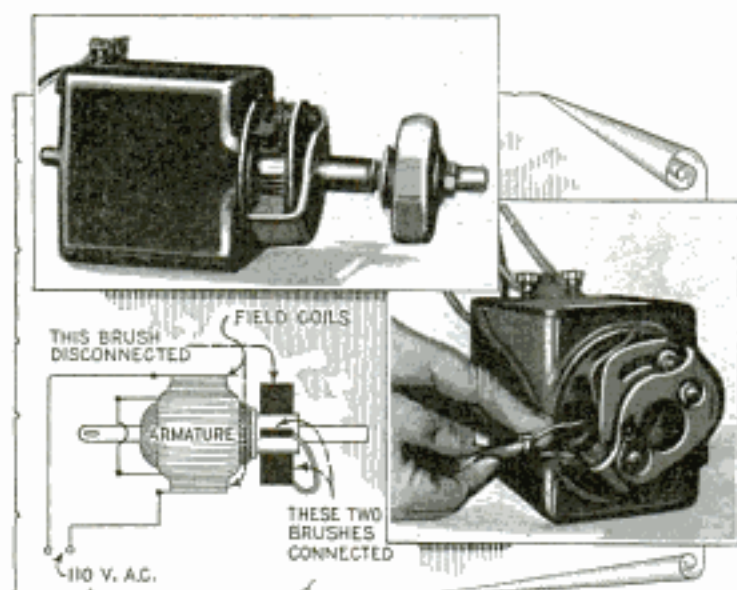
AN unusually convenient and light bed table, which has ample surface and is fitted with a book rest, can be made by following the accompanying drawing. When not in use, the table can be folded up and stored in a space about 2 in. wide. Plywood, about $\frac{3}{8}$ in. thick, is used for the table top and book rest. In cutting this to shape, use a fairly fine-toothed saw so that the wood will not split at the edges. First cut the table top, round off the edges, and set in the brass socket plates, which are to receive the pins of the book rest. Use a plate not over $\frac{1}{16}$ in. thick and chisel out a neat recess so that the plate will lie flush with the surface. Plates are attached with short brass screws, about $\frac{1}{2}$ in. long, the projecting ends being filed off on the underside. Next install the blocks for the legs and the strips which support the book rest when slid under the top, as shown in the underside view. Use brass screws where practicable but finishing nails elsewhere, and glue all joints. Bend the legs to shape from $\frac{3}{16}$ in. iron bar, about 29 in. long. The upper ends of the legs are set in holes drilled in the supporting blocks, and a second right-angle bend permits the leg

to spring up over a round screw head when the table is in use. The upper ends of the legs should be bent in to give sufficient tension to hold them in their sockets. The plywood book rest is 14 by 16 $\frac{1}{2}$ in., with a $\frac{5}{8}$ by $\frac{3}{4}$ -in. strip across the bottom and a hinged leg in back, held in place by a spring clip. Sandpaper the entire job well, stain it walnut and apply two coats of shellac or varnish.

Quick Method of Sewing on Buttons

A quick method of sewing buttons on heavy clothing is to insert a piece of fine radio wire through the eyes of the button into the cloth and twist the ends together on the other side, after which the ends are bent over sharply to prevent catching in the clothes. This will make a neat job and will hold securely.

☛ A lost dog is more likely to be recovered if you have your telephone number stamped on its collar plate.



Anyone Can Easily Make This Electric Motor from an Old Auto Generator

Auto Generator Converted into High-Speed A. C. Motor

An old 6-volt auto generator of the three-brush type can be converted into a high-speed motor that will develop from $\frac{1}{8}$ to $\frac{3}{8}$ hp. at a speed of 3,000 to 5,000 r.p.m. Remove the armature and disconnect the three field leads from the brushes. The one that goes to one of the terminals of the generator output is taken off that terminal. Then connect the two remaining wires together and insulate the joint. Connect the field coils of the generator to the 110-volt a.c. line and make sure the field is continuous, which can be determined by holding a screwdriver near the magnetic poles. If the winding is continuous, the screwdriver will be attracted toward them. Next replace the armature and assemble the generator. Connect the movable or third brush to one of the other two and then turn the current on again. If the motor does not run, disconnect it and connect it to the opposite one, which should allow the motor to run. Adjust the movable brush back and forth until the motor runs at its highest speed. On some generators the whole brush assembly is movable. In such cases, move the assembly instead of one brush. It may be necessary to mount the movable brush on an independent support to locate it at the best point. After adjustment, the brushes should be replaced with those of the carbon type, as these have very little

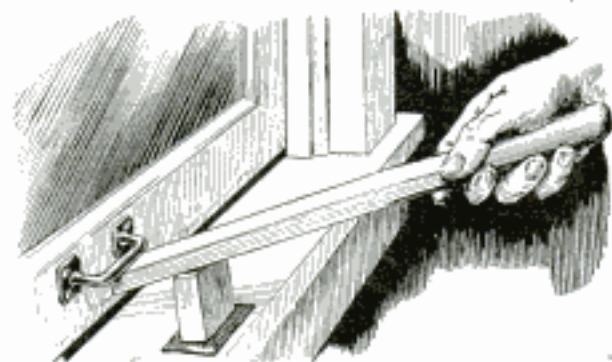
resistance. Some generators have only one terminal, the other being grounded to the frame. In this case, the grounded wire is removed and fastened to an insulated terminal by drilling a hole through the generator case and inserting an insulated binding post. If the motor has a tendency to heat up at high speeds, it can be cooled by mounting a small fan on the armature shaft.

Pipe with Fittings Removes Brush from Boiler Flue

If a cleaning brush breaks off in the boiler flues, here is a way of removing it without taking out a flue. Get a pipe cap that will fit inside of it rather snugly and use reducers to make it fit on the end of a length of pipe somewhat smaller than the diameter of the flue. Insert this assembly into the end of the flue and push the cap up against the brush. By tapping the end of the rod with a hammer, the brush can be driven out at the opposite end. A tee screwed onto the end of the pipe will prevent it from being battered in any way by the hammer.—Henry E. G. Ditzen, Davenport, Ia.

How to Open Tight Windows

Tight windows are often weakened or the glass broken by pounding the upper sash member. To avoid this, get a suitable length of wood and a block. Place one end of the stick under the sash han-



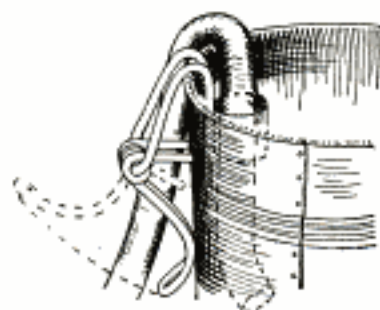
Window Sashes That Are Stuck Can Be Readily Opened with a Wooden Pry Bar

dle and use it as a pry bar with the block as a leverage point.

Worn Universal Joints Cause Rumble in Cars

Worn bushings in the universal joints of a car tend to throw the driveshaft out of balance, which may be noticeable at low speeds, but causes it to "whip" at higher speeds. This sets up a vibration in the body of the car which manifests itself by a disagreeable rumble, especially in closed cars. The wear in the joints can be tested by lifting the end of the shaft vertically or pushing it sideways. If either of these movements is possible, the wear is probably sufficient to cause vibration. The exact amount of whip in open driveshafts can be determined by jacking up both rear wheels and racing the motor in high gear, but on shafts inclosed in torsion tubes it will be necessary to remove the shaft and test it in a lathe.—A. H. Vance, Bensenville, Ill.

Wire Clip on Tub or Pail Holds Hose

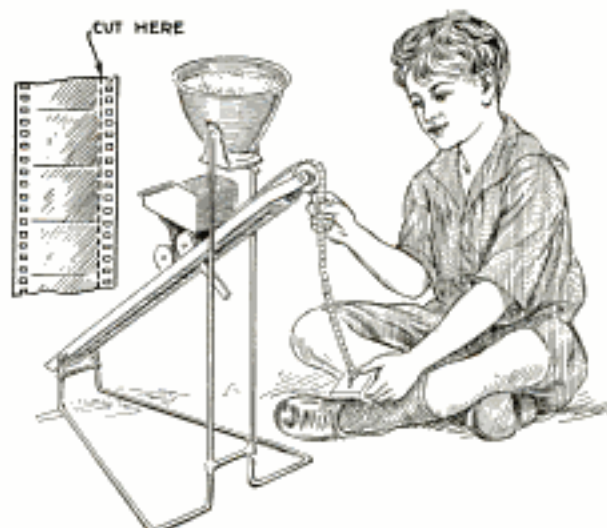


Women who do their washing alone will find this clip useful in holding the end of the water hose over the edge of the tub. It consists of a short piece of sheet metal bent to fit over the end of the hose and soldered to a spring clamp of heavy wire.

It consists of a short piece of sheet metal bent to fit over the end of the hose and soldered to a spring clamp of heavy wire.

Cement for Setting Linoleum

A good cement for setting linoleum and cork-composition flooring can be prepared as follows: Dissolve 2 oz. of para rubber in 1 gal. of gasoline, and add this solution to a mixture of gum shellac, 32 lb., commercial denatured alcohol, 7½ gal. when cut, and 120 lb. of English whiting. A smaller quantity of the same proportions can, of course, be prepared in case you do not need so much. To even up a floor before laying the linoleum, trowel on a mixture of Venetian red, 10 lb.; whiting, 32 lb.; dry white lead, 16 lb.; zinc oxide, 16 lb.; raw linseed oil, 1½ gal.; Japan drier, 3 pt., and turpentine, 3 qt.



Small Toys and Model Machinery Driven by Sprocket Chain Cut from Old Movie Film

Sprocket Chain for Toys Cut from Old Movie Film

By cutting off the perforated strip of a movie film, sprocket chains can be made for driving small toys and model machinery. The sprocket wheels from a discarded camera or projector can be used on the toy, or, the star wheel from an alarm clock, the one that actuates the bell striker, will serve the purpose. If a stronger chain is needed, cement two strips of the film together with cement or acetone.—George W. Crooks, Norristown, Pa.

Cleaning Horizontal Stovepipe

Horizontal stovepipe can be cleaned without taking it down, if fitted with a T-joint instead of an elbow. A sheet-metal cap should be fitted over the lower opening of the tee to prevent the soot from falling on the floor. When cleaning the pipe push the soot to the tee with a swab, remove the cap and catch the soot in a pan.—J. J. Brindos, International Falls, Minnesota.

Mandolin Pick from Razor Blade

An old safety-razor blade can be made into a serviceable mandolin pick. In order to do this it is necessary to grind the edges down on a fine emery wheel to the shape shown. If desired, the pick can be covered with a piece of thin felt.





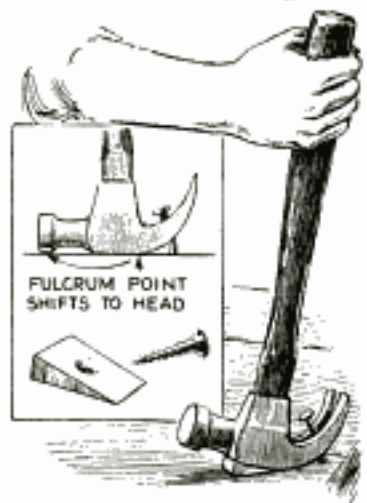
Carboys Fitted with Rockers Can Easily Be Tipped to Fill Small Containers

Rockers Aid to Tilt Carboy

Carboys are easier to handle for pouring out the contents if equipped with the rockers shown. These are cut out of 1-in. material and attached to the carboy frame, nailing or screwing the latter to the rockers. Where acids are handled this method insures greater safety.—J. H. Garety, Charleston, S. C.

Wedge Screwed to Claw Hammer Makes Nail Pulling Easier

Screwed to the end of a claw hammer an aluminum wedge will greatly aid in pulling nails.



Other metal can be used for this purpose but makes the head heavier. Drill and countersink a hole in the center of the wedge for a flat-head wood screw which holds the wedge in place as shown.

☛ When counting or handling sheets of paper, moisten the finger tips with glycerin; this will aid in quickly separating the sheets.

Brilliancy of Two-Filament Auto Lamps Doubled

An automobile mechanic, having several calls to replace single-contact bulbs of 21 cp. in headlights with brighter ones, changes the ordinary double-contact bulb into a single-contact by soldering a contact across the two leads of a double-contact bulb, having two filaments of 21 cp. each, such as is used in headlights which have a high and low beam of light, both filaments are made to light at the same time, thus providing a bulb of 42 cp. with a single-contact base.

Diluted Lubricating Oil Readily Mixes with Gasoline

When it is desirable to add lubricating oil to gasoline for use in a motor, dilute the oil with a liberal amount of the gas. It will then readily mix with the gasoline in the tank. If the oil is added to the tank without thoroughly mixing, it will settle to the bottom, or will be drawn into the carburetor in sufficient quantity to stop the motor.

Rubber Bands for Loose-Leaf Book Markers

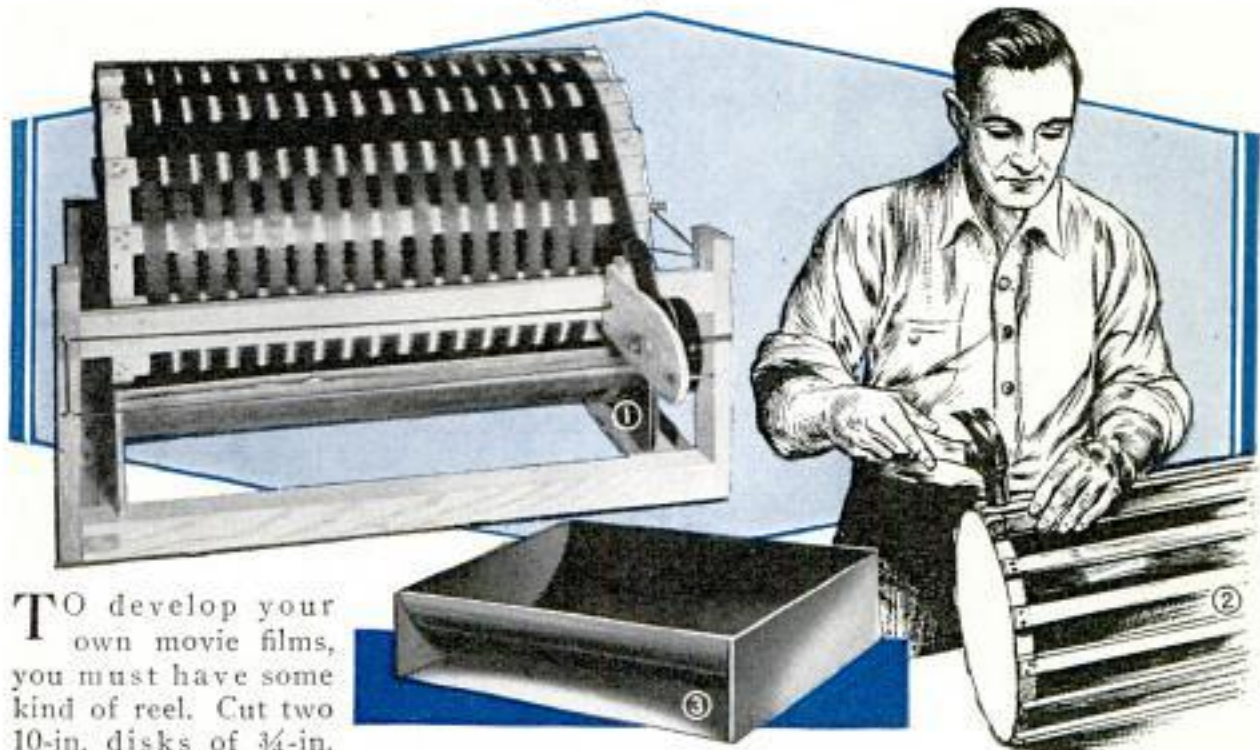
To make your loose-leaf file handier to open at certain pages it is a good idea to use rubber bands as markers. These can be conveniently slipped over the lower ring between the pages and allowed to project outside of the covers as indicated.



Oval Sandpaper Mounting Helps in Sanding Rough Work

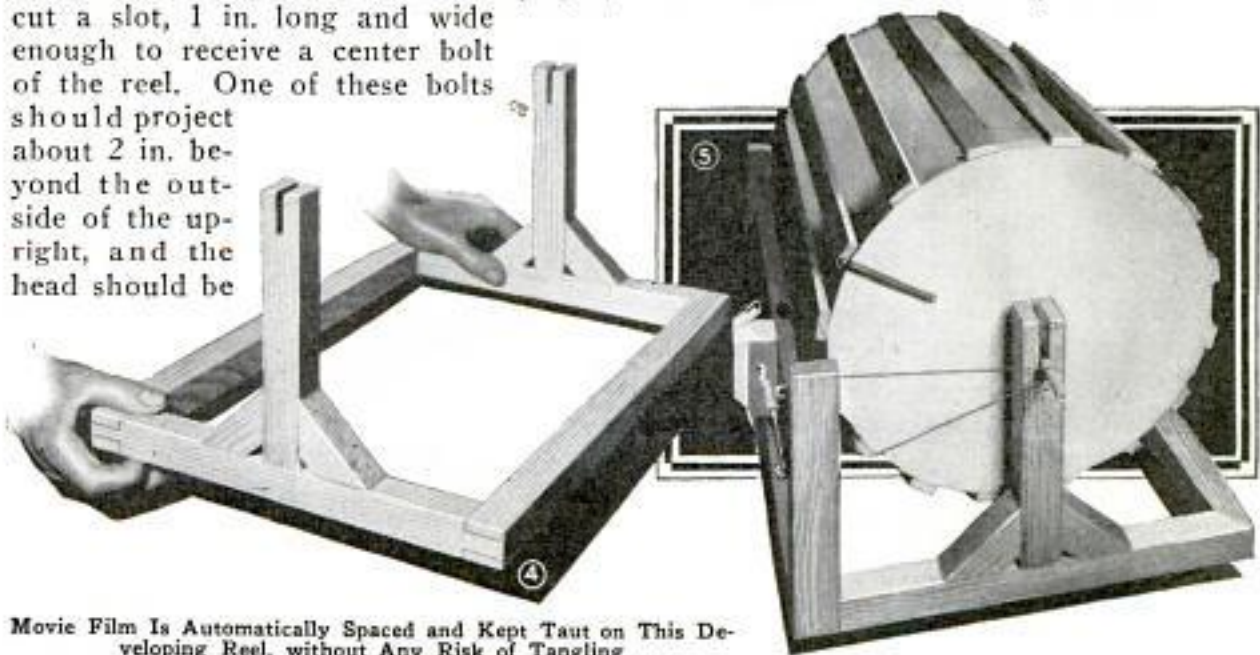
When sandpapering metal having a rough surface, an oval mounting for the paper will be found a great aid. The mounting can be made from an ordinary pint jar. First wrap felt around the jar and then the sandpaper over this. The felt provides a flexible base for the paper so that any low spots will be cleaned as well as the remainder of the surface.

Homemade Developing Reel for Movie Film

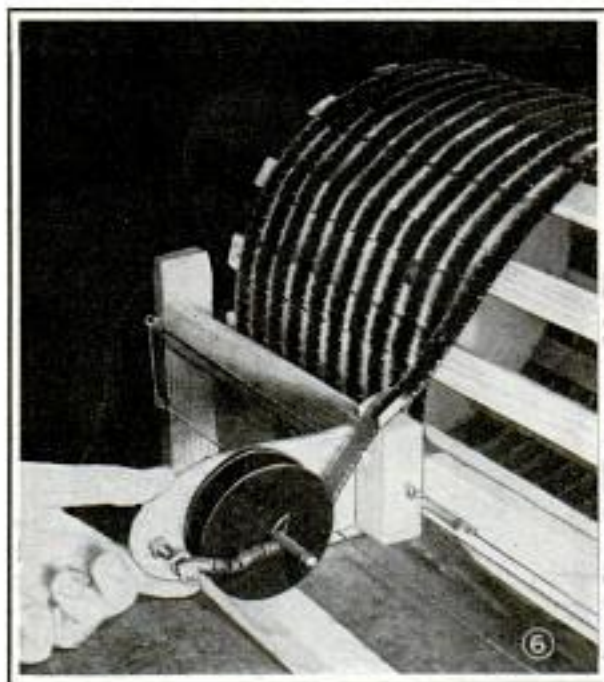


TO develop your own movie films, you must have some kind of reel. Cut two 10-in. disks of $\frac{3}{4}$ -in. wood and 16 strips, each $\frac{1}{4}$ by $\frac{3}{4}$ by 18 in. Before assembling, saturate these pieces with hot paraffin to render them waterproof. Through the center of each disk bore a hole to receive a $\frac{3}{16}$ -in. bolt and then fasten the reel together with 1-in. brass escutcheon pins or nails. The frame that holds the reel is shown in Fig. 4. It is built of 1 by 1-in. stock, and consists of a 13 by 21-in. rectangle fitted with two 8-in. uprights, one in the center of each end. At the upper end of each upright, cut a slot, 1 in. long and wide enough to receive a center bolt of the reel. One of these bolts should project about 2 in. beyond the outside of the upright, and the head should be

removed as in Fig. 5. The spacing device consists of a film guide mounted so that it moves along a horizontal wood bar as the reel rotates. A strong cord, running through screweyes and looped once around the projecting bolt, is the means of moving the guide. For a 16-in. reel, the outside diameter of the projecting bolt about which the cord is looped, should be $\frac{1}{4}$ in. You can use a $\frac{3}{16}$ -in. bolt with a piece of thin rubber tubing slipped over it to obtain the necessary friction. At



Movie Film Is Automatically Spaced and Kept Taut on This Developing Reel, without Any Risk of Tangling



one end of the cord, where it meets the guide, a small coil spring with a hook on the free end, is attached. The guide itself consists of a wood block fitted with a U-shaped piece of sheet metal to keep it on the horizontal bar. A film groove, made of thin sheet brass or other metal, is attached to the top of the block, while a spool holder, consisting of a wood arm and a pin over which the spool is slipped, is also fastened to the block. The spool should turn with a drag, so that the film will remain taut. A piece of spring metal bearing against the side of the spool will give this drag.

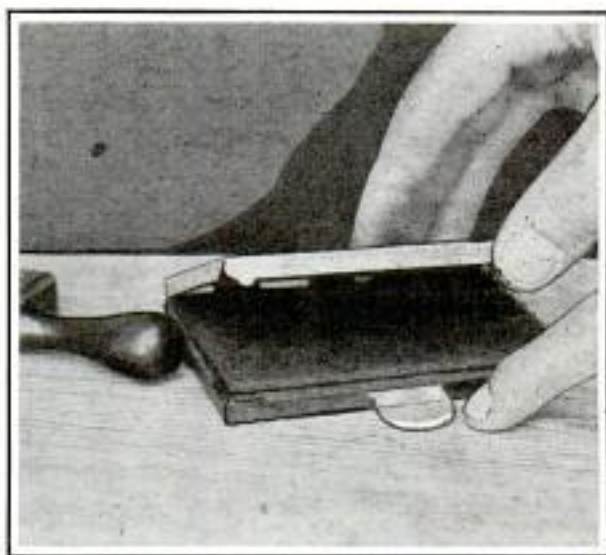
Build the tank for holding the developing and fixing solutions of sheet metal, and paint with a waterproof solution on the inside surfaces. The tank is made in the form of a cylindrical section with rectangular ends, as in Fig. 3. The two ends measure $12\frac{1}{4}$ by 4 in. each, and the piece forming the curved part is 15 by 19 in. In use, attach the film spool to the holder so that the sensitized side of the film will be on the outside of the reel. Unhook the spring at one end of the guide cord and move the guide to the extreme left of the reel. Make one complete loop with the cord about the projecting bolt, in such direction that, when the reel is turned with its upper surface moving away from the film guide bar, the guide will travel toward the opposite end. Pull out the paper leader strip of the film until you reach

the film end and fasten this to one of the reel strips with a good thumbtack or two. Then turn the reel until all of the film has been wound up, and fasten the other end in the same way. Do not let the reel move back so that the film is loosened, or you will have a tangle.

Two strips on the reel should be mounted diametrically opposite each other on springs, so that there will be a slight outward pressure on the film to keep it taut. After the reel has been wound, unhook the guide cord and remove it from the reel bolt, lift the reel out of the frame, put the tank of developer in position, replace the reel and turn it slowly until development is complete. Empty the developer, rinse the film with clear water, and then introduce the fixing bath into the tank, turning the reel until the film is fixed. Wash thoroughly and dry, after which you can wind the film on a spool. There is so much turning to do that you may find a small motor a handy accessory, though not a necessity.

Stamp Pad Easily Opened by Use of Tin Tab

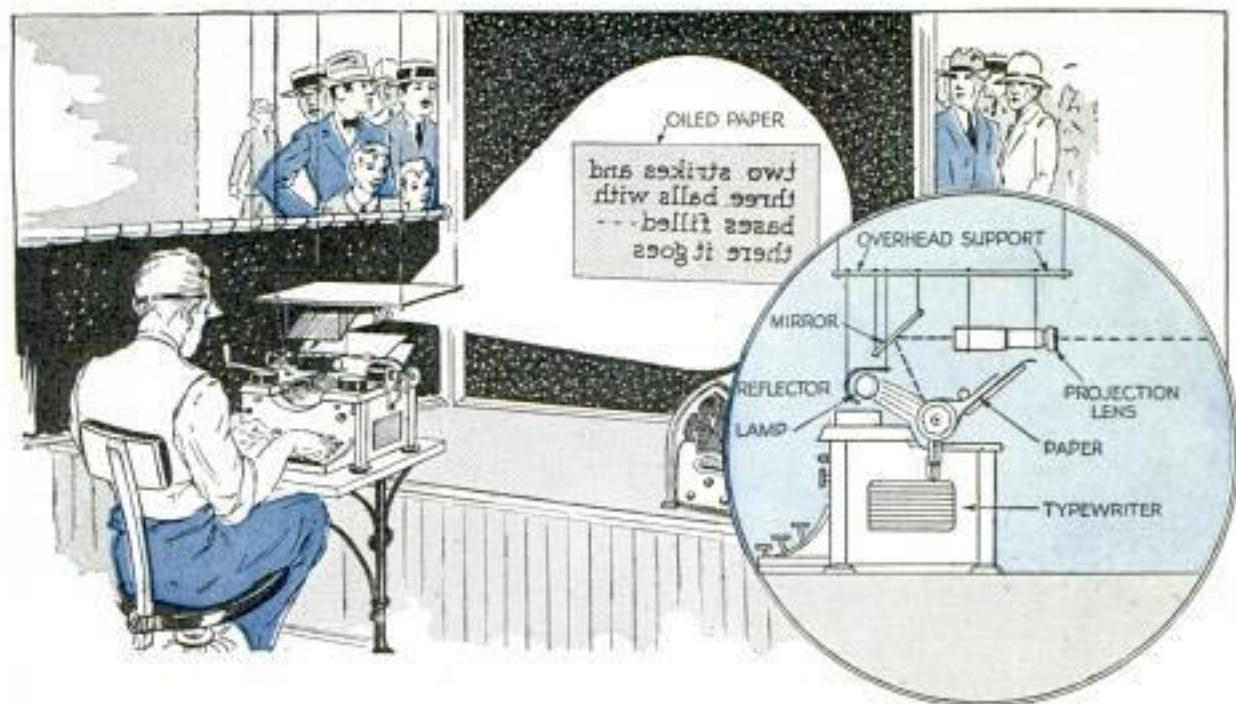
Soldered to the bottom part of a stamp pad a tin tab will aid in opening it. By holding a finger of one hand on the tab, the lid can be easily raised with the other. This also provides a means for moving



Tin Tab on Stamp Pad Provides Means for Handling Without Getting Ink on Hands

the pad around on the desk without getting the fingers in contact with the ink.

Projecting Sport News on a Store Window



Here is a simple device that will project typewritten news of sporting events on a store window where it can be viewed from the outside. A movie-projector lamp and reflector, the projecting lens and a small mirror are supported by wire, as indicated. Do not attach these parts to the typewriter or its support, as the vibration will blur the projected image. The lamp and reflector are placed in front and slightly above the paper in the typewriter so the words are reflected into the mirror, suspended above the lamp and directly be-

hind the projector, which throws the image onto a piece of solid paper pasted on the inside of the window. If the projector is of the type that makes an inverted image, it will be necessary to use two mirrors instead of one to have the image right side up. It will, of course, be backward when viewed from the inside of the window. If the outline shown in the detail is carefully followed, no difficulty, other than a few minor adjustments, should be experienced in setting up the device.—R. F. Hall, San Antonio, Tex.

Turkeys Prevented from Flying by Stick Across Wings



Fastened across a turkey's back as shown in the illustration, a length of light wood will prevent it from flying over the fence. The stick should be about as long as the width of the turkey's body. Two

small holes, drilled near each end, permit attachment of pieces of cloth with which the stick is tied to the wings.—J. Clark Cullom, Hyannis, Nebr.

Graphite and Paraffin to Make Auto Windows Slide Easy

When car windows are hard to raise or lower, a preparation of graphite and paraffin will make them work easily. Mix, by weight, equal parts of melted paraffin and powdered graphite and form the mixture into a stick by pouring it into a tube made by wrapping paper around a lead pencil. When hardened, rub the stick over the felt window channels, and you will find a decided improvement.



Simple Methods of Improving Wire Clothes Hangers for Holding Trousers and Sleeveless Dresses

Improved Hangers for Trousers and Sleeveless Dresses

By slightly bending up the ends of a wire clothes hanger, women's sleeveless dresses can be kept from slipping off. Trousers can also be held better by placing them between two hangers and slipping rubber bands over the ends.

Cork and Rubber Band Form Handle for Can Dipper

When using tin cans to dip acids or hot fluids, it is advisable to have some kind of a handle.



Here is one easily made. First, take a good-sized cork, place it against the side of the can near the top, and then stretch a section of inner tube around both can and cork.

When decorating candles with sealing wax, dissolve it in alcohol and apply with a brush.

Hints on Greasing Your Car

Keeping the steering connections and shackle bolts on the car well lubricated is a rather difficult task if they are not fitted for a pressure system. Fasten a piece of black cloth around each connection so that it completely covers it. This will keep out dirt and sand, and by keeping the cloth saturated with oil, the joint will be well lubricated. If the connections are equipped for a pressure system and have become worn, allowing the grease to work out in hot weather, the use of a special grease for universal joints, commonly called "splicer grease," will aid in preventing the trouble.

Pocket Lining for Carrying Small Rifle Shells

Those who use a small rifle for hunting or target practice and must carry several boxes of shells, will find this rubber pocket liner useful in protecting the clothes from being soiled by the grease with which these shells are coated.

Cut a section from an inner tube, of suitable size to fit the pocket, and close one end by tacking a thin board between the edges.



Freezing Water with Metals

Water can be frozen with a combination of metals mixed with liquid metallic mercury. Melt and thoroughly stir together tin, 59 parts; lead, 103½ parts, and bismuth, 183 parts. This molten mixture is poured into molds resembling solder bars and allowed to cool, after which it is either powdered or reduced to fine filings. The powdered metal is then stirred into 108 parts, by weight, of liquid metallic mercury. A thermometer placed into this mixture will rapidly sink from room temperature to 3.2° F., and a test tube of water immersed in it will freeze at once.

Avoiding Breaks in Thin Fretwork

When making fretwork overlays, the design is often ruined by small pieces of the wood splitting off, caused by vibration and pressure of the saw. To prevent this, thin a mixture of glue to a watery consistency and apply it to the underside of the work. Then lay a sheet of thin tissue paper over the glue and allow it to dry. This will hold the pieces together and prevent them from breaking while the work is being completed. The paper is removed by gently steaming it.

Reducing Cost of Roadside Signs

Two hotel owners in neighboring cities used an ingenious method to split the costs of erecting several sign boards on a main highway between the two cities. One hotel advertised on one side of each board, this being visible to motorists going in the direction where this hotel was located, while the opposite side of the board was used for advertising the second hotel to traffic going in the other direction.

House Number Built into Porch

The question where to place the house number is answered by the novel method shown here. The numbers are cut from wood and set in the arch of the front-porch roof, adding an ornamental touch. In this particular case it was found that by slightly dropping the top of the window shade in the middle section of the French doors directly behind the number, the light from within the house illuminated it at night.



House Numbers under Arch of Front Porch Are Ornamental and Can Be Seen at Night



Dusty Task of Removing Ashes from Furnace Made Less Dusty with Aid of Vacuum Cleaner

Vacuum Cleaner Prevents Dust When Removing Ashes

Set over an ash can as shown, a vacuum cleaner will quickly absorb dust arising from the can when removing ashes from a furnace. Place a chair near the ash receptacle and set the cleaner on the chair so that the nozzle hangs over the edge as indicated. If care is taken in handling the ashes, almost no dust will result.

Heat Removes Old Patches from Inner Tubes

When repairing inner tubes, it is often necessary to remove an old patch, which is a rather difficult job to do unless it is heated. By placing it against a hot surface, such as a stove, the manifold of the car, or even a 100-watt electric lamp, the patch can be readily pulled off.

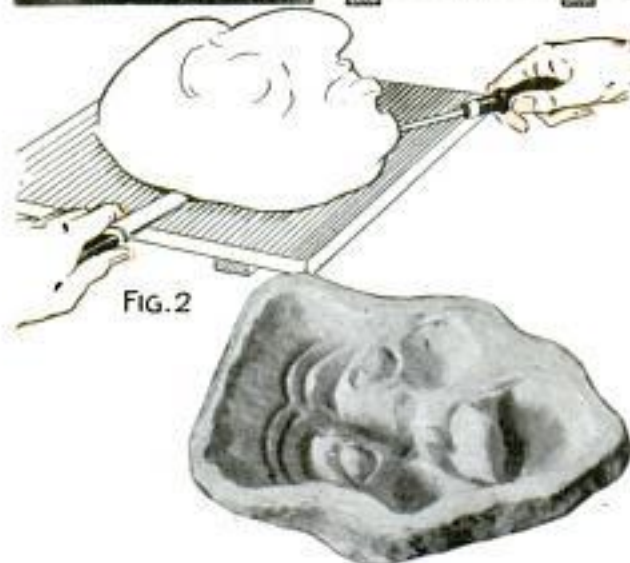
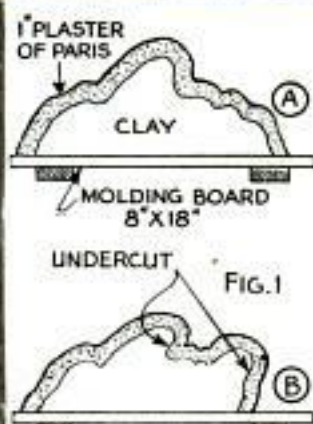
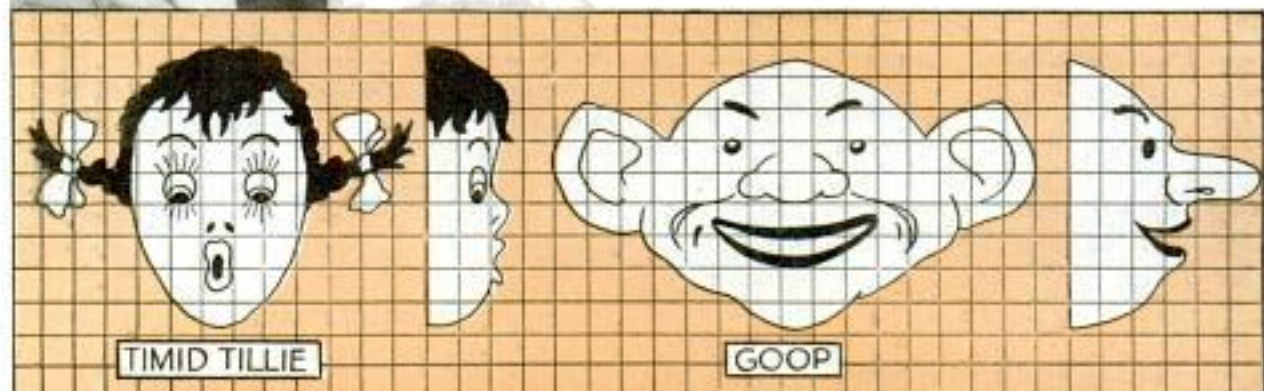
Caster Serves as Tightener for Round Belting

An effective tightener for round belting can be formed by cutting a groove in the roller of a caster and mounting it so it will run true on the belt and have sufficient tension to take up the slack. The method of mounting depends on the conveniences at hand.



HALLOWEEN

that you



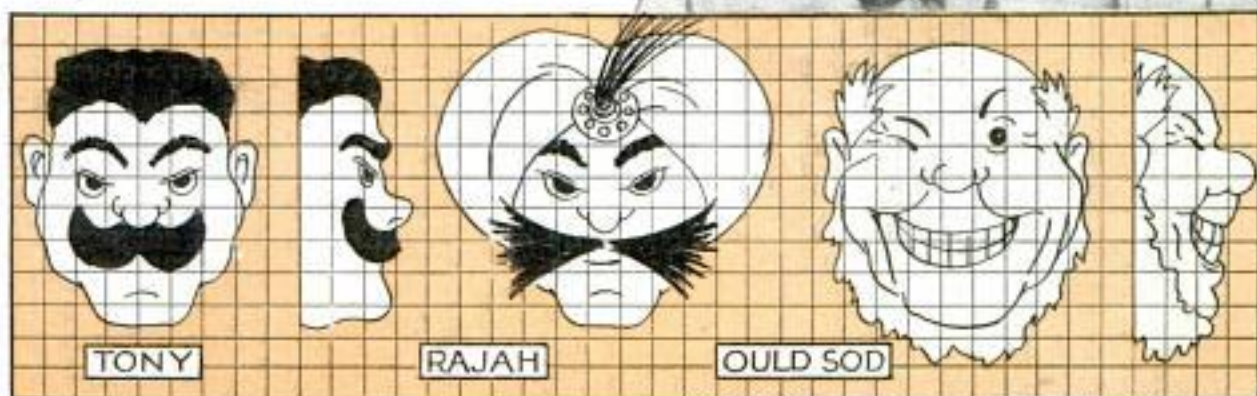
THERE'S lots of fun in making masks for Halloween or parties, as almost any type of face, and, with practice, even caricatures of your friends, can be reproduced. Those shown here were made without any previous experience.

First a clay model of the face is made as shown in the photo, Fig. 1. This is covered with plaster of paris to form a mold. When the mold has set, it is removed from the clay, and the mask is then built up in it with successive layers of tissue paper, thread and mucilage.

Fig. 1 shows cross sections of two types of molds. The easier type is illustrated in detail A. This one can be lifted off the mold intact. Detail B shows an undercut design; that is, the nose and chin overhang so that the plaster must be carefully broken to get the clay out. Although more difficult than the first, it can be successfully made with a little practice. The mold should be made rather thin at the points where it is to be broken, say about $\frac{1}{4}$ in., so that it will crack off readily. After the clay has been removed, the broken pieces are put together again and covered with another layer of fresh plaster of paris.

In preparing the clay model allow it to

MASKS *can make*



set long enough to become fairly dry on the surface, but not so dry that it cracks. Then rub ordinary machine oil over the exposed surface to prevent the plaster from sticking. Press the plaster down well into the hollows, so there will be as few air pockets as possible, and let it set until hard, after which it is removed with a knife, as shown in Fig. 2. Air pockets and flaws are filled with plaster as in Fig. 3. When the plaster has hardened thoroughly, apply three coats of shellac, allowing each to dry, and then rub oil over the entire inside surface wiping the excess out of the hollows. Cut up light paper toweling, or absorbent tissue paper, into triangles about 4 in. on a side. Paper cut this shape will not wrinkle as quickly as square pieces. Lay them in the mold so that they overlap each other, covering the entire surface, and press them down with a wet sponge or paintbrush. Squeeze out all air bubbles. When moistened, the paper will cling to the mold. Continue with about two more layers of tissue paper, or one layer of paper toweling. Next cover the paper with mucilage and lay threads over the surface in crisscross fashion, after which another layer of paper is applied, beginning at the nose and working



FIG. 3

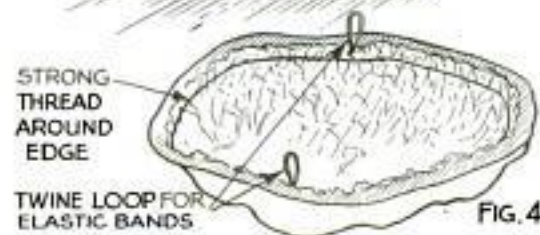


FIG. 4





Above, with Suitable Costumes, Grotesque Figures Can Be Produced; Below, Three Different Masks Built Up in the Same Mold

toward the rim. If the mucilage soaks through, add still another layer and apply more mucilage over that. At this point, twine loops should be placed at the sides to permit attachment of an elastic band, and a stout thread is laid around the edge to prevent tearing. Cover with about four more overlapping layers of paper and mucilage. The final layer of paper should absorb the remaining mucilage to the extent of being moist but not too sticky. Press out all remaining air bubbles, and see that the paper is worked well down into the tip of the nose and other hollows. The mold should then be set up in front

of an electric heater, or in the sunlight. When dry enough to crackle when tapped, begin pulling it away from the mold, very carefully and a little at a time, so that the newly exposed outside surface of the mask will have a chance to dry out before pulling off more. Here and there it may stick to the mold, and should be cut away with a thin, sharp knife. In this way the entire mask can be withdrawn from the mold intact—or with but a few torn places. Even though it is pretty badly torn on the outside layers, don't be discouraged, because these can be pasted down smooth with mucilage. Press out all wrinkles and allow to dry thoroughly before covering inside and out with shellac, which makes the mask waterproof to a certain extent, and prevents softening of the mucilage from moisture or breath. With a sharp knife or manicuring scissors, cut out the pupils of the eyes, the nostrils and the mouth, and proceed to paint the mask. A good flesh tint can be obtained by mixing a little red and orange in white brushing lacquer. For the eyebrows and lashes, use oil colors in brown or black; eyeballs white and lips red. The nostrils should be rimmed with red.

Several types of masks can be made from one mold by altering the mouth and nose. Putty is used to fill up parts of the mold, as this can be readily removed for another alteration. Wigs are very effective, but to save time and labor, hair can be imitated in the formation of the mask and painting this portion to suit. For "Timid Tille," untwisted strands of rope were used, braided into pigtails and tied with ribbons. The pigtails were reinforced with stiff wire. In the squared illustration, other types are shown as suggestive of the many possibilities.

Easy Method of Removing Paint

Waterglass, a common chemical often used for preserving eggs, is a cheap and effective agent for removing paint from furniture. It is applied with a brush and allowed to stand for about ten minutes, after which the paint can easily be removed with an ordinary scrubbing brush.

Simple Stunts with Matches Are Amusing



You Can Make Pencil Marks on Matches Disappear at Will, and, with a Few Moments' Practice, Astonish Your Friends as an Accomplished Sleight-of-Hand Performer

Relighting a match by simply holding it under a lighted one, as in Fig. 1, seems strange. Tear two matches from a paper pad and light both. Blow one out and immediately hold the smoking end under the other, taking a light hold of the latter with the fingers. If quickly done, the flame from the lighted match will jump as indicated by the arrow and will relight the lower one. The second trick is even better. Tear off two more matches and mark one side of each with a pencil or with ink, as in Fig. 2. The object of this trick is to make the pencil marks disappear, after showing your audience that the matches are apparently marked on both sides. Hold them side by side, between the thumb and finger as shown in Fig. 3, with the marked sides in view

and the heads up. Then turn the hand so that the heads are down as in Fig. 5, and, while doing this, twist the matches over, as in Fig. 4. The result is that the marked sides of the matches will still be seen, and, if the twisting is done quickly, it will seem that both sides of the matches are marked. Repeat the movement a few times to strengthen this impression. Then pass the other hand over the matches to hide them, and twist but do not turn the hand, which brings the unmarked side in view. Evidently you have caused the marks to disappear at will. As the effect of such tricks cannot be adequately described, try them, and you will be surprised at the audience's appreciation of your sleight-of-hand performance.—D. S. Hawkins, Youngstown, Ohio.

Hook for Holding Paintbrush in Bucket



With the use of this holder it is not necessary to wipe out surplus paint from the brush every time you want to lay it down. Get a length of heavy galvanized-iron wire and bend it as shown, to fit the narrow part of the brush handle and the edge of the bucket.

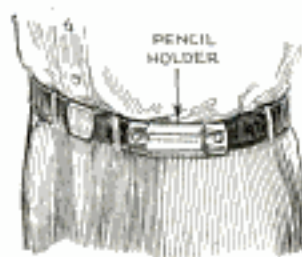
Keeping Dirt Out of Auto Brakes While Washing

Mud and grit driven into the brakes of a car by a high-pressure stream of water are often the cause of screeching, cut brake lining and grooved drums. To prevent this, set the brakes while washing

the car, thus expanding the bands against the drums. If the outside bands are connected to the foot or service brake, it can be held down with a suitable stick placed against the pedal and braced against the front seat or other convenient place.

Pencil Holder on Your Belt

Here is a pencil holder attached to your belt with snap fasteners that is useful when no coat is worn. A two-pencil fitting can be purchased from a stationery store for a few cents, and the pin, with which it is usually provided, is removed. Snap fasteners are then attached to each end of the holder and to the belt.—Noble D. Gilkerson, Kansas City, Mo.



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Lawns, Sidewalks
and Cement Floors
Can Be Quickly
Cleaned with This
Revolving Sweeper

Revolving Walk Sweeper Made from Discarded Lawnmower

A revolving-brush sweeper for cement floors and sidewalks can be improvised by fastening brushes to the blades of a discarded lawnmower. The stationary cutting blade and roller are removed and a grass catcher attached close to the blades to gather the dirt. The implement will also be of use for sweeping lawns.

Kerosene Cleans Drain Pipes

Drain pipes can be made clean and kept so by using kerosene and soapsuds. A practical way is to do this each wash day. Pour the kerosene down the drain and after about 15 minutes follow with a bucketful of boiling soapsuds. The kerosene will loosen the grease and dirt and the hot soapsuds will wash them out.

Wooden Block for Tent Poles Protects Floor Cloth



To protect the floor cloth of a tent from being punctured by the center pole or by the legs of heavy objects, such as chairs and cots, a wooden

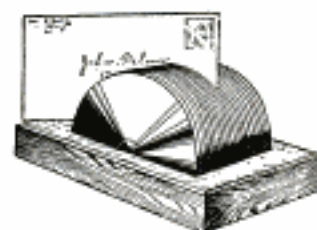
block with cleats nailed on it to prevent the pole from slipping off, is easy to carry along with the tent equipment. The block should be about 8 in. square, or smaller, depending on the weight and size of the object it is to support.

An Elastic, Quick-Drying Varnish

A varnish superior to ordinary shellac in that it dries more quickly, is clear and elastic and therefore more durable, is made as follows: Manila copal, 4 oz.; flake shellac, 3 oz.; sandarac, 1 oz. These gums, which are obtainable at any paint store, are coarsely powdered and placed in a bottle with washed sand, 1 oz., and denatured alcohol, 40 oz., by volume. The alcohol dissolves the gums while the sand prevents them from sticking together. The bottle is loosely corked with a paraffin-coated cork and set away, shaking the mixture at intervals. After a few days, the mixture is poured out, taking care not to stir up the sediment in the bottom of the bottle.

Letter File from Radio Condenser

Provided with a suitable base, the rotor-plate assembly of an old radio condenser will serve the purpose of a letter file. Drill



and tap a small hole in the bottom of the condenser for a screw which holds it to a wooden base as shown.

Striping with a Mechanical Pencil

By using an ordinary mechanical lead pencil, a man in Warwick, Mass., was able to do a neat job of striping on the body of his car. He removed the lead and the top from the pencil and screwed the thin piece of metal down on the inside to close the small hole in the end. Then by filling the barrel with enamel and pulling the thin metal piece back he was able to adjust the flow. In this manner he could make a narrow stripe or draw the outlines for a wider stripe, which was then filled in with a brush.

SHOP NOTES

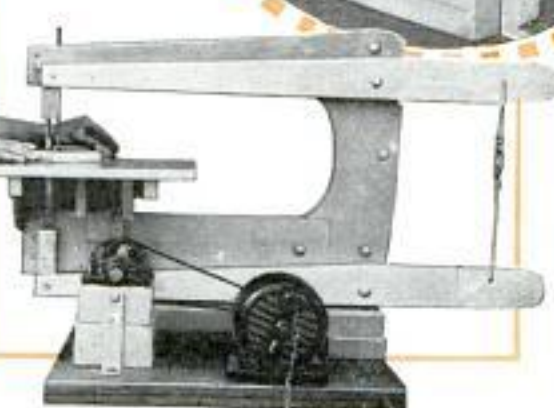
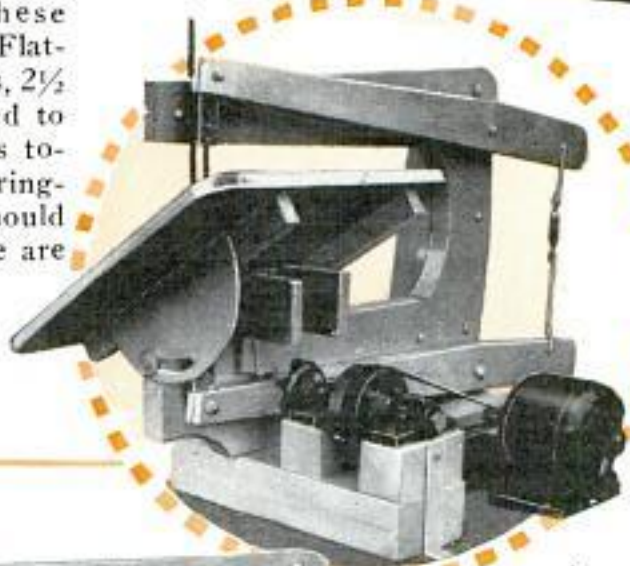
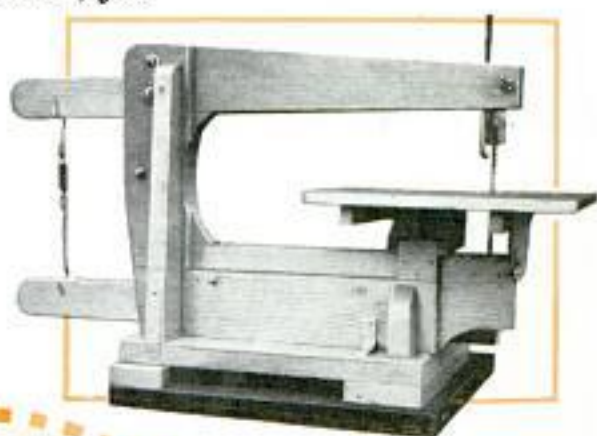


This HEAVY-DUTY JIGSAW has Large Capacity

By M. C. SMOCK, JR.

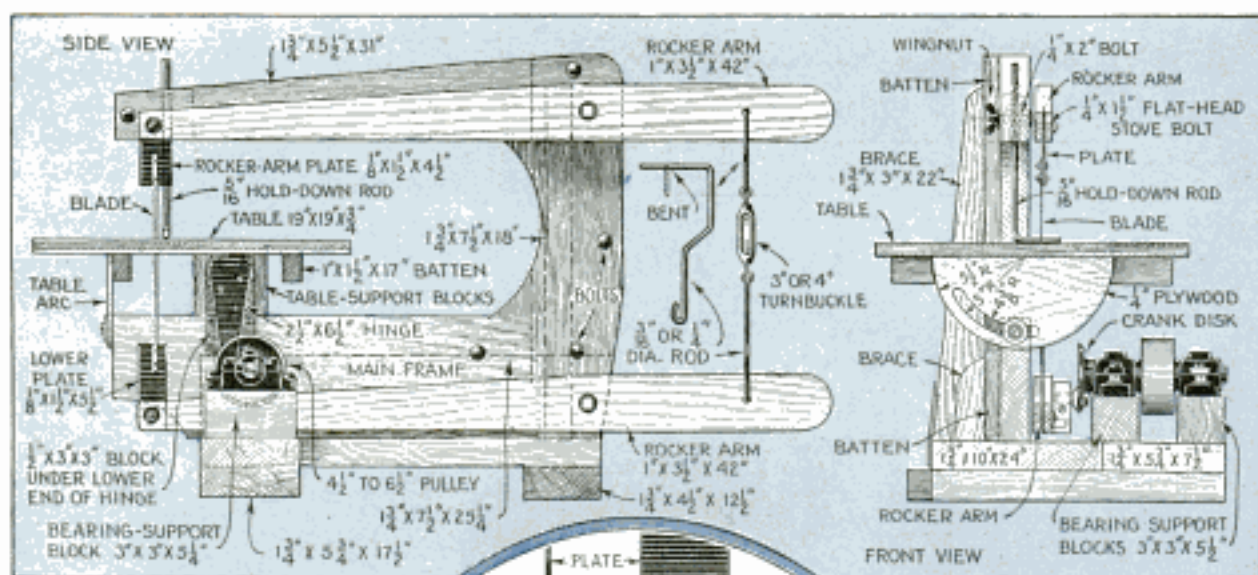
CUTTING 1-in. stock with ease, and capable of handling large pieces of work, this wooden jigsaw, which is a homemade product, will prove a great help in your workshop. The total cost is about \$5, exclusive of the $\frac{1}{4}$ -hp. motor used to drive it.

Set on two cleats or battens, the base for the jigsaw proper and that for the motor are laid side by side, as shown in the front view, where dimensions of these pieces are given. Flat-head wood screws, $2\frac{1}{2}$ in. long, are used to fasten these parts together. The bearing-support blocks should be of oak. These are



attached to the base with two bolts through each block, the heads and nuts being countersunk. For the main frame, three pieces of hardwood are preferable, screwed and bolted together securely. A 1-in. batten is screwed along the lower edge of the bottom member of the frame,

and a similar piece is attached vertically to the back member. Place the assembled frame on the base with the right side 6 in. from the left side of the base, and nail temporarily from underneath so that you can drive in $3\frac{1}{2}$ -in. screws. Then cut and attach the two braces shown in the front view. Angle braces may also be added for further



support. For the table-support block use a 3 by 3 by 5-in. piece of oak, cutting out a 2 by 2¼-in. piece at the bottom to fit over the lower member of the frame. Two table-support blocks are screwed to the sides of this piece, one end of all three being cut off at a 45° angle as indicated. The lower part of the center block is screwed to the lower frame member, while the other pieces rest on the frame. A strap hinge is fastened to the underside of the table and to the side of the center block, permitting the table to be tilted 45°. There will just be enough space under the lower end of the hinge for a ½ by 3 by 3-in. block, cut at an angle to allow sufficient clearance for the lower rocker arm. The plywood table is reinforced with two battens. The front batten carries the table arc, which is made of ¼-in. plywood and has a slot cut to the dimensions shown with a coping saw. A round-head wood screw, slipped through a washer, is driven through the slot of the table arc and into the lower frame member, to hold the table at any desired inclination.

The drawing clearly shows the dimensions and assembly of the rocker arms, which are adjusted to get the correct blade tension by means of a turnbuckle

attached to suitable rods, bent to fit holes at the ends of the rocker arms. A slot is cut at the front end for ⅛-in. plates, and these may be fitted with short ½-in. rods slotted to receive pin-end saw blades. This method of holding the blades may, however, be varied. The writer found lengths of

old ⅜-in. bandsaw blades durable and cheap. These were bolted directly to the rocker-arm plates without the slotted holder.

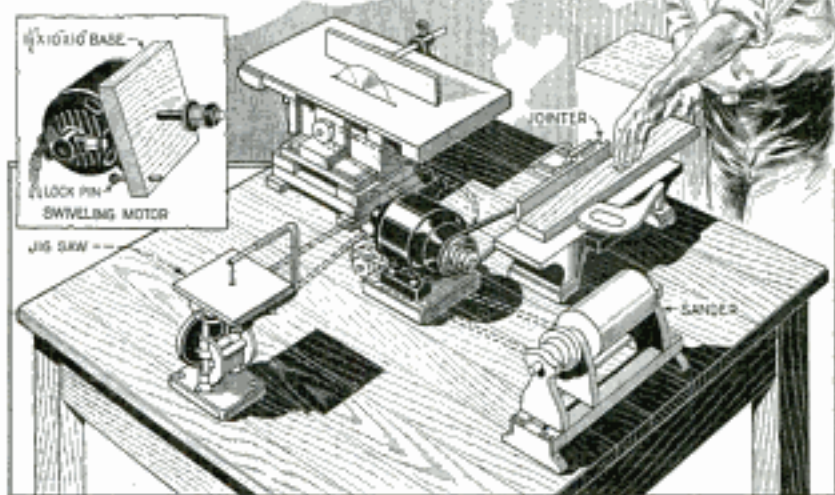
To drill the ends of the blade, the temper must first be drawn, which is done by heating to a bright red and allowing to cool slowly. A hold-down rod runs up through a vertical hole in the upper frame member and is held in any position by means of a bolt and wingnut, shown in the front view. The pitman, or connecting rod, is shown in the detail, this being slipped on pins on the lower rocker arm and on the crank disk. The latter is keyed to a shaft, which also holds a flat-face pulley, the shaft being held in two split bearings and belted to the motor.

Ⓞ A small amount of glue applied to the end of the tape used in winding electric motors will prevent it from unrolling if dropped to the floor.

Motor on Swivel Base Runs Four Machines

Mounted on a swivel base, an electric motor can be used to run four machines direct, and thus eliminate the need of a countershaft. The machines can be arranged on a square-top table, which saves considerable space. The base on which the motor is mounted has a lock pin at one corner which fits in any one of four holes drilled in the table, holding the motor from turning. Washers and a nut, fitting the bolt on which the motor pivots, are used to hold it solid. One belt is sufficient, as the machines can be arranged so that the belt will be taut, and a step pulley is used to permit variation of speed as required.—M. C. Smock, Jr., Indianapolis, Ind.

These Machines Can Be Run from a Motor Pivoted in the Center, Eliminating the Need of a Countershaft



Heater Housings Centered on Auto Exhaust

Heater housings around auto exhaust pipes that become loose and rattle can be securely centered in the following manner: Drill three holes in the housing for stove bolts, and also corresponding holes in a length of strap iron. Clamp the latter around the housing and insert the bolts as shown, holding them in place with two locknuts on each bolt. The bolts are driven in the same distance, centering the housing and stopping the rattling.



Carbonate of Soda Cleans Radiators

Efficiency of radiators can be maintained and a saving in fuel made, if they are kept free of sediment and other deposits from water. This is especially true in localities where the water supply has a high mineral content. Dissolve 2 lb. carbonate of soda to every gallon of water used, and fill the entire circulating

system with it, allowing it to remain overnight. Flush the system the following morning by running water through it under pressure until the water comes out clear. The soda will reduce the deposit to a powder so that it will be carried out with the water. One should make sure, however, there is no soda left in the system before using it again.

Small Jacks from Capscrews

Small jacks for use around the shop can be made from a capscrew nut and a steel ball. The nut is run down on the bolt a distance about two-thirds of its width, and the ball, which should be about one-third larger than the hole, placed on the nut as shown. This assembly is then put under the work with a washer between it and the ball. By running the nut up, the work will be raised. While the range of movement of such a jack is limited, it can be increased by keeping a number of capscrews of different lengths on hand.—Henry Simon, Santa Ana, Calif.



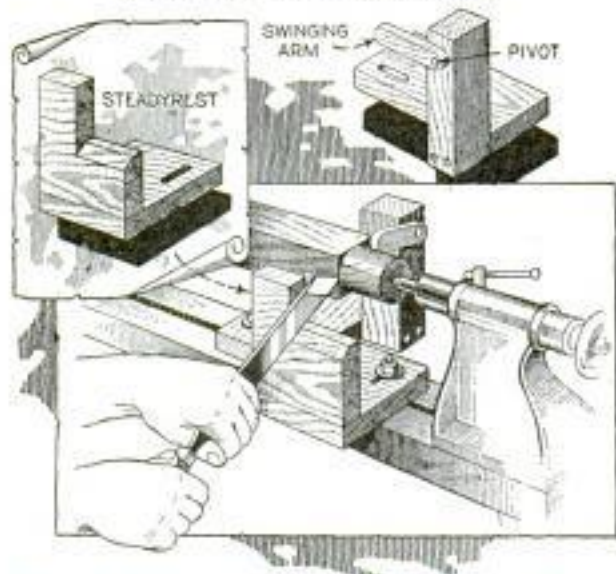


Blowtorch Tank Fitted with Valve Stem Quickly Filled with Tire Pump

Attachment for Using Tire Pump on Blowtorch Tank

By fitting a blowtorch with a valve stem from an old inner tube, a tire pump can be used to force air into it. Take a pipe cap, of suitable size to fit the hole in the blowtorch tank, and solder the valve stem into a hole drilled through the cap. This provides a quick and efficient method of supplying pressure in the tank when the pump provided for that purpose has worn out.—H. L. Weatherby, Montgomery, Ala.

Steadyrest and "Semaphore" Gauge Speeds Up Tenon Cutting

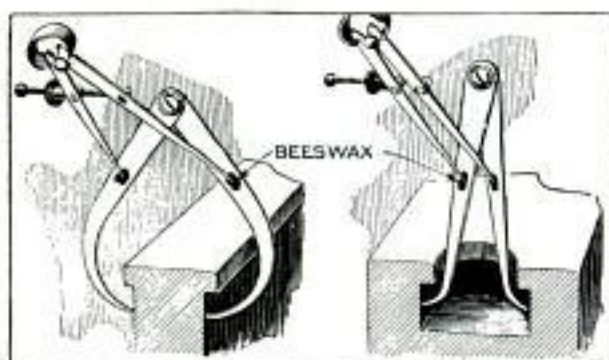


Tenons Quickly and Accurately Cut with the Use of This Steadyrest and "Semaphore" Gauge

When a number of tenons are to be cut, the use of a combined steadyrest and "semaphore" gauge will speed up the work. The attachment is made of wood, as shown in the upper details, and is clamped to the lathe bed with bolts. In use, the tool is held flat against the rest to cut the tenon, after which it is held as shown to cut the shoulder off squarely. The pivoted arm on the gauge rests on the tenon, and is adjusted so that it will drop to a vertical position when the tenon is turned to the required size.—Wm. J. Edmonds, Rutland, Vt.

Beeswax Aids in Calipering Flanged Work

When calipering flanged work, rub a little beeswax or paraffin on the calipers as shown. This will provide a base for the divider markings and will not mar the calipers, as does the usual method of



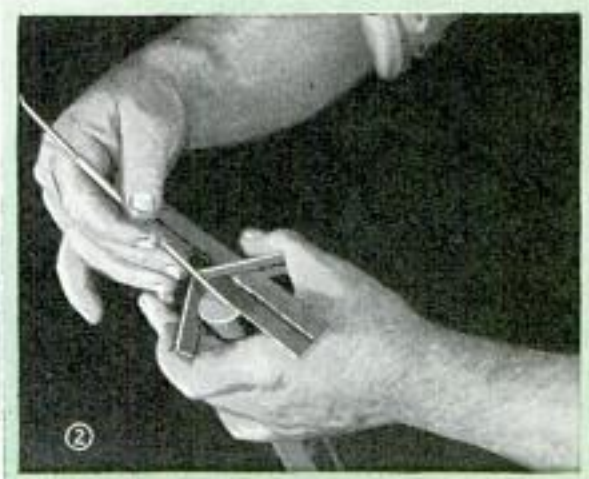
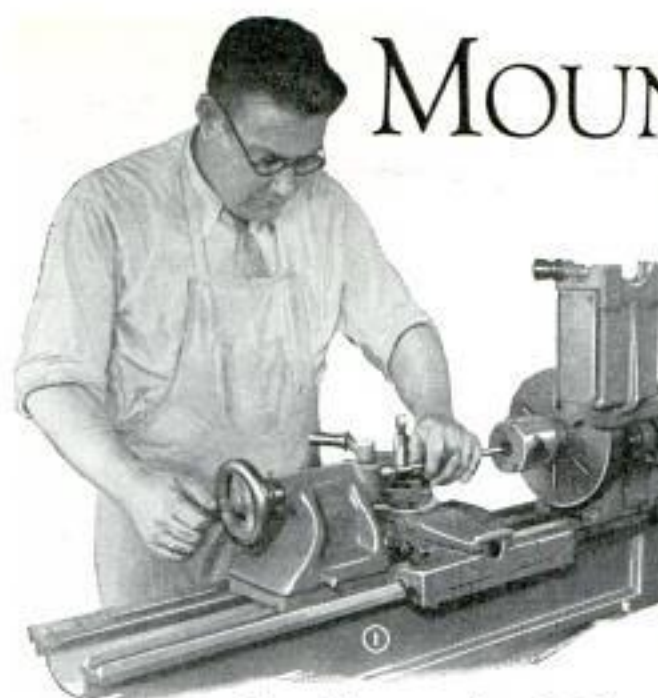
Beeswax Forms Base for Divider Markings on Calipers When Used on Flanged Work

scratching the markings on them. The beeswax will stick to the calipers so markings made with the dividers will be accurate, and can easily be removed when the job is finished.—W. C. Wilhite, Hornsby, Illinois.

Stretching Prevents New Ropes from Twisting

When first used, a new rope has a tendency to twist and tangle. To overcome this, soak it in water for two or three hours before using. After taking it out of the water, tie one end to a tree and hitch a team of horses onto the other end and give it a thorough stretching. Then fasten it in this position and allow it to dry.—Adolph Rieter, Marinette, Wis.

MOUNTING Work



on a Metal-Turning LATHE

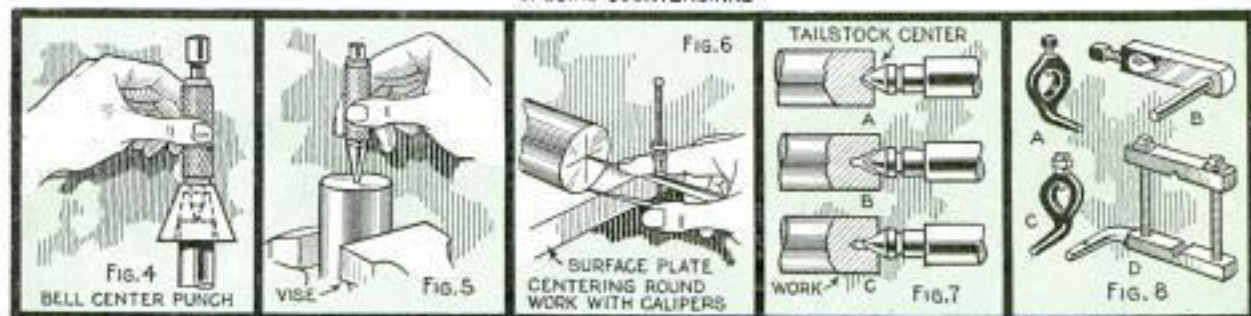
By W. CLYDE LAMMEY

IN USING a metal-turning lathe, the first operation is that of accurately centering the work, several methods of which are shown in Figs. 1 to 6. In Fig. 6, the work is laid on a surface plate, the dividers being set to the radius of the work, and right-angle center lines are marked as shown with one leg of the dividers bearing on the plate. If the ends of the work are rubbed with chalk, the lines can be more easily seen. Another method, shown in Fig. 2, makes use of the center head, the blade of the tool being automatically centered on the work. Right-angle center lines are laid

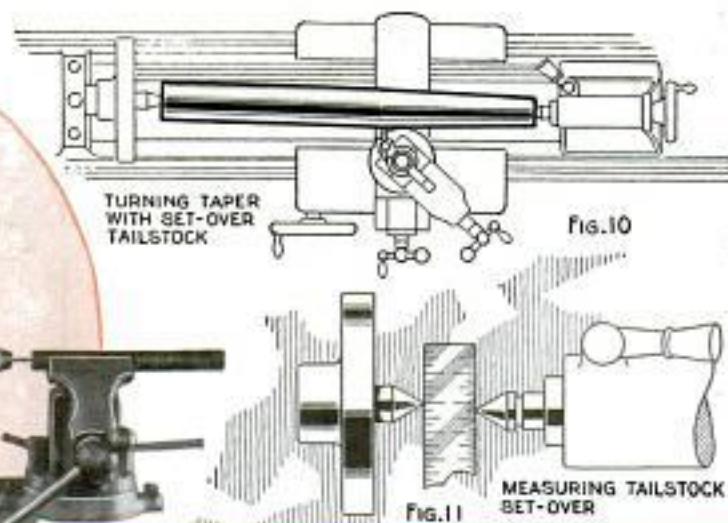


off along the blade with a scribe.

Next, the centers must be accurately checked with a punch. This is done by hand, as in Fig. 5, the point of the punch being located exactly at the intersection of the scribed center lines. One sharp blow with the hammer will suffice to set the punch. If the punch mark turns up slightly off center, it can be moved in the proper direction by inclining the punch and repeating the operation. Another quick means of locating and punching the centers is the use of the bell center punch, as in Fig. 4. Several countersinks are shown in Fig. 3. The first, known as the combination drill and

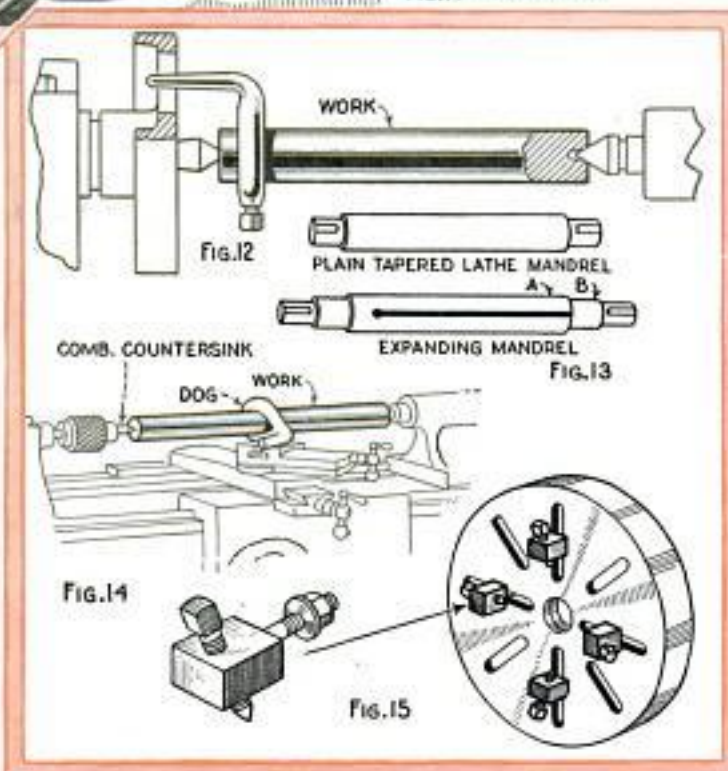


Before Turning on a Metal-Cutting Lathe, the Operator Should Know All the Tricks of Accurately Centering, Countersinking and Mounting the Work, as Success Greatly Depends on These Steps



countersink, is most universally used, as it drills and countersinks the center in one operation, while the three tools A, B and C require the drilling of a small pilot hole as a separate operation. The tool C is especially effective on softer metals, such as aluminum. With care, very accurate countersinking may be done with a breast drill, as in Fig. 9, although it is better to do this on the lathe, as shown in Figs. 1 and 14. A drill chuck, fitted with a tapered arbor, is set in the headstock spindle, and the work is mounted with one end supported by the tailstock center. The tool post is removed from the carriage, and a dog is clamped at the center of the work, the tail resting on the carriage to prevent the work from turning. Apply a few drops of lard oil to the drill point when countersinking steel. On ordinary work the error in centering should never be greater than $\frac{1}{4}$ in., and this is, of course, not permissible where the work must be finished within close limits, or where the rough size is close to the required finished dimension.

Further, it is of the greatest importance that the work be countersunk to the proper depth, as shown in detail C of Fig. 7, and in Fig. 12, while details A and B of Fig. 7 show the result of countersinking too deeply or shallowly, both of which



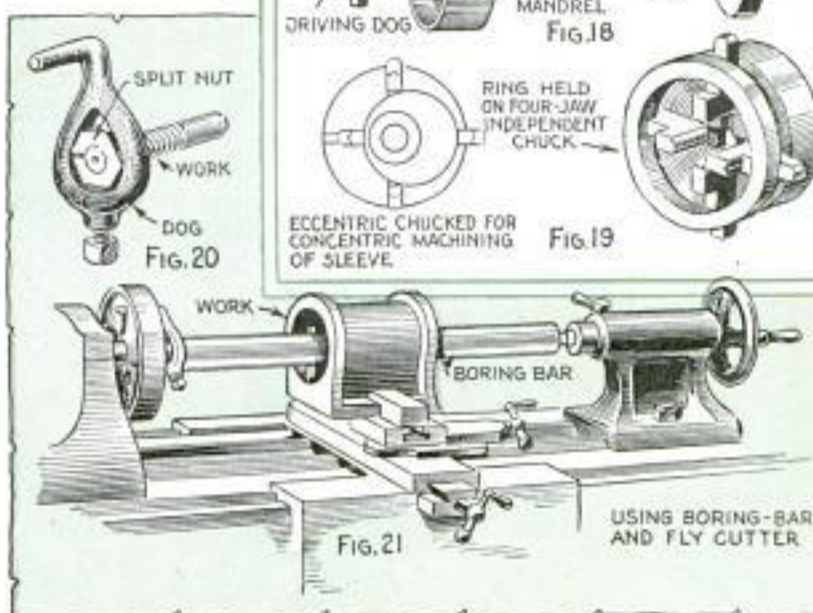
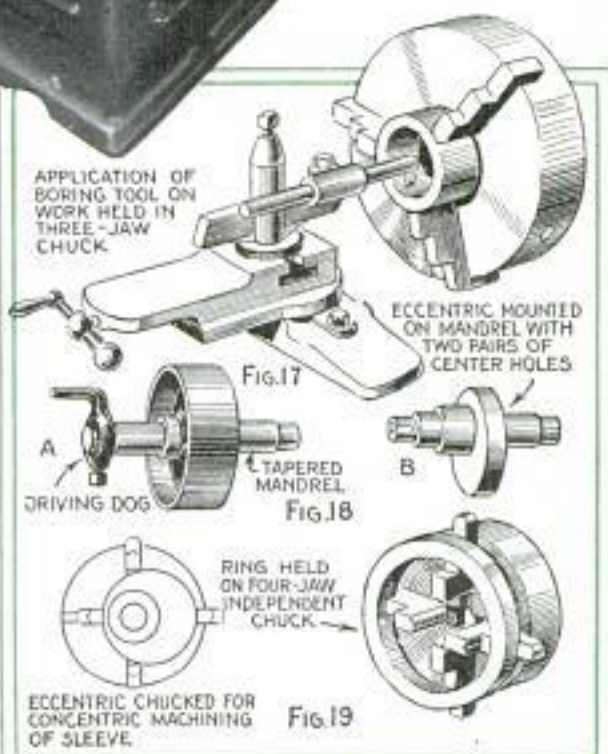
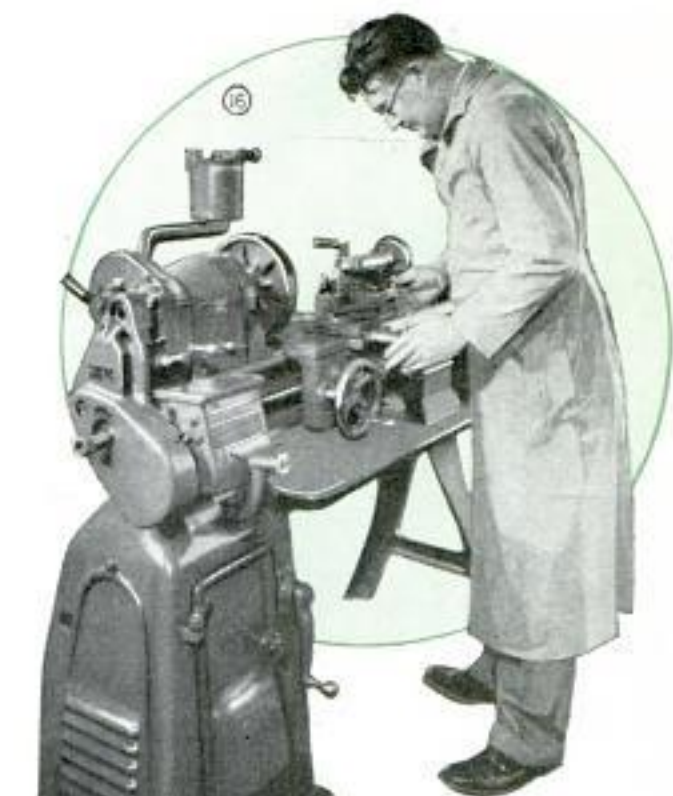
cause undue wear on the lathe centers.

The work is then mounted between centers and is driven by a dog, a few of which are shown in Fig. 8. Of these A is the most commonly used; type B is a variation of the same dog used for driving work of small diameter, while type C is fitted with a cap, covering the exposed head of the setscrew, to reduce danger of injury. Fig. 8, D, shows a dog used for driving square or rectangular work. When mounting the work, make sure that the setscrew is tight and that the tail of the dog does not ride on the bottom of the faceplate slot; also be careful not to draw the tailstock quill up so tightly that the work will bind, for considerable heat is

generated by turning and causes the work to expand slightly lengthwise.

Flat work in the square, rectangular or round, and more particularly work of irregular shape, is generally clamped or bolted to a large faceplate. Where a chuck is not available, the four faceplate dogs shown in Fig. 15 may be turned from square stock. When bolted in the faceplate slots as shown, they can be used for holding a variety of work. Cylindrical work, such as a bushing, which requires to be machined all over, is usually bored or reamed in a chuck and then finished on a mandrel mounted between centers and driven by a dog. Two types of mandrels are shown in Fig. 13. The first is a plain tapered one, while the second is of the expanding type, differing from the former in that it is fitted with a loose internally tapered and slotted sleeve. Detail A of Fig. 18 shows a piece of work mounted on a tapered mandrel, while detail B shows an eccentric mounted on a special mandrel with two pairs of center holes, one pair for concentric and the other for eccentric machining. Before driving the work in place on the mandrel, coat the surface of the latter with light machine oil to prevent the parts from seizing.

Turning a taper on work between centers is done by means of the set-over tailstock as in Fig. 10, practically all lathes being provided with this adjustment. The method of gauging the degree of set-over is shown in Fig. 11, while the common rule for calculating the set-over on work to be tapered its entire length is as follows: Subtract the diameter of the small end from that of the large end and divide the difference by 2; the quotient will be the set-over. Where it is necessary to work to an exact taper per foot, divide the total length of the stock in inches by 12; multiply this quo-





tient by one-half the amount of taper required, and the result will be the set-over.

If the lathe is to be used for a variety of machining operations, a chuck is indispensable, and where the shop affords only one, this should be of the four-jaw independent type, being more universal in adjustment than the self-centering chuck. Fig. 19 shows two typical examples of work mounted in a four-jaw chuck. The first is a method of chucking a large ring and the second a method of holding an eccentric off center for the purpose of machining the sleeve. Unless center-testing devices are at hand, it is necessary to center the work by trial, using the lathe tool as an index. On round work, the circles on the chuck face will aid in centering. The high place on the revolving work can be marked with chalk, and any inaccuracy may be corrected by slacking one or two jaws and tightening the one or the two opposite, to bring the work to the correct position. Be sure to remove the chuck wrench before starting the lathe. In centering some types of work, the tailstock may be used as in Fig. 23, the center of the work hav-



ing been located and checked with the punch. The tailstock center is then run up to the center of the work, to hold it in place while the chuck jaws are tightened. When the thickness of the work is less than the width of the chuck jaws, it is necessary to use a backing piece cut from hardwood of such thickness that, when placed behind the work, the edge of the latter will clear the chuck jaws as in Fig. 22.

When chucking work for external machining, it must frequently be mounted for internal

boring operations. Two examples are shown in Figs. 17 and 21. In the first, the boring tool is held in the tool post vertically, while the second shows a boring bar and fly cutter mounted between centers for boring work clamped to the tool-post saddle, care being taken to get it aligned properly to obtain a true bore. The fly cutter is made adjustable

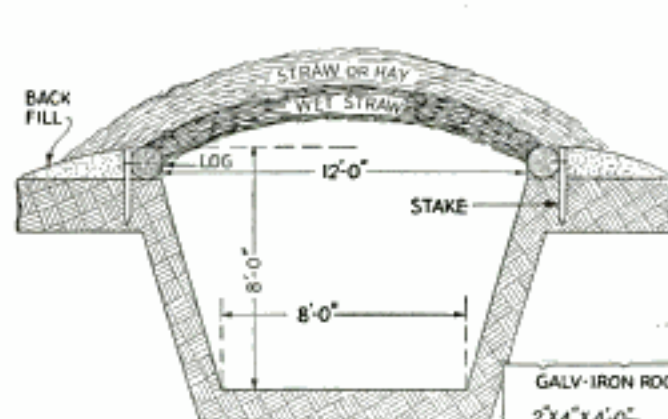
transversely with the bar, and the latter is mounted between lathe centers and driven by a dog as in Fig. 21.

Another problem the lathe operator often encounters is that of machining a piece of round work, one end of which has been threaded. Fig. 20 shows how this is done by means of a split nut turned up on the threaded end of the work with the driving dog clamped on the nut. The latter holds the work securely and prevents damage to the threaded end.

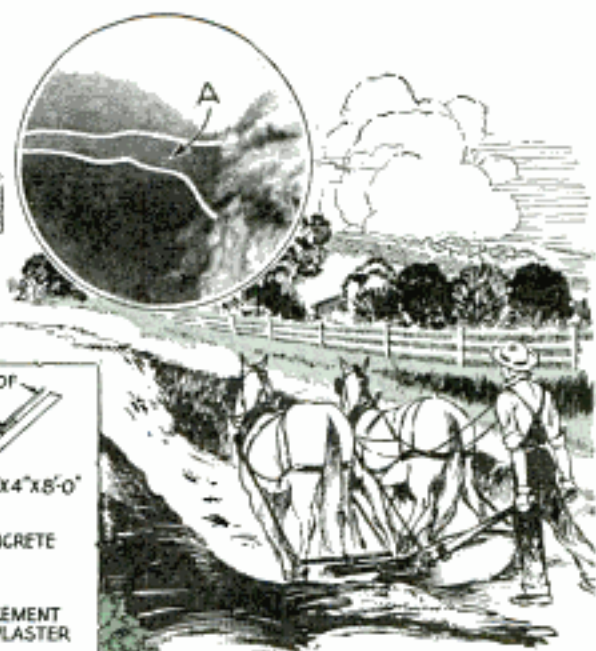
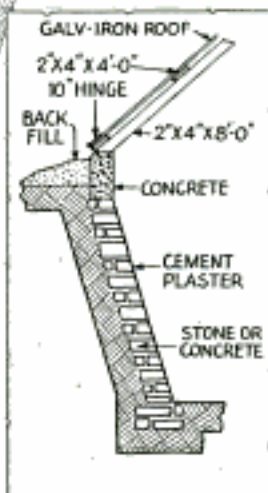
Pumice Paste for Lapping Soft Metals

When lapping soft metals, such as copper and aluminum, mix equal parts of pumice powder and machine oil to use as a lapping compound. This compound will give a smooth job and will not dig into the surface, as is sometimes the case when emery flour is used.

Ensilage Stored in Trench Saves Silo Cost



EXPERIMENTS conducted by the Nebraska agricultural department show that ensilage stored in a trench silo suffers very little spoilage, and that the silo can be constructed at small cost. Although the illustration shows the trench lined with bricks covered with cement plaster, or with a concrete wall, such construction is not necessary the first year, if the ground is moderately firm and will not cave in. The trench should be dug on fairly level ground that is well drained, both ends being sloped for ease of driving in and out, or it can be dug in a hillside, leaving only one end open. The size of the trench depends on the amount of ensilage to be stored, but it should not be too wide, as this may cause more spoilage. A trench, 40 ft. long with a 20-ft. slope at each end, 8 ft. deep, 12 ft. wide at the top and 8 ft. at the bottom, held 80 tons of ensilage, which was packed by driving a light tractor over it while filling.



This is equivalent to two tons of ensilage for each foot in length of the trench proper, and six-tenths of a ton for each foot of slope at the ends. After the ensilage

has settled level with the top of the ground, place logs along the edge of the trench and make a backfill of dirt as shown in the left-hand detail. Then spread a 14-in. layer of wet straw over the top and cover this with dry hay or straw. The amount of spoilage is indicated at A in the circular inset. This layer varies from 4 in. at the center to 18 in. at the sides, or about 7 per cent of the total amount of ensilage, which is considerably less than the percentage of spoilage in a concrete or wooden silo of the usual type.

Miter Box for Cutting Pipe



Accurate miter cuts can readily be made in pipe, and metal or wooden rods, by using the illustrated box. It consists of a length of angle iron, of suitable width, hav-

ing miter cuts made in it with a hacksaw. In use, it is clamped to the pipe with a large C-clamp. This is a simple method of doing a job that would otherwise require careful measurement and sawing.

Glass Tubing to Erase Ink

Draftsmen will find a piece of freshly broken glass tubing serviceable as an ink eraser. Hold the tube almost perpendicular to the paper or tracing cloth, and use the sharp edge of the broken portion to scrape off the ink.



Painters Who Have a Number of Small Jobs Requiring Different Paints Will Find This Carrying Case Handy

Carrying Case for Paint Cans

Here is a carrying case that will be appreciated by the painter who has a number of small jobs to do. It is made from an ordinary dry goods box which, in this case, was 10 by 12 by 19 in. in size. It is fitted with a shelf of $\frac{3}{4}$ -in. stock while two $\frac{3}{4}$ by 1-in. cleats nailed on the bottom serve as feet. Strips $\frac{1}{4}$ by $1\frac{1}{4}$ in. in size are nailed across the edges of the shelf and bottom to prevent the cans from falling out. The bottom shelf is divided into two parts by a $\frac{3}{4}$ by 3-in. partition, one side of which may be used for cans and the other for brushes. A suitable handle is also provided by nailing two $\frac{3}{4}$ by 1-in. cleats to the ends of the box vertically and attaching a $\frac{3}{4}$ by $1\frac{1}{2}$ -in. cross-piece.—M. C. Smack, Jr., Indianapolis, Indiana.

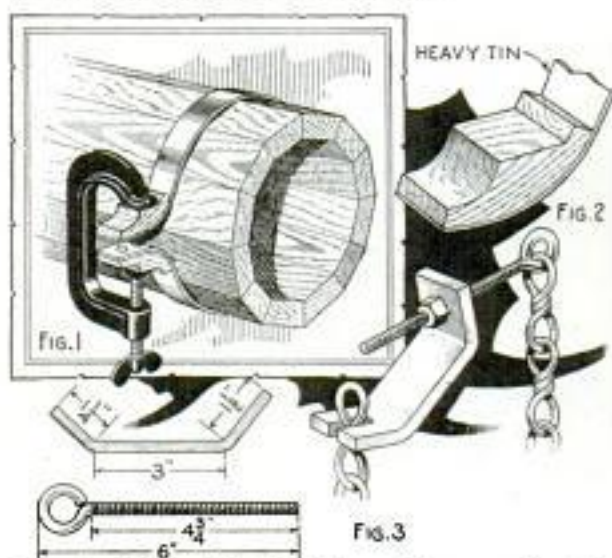
Worn Pilot Bearing Causes Noisy Second-Speed Gears

The main driving gear in most automobile transmissions is fitted with a bearing within the gear itself, which supports the end of the main shaft. This bearing is subject to considerable wear if much driving is done in second speed, and allows the gears to run slightly out of mesh, which results in noise and excessive wear

on the teeth. The remedy for this condition is to replace the bearing.

Clamps for Built-Up Column Work

Built-up column work is rather difficult to handle without suitable clamps. The clamp shown in Fig. 1 is to be used in connection with a C-clamp and is not adjustable. It consists of a heavy-gauge tin or light sheet-metal band, about 2 in. wide and 5 in. longer than the circumference of the column. Two blocks of hardwood are cut, with the grain, to the shape shown in Fig. 2, and fastened to each end of the band. In use, the band is slipped around the column and drawn up tight with the C-clamp. Another type, shown in Fig. 3, is adjustable and consists of a 6-in. piece of $\frac{1}{2}$ -in. bar iron and a suitable length of No. 0000 wire-coil chain. The iron is drilled at one end to receive a $\frac{3}{8}$ -in. eyebolt, 6 in. long, while the other end is slotted to receive one end of the chain. It is then bent to the shape shown and assembled. In use, run the nut out to the end of the eyebolt, place the clamp around the work and fasten the chain in the slot. Then tighten it by running up the nut. It is a good idea to place heavy paper under the clamp to prevent marring the work.



Built-Up Column Work of Large Diameters Can Be Held Firmly with These Clamps

How to Anneal Aluminum

For raising wire edging, forming, or to get elasticity on sheet aluminum, use an acetylene flame without oxygen. This will deposit a dense film of carbon or soot on the part where annealing is to be done. Then add oxygen to the flame until it is neutral, burn the carbon off with a rapidly swinging motion of the torch and with the flame approximately $\frac{1}{2}$ in. from the work. Care should be taken not to hold the flame on the metal after the carbon has disappeared, as such a heat may burn it. This method will be found more satisfactory and thorough than heating with flame and testing with a soft pine stick for charred marks.

A Soldering Iron for Places Hard to Reach

When you have light soldering work to do in places difficult to reach with an ordinary iron, make this one. It consists of a suitable length of copper wire, one end being pointed and tinned and the other wrapped with asbestos paper and fitted into a wooden handle. The purpose of the



paper is to prevent the wire from burning the handle. In use, the wire is heated and kept hot by holding a flame from a Bunsen burner against it, as near the work as possible.

The heat will travel down the wire and keep the point hot.

Shop-Floor Covering from Discarded Fabric Belting

By covering the greasy spots on shop floors with discarded fabric belting, slipping on them and consequent accidents will be reduced. Even though oil continues to drip on the belting, it will not become slippery. It is cut into suitable lengths and laid on the floor where it is tacked down. On a concrete floor, it should be thoroughly cleaned and the belting made fast with linoleum cement.



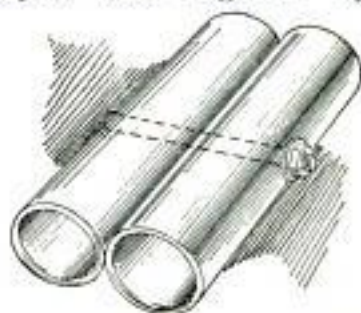
Guide Aids in Starting Air Drill on a Smooth Surface without Slipping or Jumping

Guide Prevents Jumping of Air Drill

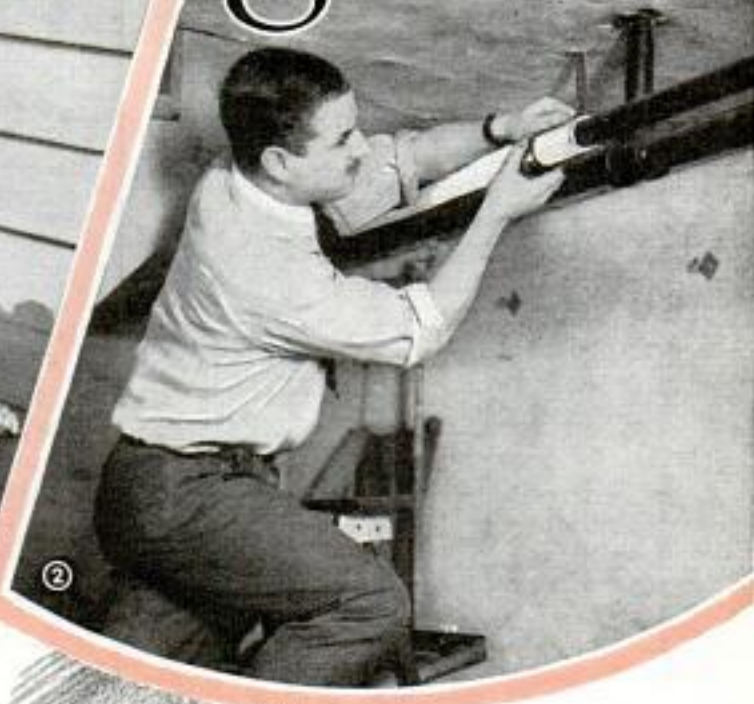
When starting an air drill on a smooth surface, the tendency to slip and jump can be prevented with a guide into which the end of the drill is slipped. Two projecting arms on the guide enable the worker to hold it down securely with his feet. As many air-drill operators attempt to hold the tool between their feet, such a guide will help to avoid accidents.

Wristpins Bolted Together Form Handy V-Block

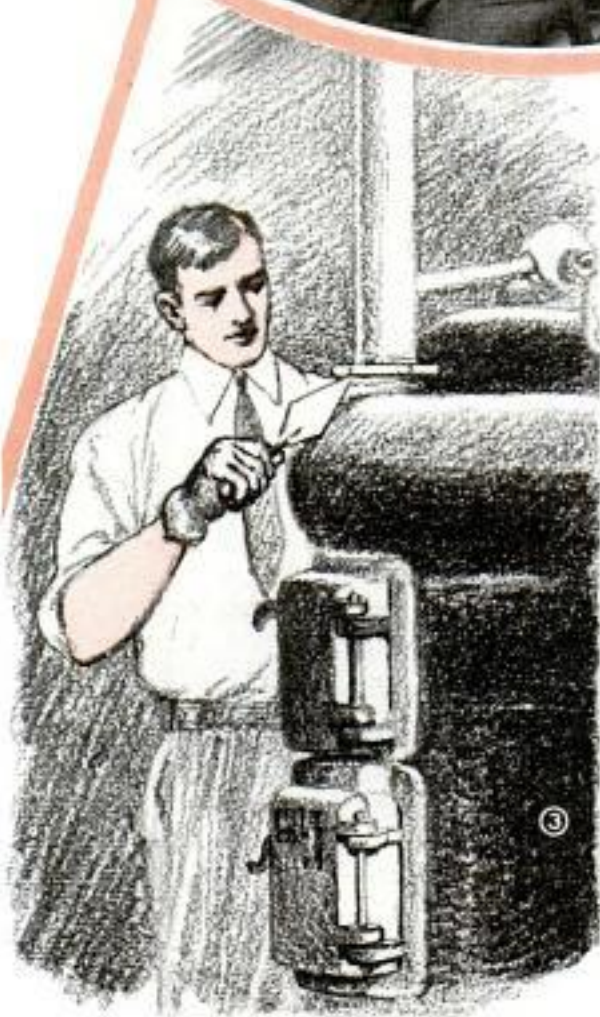
An emergency V-block can be made from two wristpins held together by a small bolt through the holes in the center. If there are no holes, the pins may be welded or brazed together. As the pins are very hard, they will stand abuse and are as good for faceplate work as for the bed of a drill press.



Insulating to Cut



H EAT escapes from your home both by wind action and conduction. Wind striking the exposed sides of the house drives cold air through the cracks and crevices around the doors and windows. The entrance of this cold air crowds a like quantity of warm air out the opposite or sheltered sides of the house through similar exits. Heat is also lost by conduction through the building materials which form the walls and windows. Wood is a poorer conductor than stone, brick or concrete, and a dead-air space

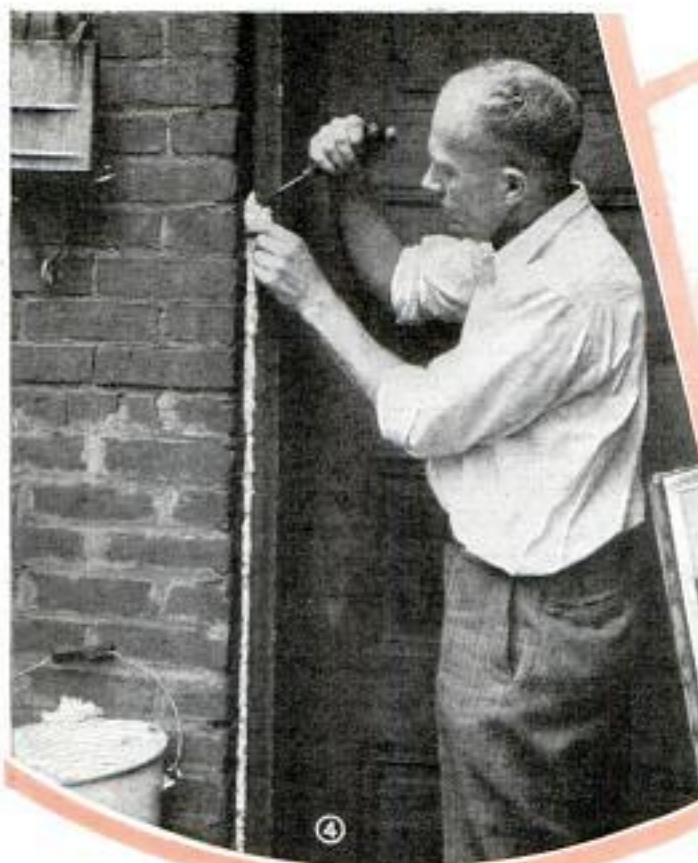


Ground Asbestos, Moistened to Form a Stiff Paste Is Troweled on the Boiler and Covered with Cheesecloth

ranks as the poorest known conductor. Experiments prove that the thicker the material, the less is the heat lost in a given period. Efficient and relatively inexpensive insulation materials are now available, but they should never be substituted for structural materials as they lack strength for such service.

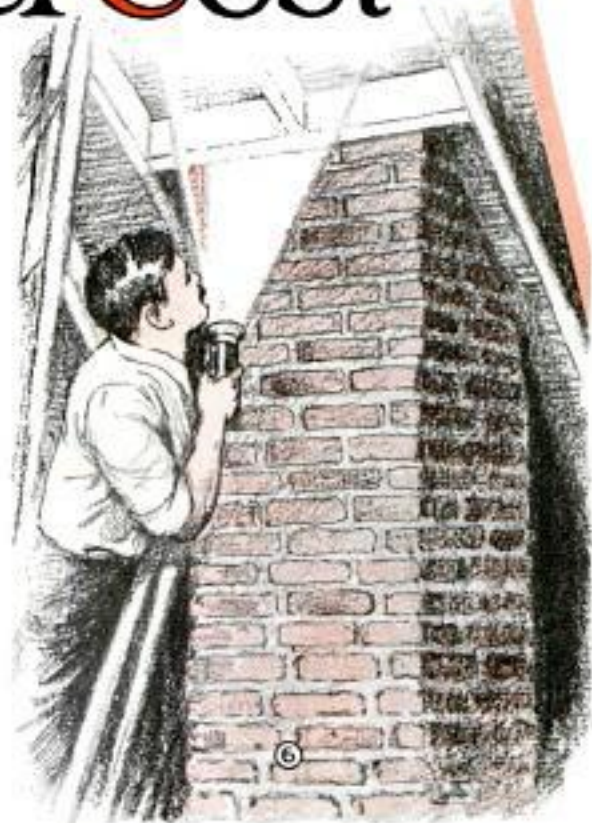
You can prevent heat losses through the ceiling by placing a 4-in. layer of fibrous insulation, such as mineral wool, hair felt, granulated cork, or the like, directly above the plaster and between the

As Much as Three-Tenths of Heat Losses from the Average Home Can Be Stopped by Using Storm Sash on All Windows, Sealing the Sash with Felt, and Screwing Them On Tightly



Your Fuel Cost

joists or the top-floor ceiling. A wooden rake with a flat face makes an effective tool to spread this insulation, the width of the rake being slightly less than the distance between the joists. The roof must be leak-proof, as wet insulation is worse than none, and the roof should therefore be inspected and repaired before the insulation is applied. Where it is impractical to use fibrous material, insulation board, which can be nailed to the inside face



Leaky Roofs Allow Moisture to Soak into Insulation, Which Then Becomes Ineffectual for Its Purpose

of the roof rafters, is advisable. It is usually impractical to attempt to insulate the walls of an old house because of the expense involved, but the average owner can plug the major outlets of warm-air leakage by calking the cracks in the window and door frames with mastic, as shown in Fig. 4. Entrance of cold air between the door and its casing can be greatly reduced by applying stripping as in Fig. 7, while space under a door should be closed as in Fig. 8. In houses

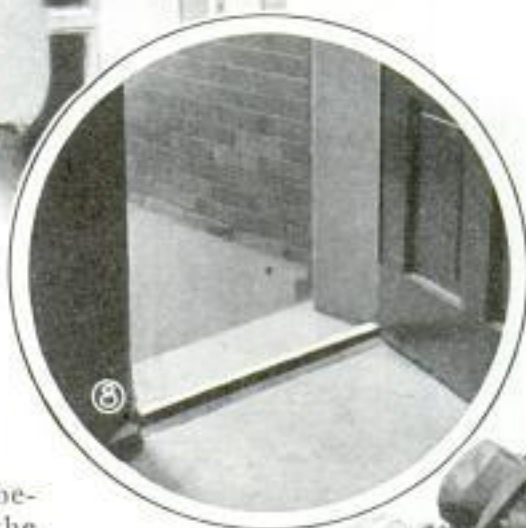


of frame construction, this process may necessitate the temporary removal of facing boards, while in brick, stone or stucco dwellings, the spaces between the walls and the window and door frames must be plugged. Also caulk the crack around the bottom board or skirting which overlaps the foundation, as in Fig. 1, to prevent flue action.

The use of tight-fitting storm sash, sealed with felt strips, as shown in Fig. 5, and drawn up with screws, is one of the most efficient ways to prevent heat loss and improve humidity. If you cannot af-

ford to equip all your windows with storm sash, at least provide them on the north and west exposures and, if possible, on the east frontage also. It is possible to stop approximately three-tenths of the ordinary heat loss in this manner, while condensation and ice formation—the major foes of successful humidification—are prevented by double panes of glass with the supplementary dead-air space.

The importance of vagrant basement heat is seldom appreciated. This seeps readily throughout the average house, which mostly is rather porous. To gain the maximum benefit from this heat, the basement windows must be equipped with tight storm sash. In cases of exposed frame houses, it is good practice to bank the outside basement walls with brush, straw, stable manure and other natural insulation. Under such conditions, it is inadvisable to insulate the hot-water or steam pipes in the basement. If, on the other hand, too much heat is retained in the basement, it is a good idea to cover the pipes as in Fig. 2, in order to prevent excessive loss of heat from them. Similarly, the boiler should be covered with ground asbestos moistened to form a stiff paste, as in



Top and Center, Applying Weatherstrip to Keep Out Draft; Bottom, Workman Repairing Roof before Insulating the Second-Floor Ceiling

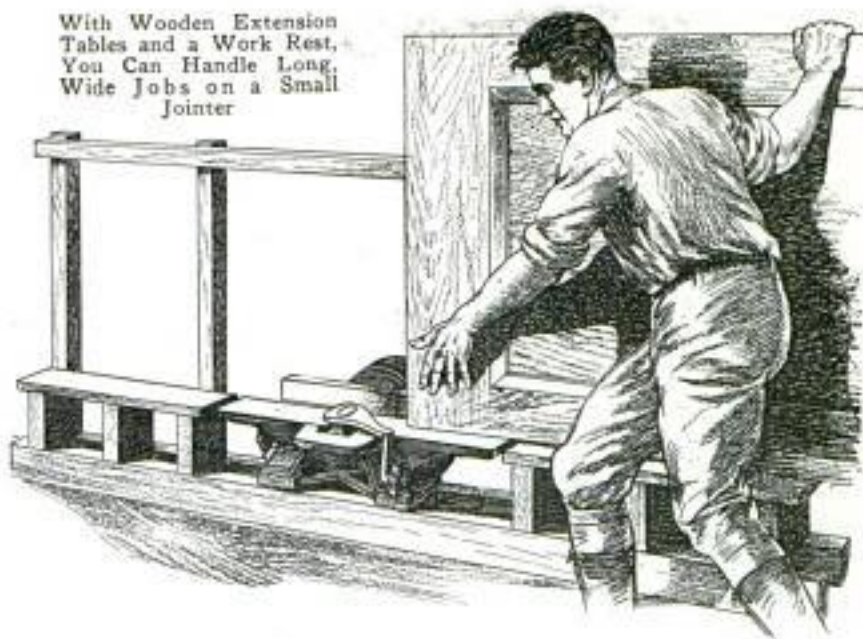
Fig. 3, and apply cloth on top of the asbestos.

Low, thin cast-iron radiators, located under windows, heat a room more comfortably and more economically than high-column or tubular radiators, similarly placed. The use of a properly designed shield on a tubular radiator effects a gain in steam economy and more satisfactory air conditions than if a similar but uninclosed radiator is used. Locating radiators near the ceiling is poor practice as the heat does not circulate as well. Oil paint should be used exclusively in painting radiators, as it has no material effect on heat transmission, but heat transmission is about one-eleventh less where the radiators are covered with a bronze or galvanized coating. It has been found, also, that the use of storm doors caused a gain in steam economy as high as 21 per cent, in addition to improving room temperature, while the use of both storm doors and storm sash resulted in a gain of almost one-third in steam economy. In the case of the average householder, this saving depends on the ratio of window and door area to exposed wall area and on the air-tightness of the storm door and sash. Curtains and shades, which screen your rooms against sunlight and afford privacy at night, also increase comfort during the winter by shielding the occupants of the house from radiation of cold from the glass.

Table for Handling Long Work on Small Jointer

Long work can be handled on a small jointer by using extension tables at the ends and a rest to hold the work vertically. The jointer is mounted on two lengths of 2 by 6-in. stock, which must be perfectly straight. The table is then adjusted to make the desired cut, and another table is added at each end by mounting $\frac{3}{4}$ -in. stock, ripped to the same width, on crosspieces as shown. Test all surfaces

With Wooden Extension Tables and a Work Rest, You Can Handle Long, Wide Jobs on a Small Jointer



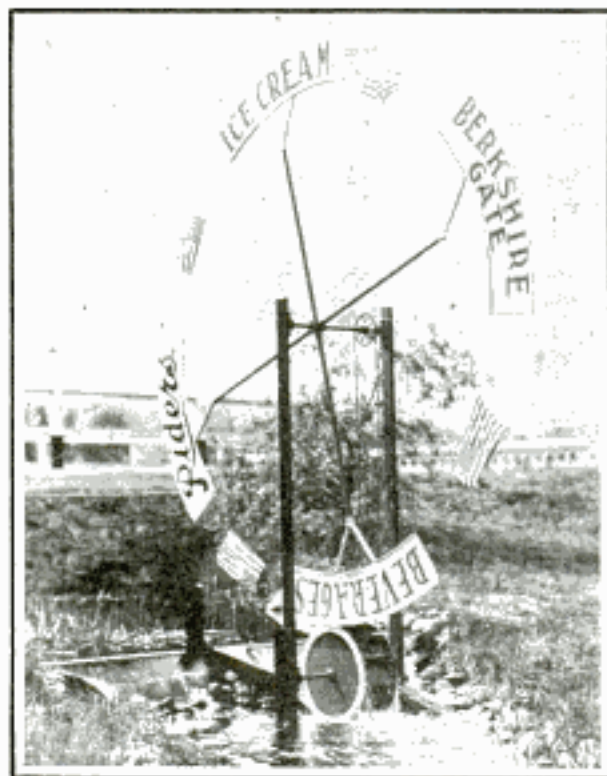
with a straightedge to get the extension tables exactly the same height and width as the jointer tables. Nail four upright pieces to one of the 2 by 6-in. base pieces. Nail a guide rail of 2 by 2-in. stock across the uprights at the top to be in line with the jointer fence. If the tables and guide rail have been accurately lined, no trouble should be experienced in making a cut the full length of work such as doors and window sash.

Shop Seat Made from Discarded Machine Parts

Parts from discarded farm machinery were used to make the shop seat shown here. It consists of a disk blade, a seat and two lengths of pipe. The blade was



used as a base and was welded to a suitable length of pipe. The seat was welded to another length of pipe that would slip easily into the first. A collar and setscrew permit tightening the seat at any height that may be desired.



This Sign Will Bring Your Advertising to the Attention of the Public at Small Cost

Revolving Sign Driven by Stream

Here is a revolving sign that costs nothing to operate and attracts considerable attention. It is operated by a water wheel which drives a shaft supported on two uprights. Lengths of pipe attached to the center of the shaft and at right angles to it hold a circular sign as indicated. A small chain runs over sprocket wheels attached to both the sign and wheel shafts. Care should be taken to make the sign sufficiently strong and not too large as a high wind might tear away the mechanism. As little power is required, this sign can be operated by a very small stream.—H. R. Snyder, Guilford, Conn.

How to Grind and Polish Ends of Glass Tubing

Ends of glass tubing can be ground plane and perpendicular to the axis of the tube as follows: Chuck a block of soft brass in the lathe and face off the end. Mount the tube in a wooden frame in the lathe, with the free end held in a padded pipe center and the other end pressed against the brass block. Run the lathe at slow speed and use fine grinding compound mixed with water as an abrasive.

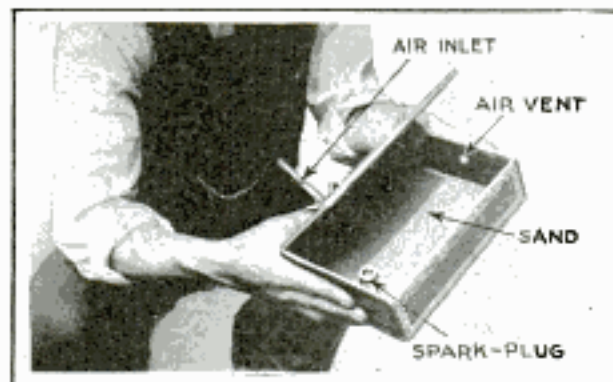
The polishing can be begun with crocus, continued with a hard-rubber lap, and finished with a pitch lap and rouge.

Chain Link Prevents Tethering Rope from Tangling

When staking an animal out to pasture, a chain link will be found a good means of connecting the rope to the stake. Have the stake made with a large head, and drive it through a link that is just small enough not to slip over the head. Then tie the tethering rope into the link. As the animal walks around the stake, the link will turn on it, preventing the rope from being wound around the stake.

Sand Blast Cleans Spark Plugs

Operated by compressed air, obtainable at any gas station, this spark-plug cleaner will be useful to the car owner as well as the garage mechanic. In the lid of an ordinary cigar box, drill a hole near one end and insert a tire valve stem. Directly under this, drill a hole in the bottom to fit the threaded end of the standard plug and also drill a $\frac{1}{2}$ -in. hole at the other end, this one being used as an air vent and covered with fine cloth or fine screen wire. To operate the cleaner, put a handful of fine, sharp sand in the box, insert the plug as shown and press the lid down tight, holding the box in a vertical position with the air vent on top. Press the nozzle of the air hose over the valve stem



Spark Plugs Are Thoroughly Cleaned with This Sand-Blast Cleaner in Two or Three Minutes

so that the air will drive the sand into the plug, thoroughly and quickly cleaning it.

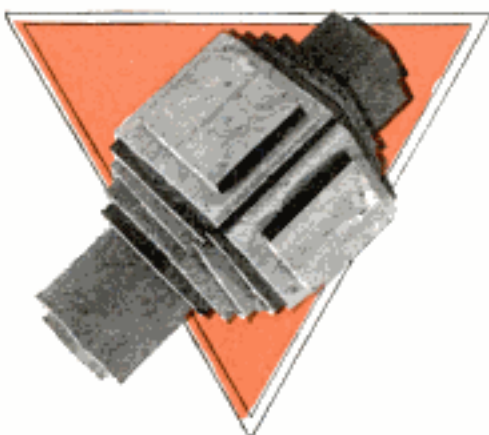
Be sure to oil the surface of work to be knurled.

Imitation WOOD INLAY

Turned from Scrap Stock



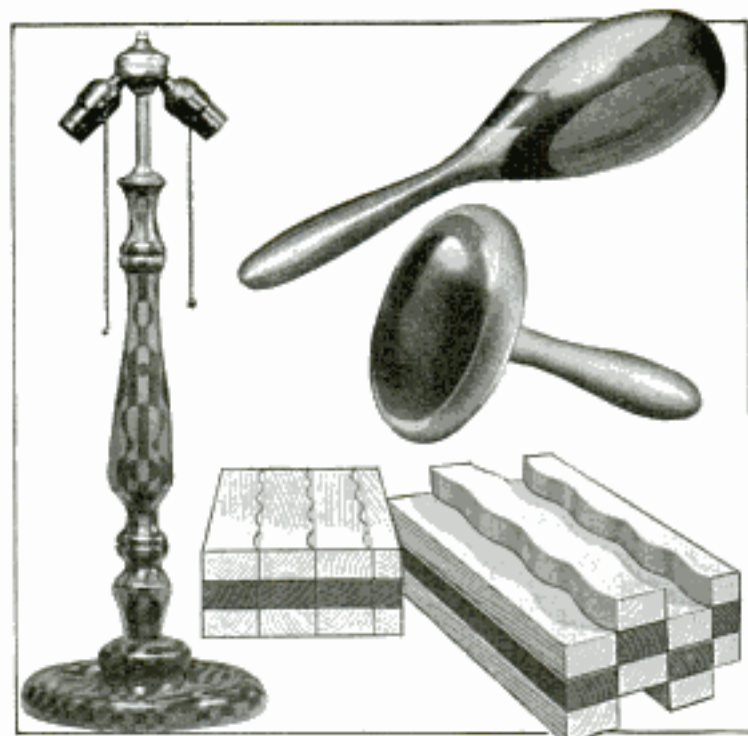
BEAUTIFULLY finished and highly attractive, these imitation lamps, hat stands, and other turnings, cost practically nothing, as scrap stock can be used in making them. The trick lies in gluing alternate layers of dark and light-colored wood on a core and then turning down the resulting block to expose the different woods. All you need is the wood, some glue and varnish, plus a small lathe and a couple of chisels and clamps. First make a core 1 in. square and from 6 to 15 in. long, depending on the design and shape of the lamp base desired. Then drill a $\frac{3}{8}$ -in. hole through the center for the lamp cord. For the longer designs, it is better to split the core and groove out the insides of both pieces with a gouge or a dado head, then glue them together again. The core should be of dark wood, such as mahogany, walnut or cherry. When it is cut to size and planed smooth, add the first layer of wood, which should be light-colored. Prepare four pieces of this wood, $\frac{1}{4}$ in. thick and of suitable dimensions to cover each side of the core. First glue pieces on opposite sides. Clamp the assembly and allow to dry. When thoroughly dry, true up the edges with a plane and glue pieces on the other two sides. Plenty of pressure should be applied in clamping, or an uneven contact is likely to result and there will be gaps or open joints between the different woods after the block has been



turned. The second layer is applied in the same way, using a dark wood of the same thickness. Continue using alternate layers of light and dark wood until the desired thickness is obtained, as shown in the lower detail.

The base of the lamp can be made in "sandwich" form by gluing three or four layers of different wood on each other. The base is glued onto the bottom of the block so that both can be turned at the same time. A groove should also be cut in the base to receive the lamp cord. When the turning is finished, apply a wood filler. Then follow with three or four coats of varnish, sandpapering between successive coats. The final coat is rubbed with pumice or powdered rottenstone and rubbing oil. A coat of wax gives a very rich luster. The result is a handsome imitation inlay lamp that is difficult to distinguish from genuine inlay work. In addition to lamps, such articles as darning eggs, hat sets and smoking stands, in fact any article of wood that is turned, can be made by this method.

Another method of imitation wood inlay is shown on page 878. Pieces of light and dark wood are selected and planed smooth and to the same thickness as a great deal of the finished effect depends upon this. The pieces of dark and light



Glued Up Strips of Dark and Light Wood, Checkerboard-Fashion, When Turned, Produce Odd Designs

wood are glued together and placed between clamps to harden. After the pieces have dried, they are run through a band-saw. Any series of wavy lines may be cut along their length and need not be regular in order to bring out the finished effect. After finishing all the sawing, the alternate vertical rows are moved up the thickness of one board and the pieces again glued. When dry, the protruding pieces are cut off, and the piece is ready for the lathe. It should be remembered that one row more than the thickness of the finished block of wood is required because the rows are moved up and then cut off. By carefully following the two methods described, beautiful effects in imitation wood inlay can be produced, and skill in turning depends on practice.

A Non-Slip Handle for Your Babbitt Hammer



When using a babbitt hammer with greasy hands, the chances of having it slip out of your grasp can be greatly reduced by knurling the handle. Do this for

about one-half its length, then flatten it slightly as shown—A. Mathieu, Chicago.

Reclaiming Silver Solder

Silver solder, that is generally used for soldering fuel and oil lines on aircraft engines, can be reclaimed and used again by cleaning off the grease and melting it out of the joints. When melted in a puddle a small rod is plunged into it and the solder will adhere to it. When cool, it can be applied to small jobs under flame, using the rod to make a raking motion where the bonding is needed.

Brazing Enameled Ware

Enameled cooking utensils, of iron or steel, can be brazed when in need of repair. No flux is necessary, as the enamel will serve this purpose. The brazed portion can be tinned when used for cooking. Many otherwise useless articles can be reclaimed in this manner for a few cents.—Hallie P. Davidson, Great Lakes, Ill.

Self-Sealing Shellac-Pot Cover

Covered with an old hydrometer bulb, the contents of a shellac pot can be kept in good condition.

A pot with a wide mouth is fitted to a wooden base by drilling a hole partly through the latter and cementing the pot to the base with shellac. A hole is cut through the center of the bulb to receive a handle.

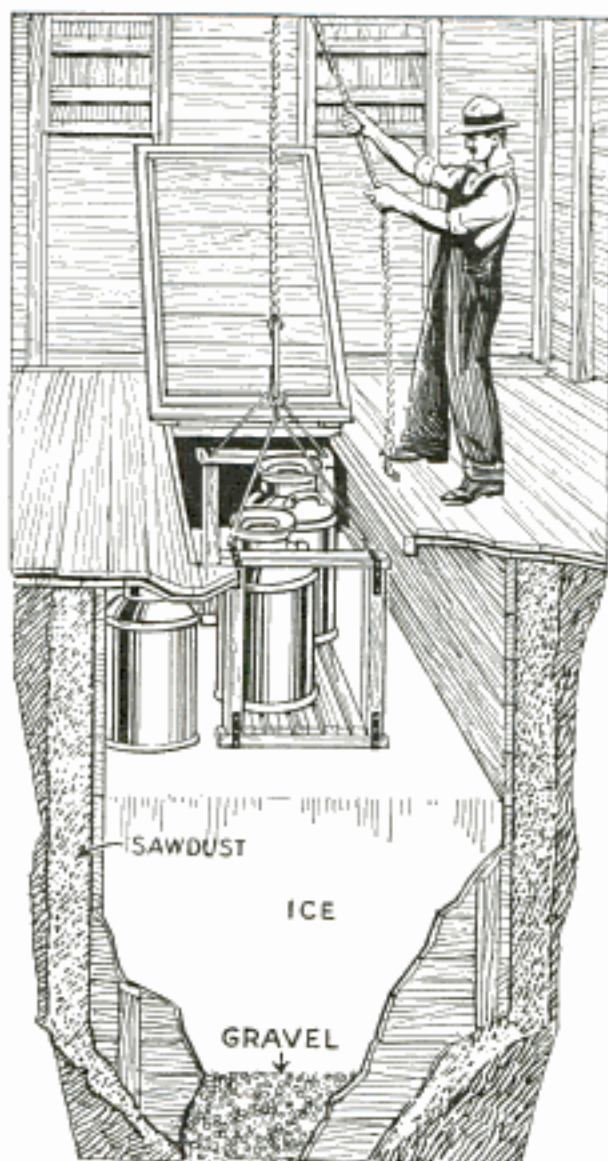


Surfacing Thin Stock on a Planer

Thin boards can be surfaced on a large planer by laying a piece of heavier stock over them. The heavier piece affords a rigid support so that there is no spring or vibration to throw the boards into the cutters unevenly.

An Underground Refrigerator for the Farm

Underground refrigerators, easily made and efficient, are being used on farms in certain parts of the country as a substitute for the usual method of cutting ice from ponds and storing it in ice houses. Under the floor of a small building, set aside for the purpose, a pit, 8 ft. square and 9½ ft. deep, is dug. The sides are boarded up with cheap lumber, leaving a 12-in. space between the earth and the boards to be filled with sawdust. The bottom of the pit is covered with a 1½-ft. layer of coarse gravel to insure effective drainage. The floor of the ice house should be made of two thicknesses of lumber, with a layer of heavy paper between. The windows are boarded up during the summer so that the inside of the ice house will be kept as cool as possible. During freezing weather, water is run into the pit, a few gallons at a time, and allowed to form ice, the building being left open to admit the cold. This process is repeated until a solid cake of ice, 8 ft. square and over 6 ft. thick, has been formed. The floor is then replaced and the house tightly closed. In many sections of the country such a cake of ice will last throughout the summer, providing a cold-storage compartment for milk and other products. A suitable lift is built to fit into the ice chamber, and a block and tackle are used to raise and lower the lift, which is necessary when it carries an extra heavy load, such as two or three milk cans. The floor of the lift consists of a number of wooden strips, spaced apart to permit circulation of air so that the heat of the load will not be transmitted directly to the ice. Also notice that the parts of the lift are assembled with strap iron to increase its strength.



Large Cake of Ice Frozen in Underground Box During Winter, Provides Refrigeration All Summer

The trapdoor should fit snugly to prevent air from getting into the pit unnecessarily, and like the flooring, it is made up of two thicknesses of lumber with heavy paper insulation between.

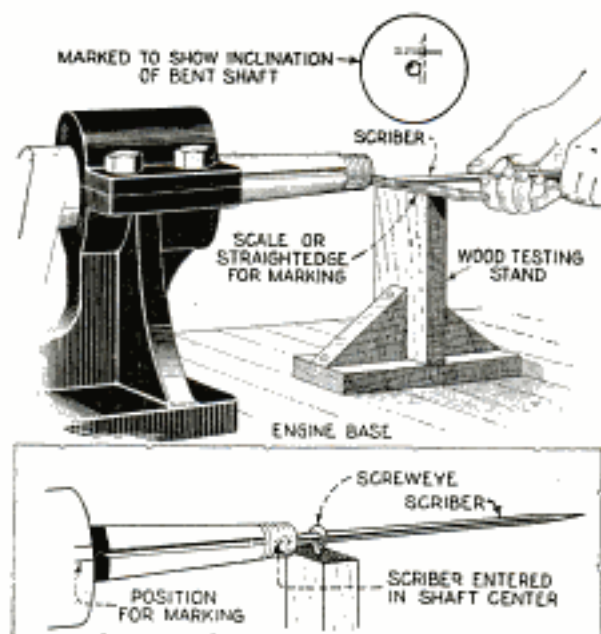
Arc-Brazing Galvanized Surfaces

It is comparatively simple to braze zinc and galvanized surfaces with an electric arc. To do this, copper, which will melt in the arc, is used instead of brass. It will mix with enough of the zinc to form an adherent alloy similar to bronze. As a current of only 45 volts is needed, a transformer must be used if the voltage of the

current supply is over 45. One wire from the transformer is connected to the work and the other to the carbon. A length of large-size copper wire is then held against the work so the arc is from the wire to the carbon. Flux must be used.

☛ Separate links of worn-out chain placed in a tumbling barrel will aid in polishing or smoothing a product.

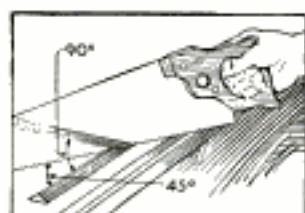
Indicator for Testing Bent Shafts



Bent Shafts Straightened without Dismantling by Means of a Jack and Improved Test Indicator

The degree of bend in a shaft can be determined without dismantling it by using this tool. A wooden upright is made to the approximate height of the center of the shaft. A scale or straightedge is placed on top of the upright and used as a steady rest for a scriber, with which lines are scratched in the end of the shaft at right angles to each other to show the direction of bend as in the upper detail. The shaft is then straightened by exerting pressure against it with a jack. Other tests are made until the shaft is as nearly straight as possible. For a more accurate test, a screw-eye is driven into the top of the upright, the scriber passed through it and inserted into the center at the end of the shaft, as shown in the lower detail. The free end then acts as an indicator.

Miters Cut without Miter Box



When cutting miters, much time can be saved by "shadow-sawing." A saw having a bright blade is placed on the work in the approximate position where the miter is to be cut. Then the saw is moved until the reflection of the work on the blade forms a right angle with the real work, as shown. After a little practice

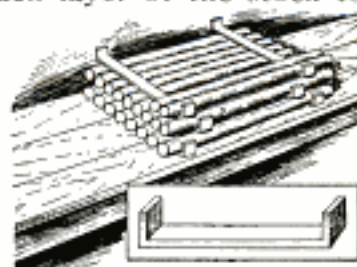
you will be surprised with the accurate results obtained in this way.—Roy Beach, Placerville, Calif.

Larger Cone Tip for Brazing

When a white smoke issues from the added material in brazing, its quality is being injured. A larger tip than is ordinarily used should be employed for this work with a neutral flame. When the desired heat is reached, the flame should be held 2 or 3 in. away from the work and the bonding material melted within the envelope, but not directly under the white cone. The flame may be moved closer or farther away from the work to get a good job. The envelope should be maintained in a protective position at all times where brazing is in progress.

Holders for Long Round Stock

For long round stock, the holders shown will be of considerable utility to keep them piled neatly. Lengths of bar iron, with the ends bent at right angles, are placed on each layer of the stock to hold the next layer in place. Besides being neat, the piles cannot roll down and cause injury to workers.



Whiting Prevents Tin from Adhering to Brass or Copper

When dip-tinning brass and copper parts, a mixture of whiting and water, applied to the surfaces not to be tinned, will prevent the tin from adhering to them. This mixture should be allowed to dry before dipping. It will not burn off or injure the tin in the pot.—V. C. Darby, Cedar Rapids, Iowa.

Oil Keeps the Chisel Edge Keen

A cold chisel, used for cutting mild or cold-rolled steel, will stay sharp longer if it is occasionally dipped in oil. A heavy-bodied machine or lard oil has been found best for this purpose.

The three types of men that buy "Yankee" bit braces



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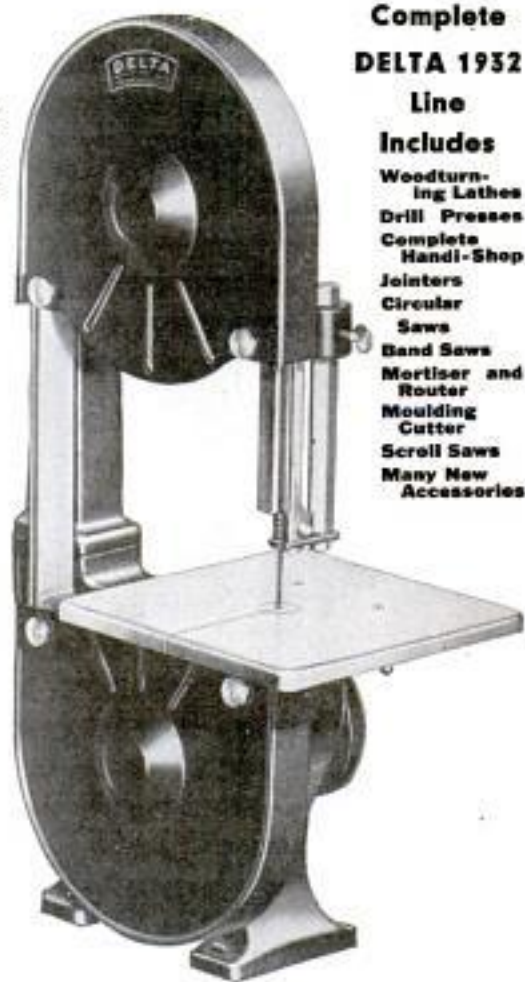
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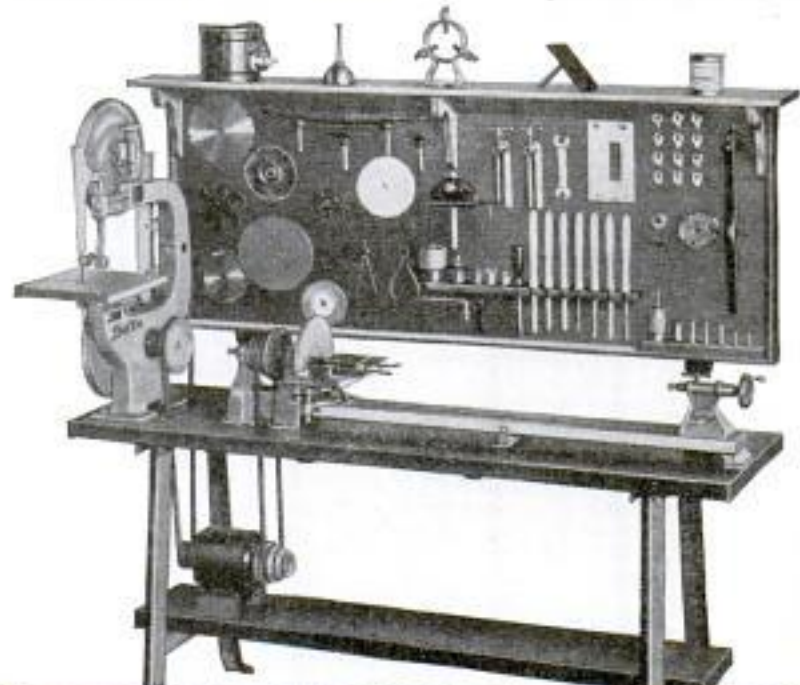
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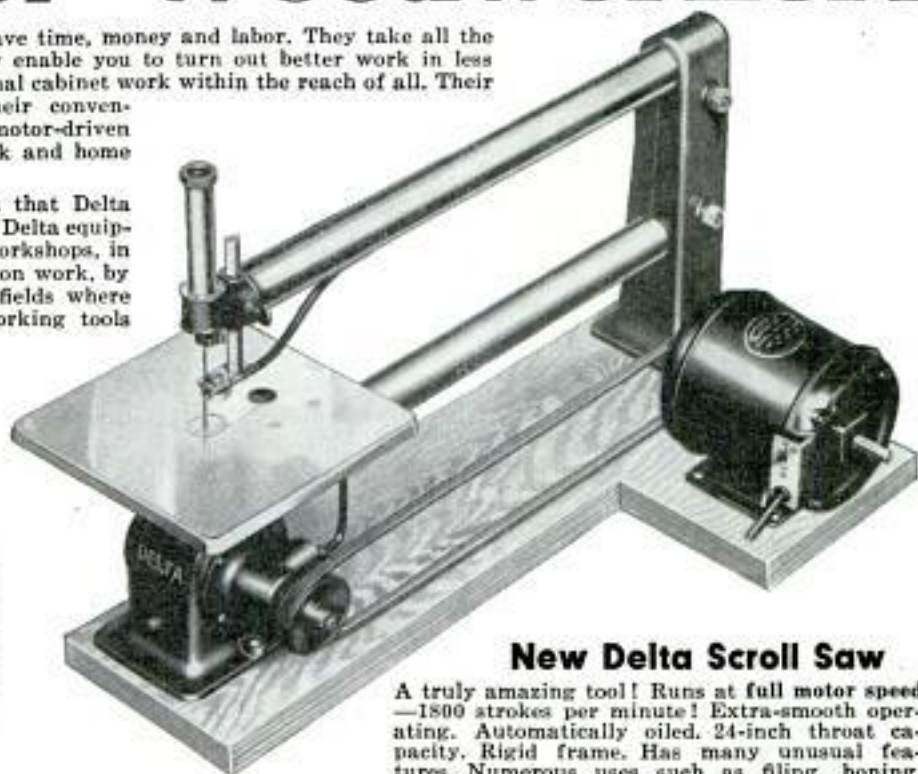
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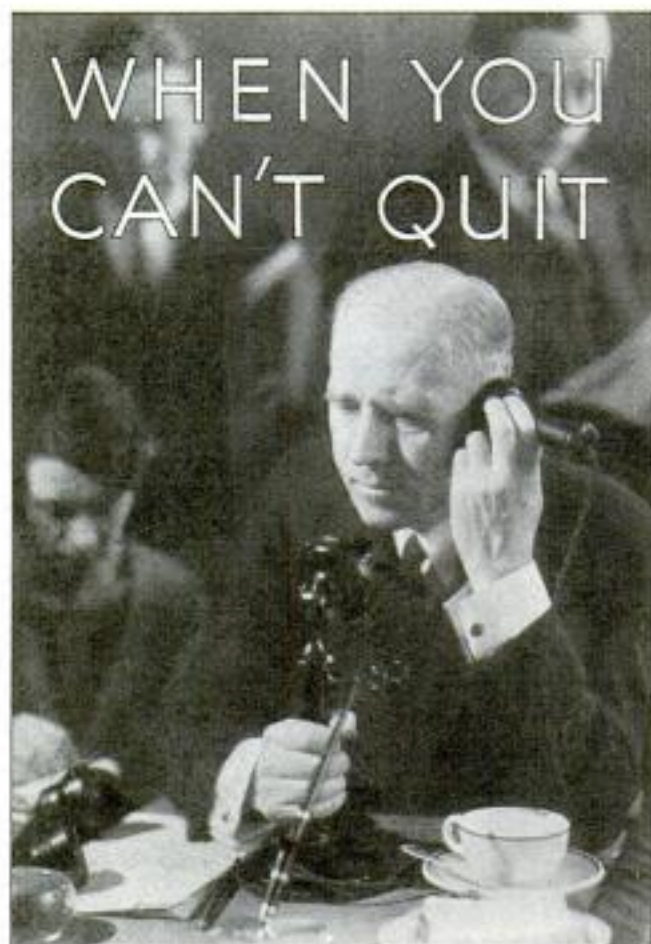
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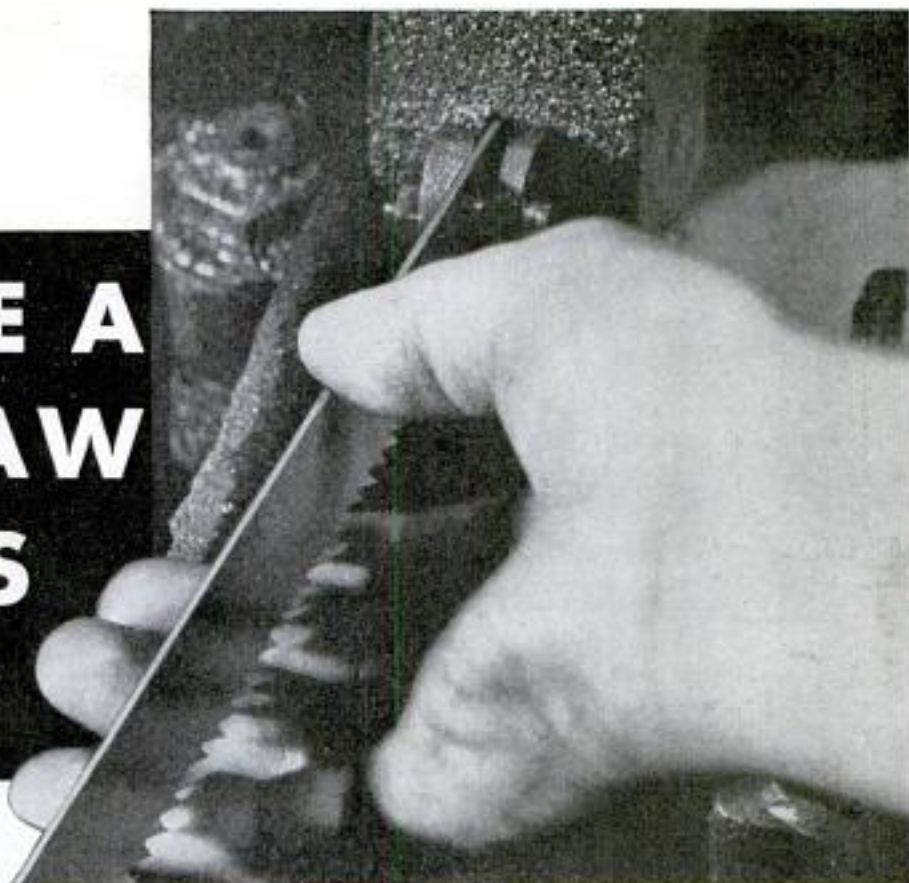
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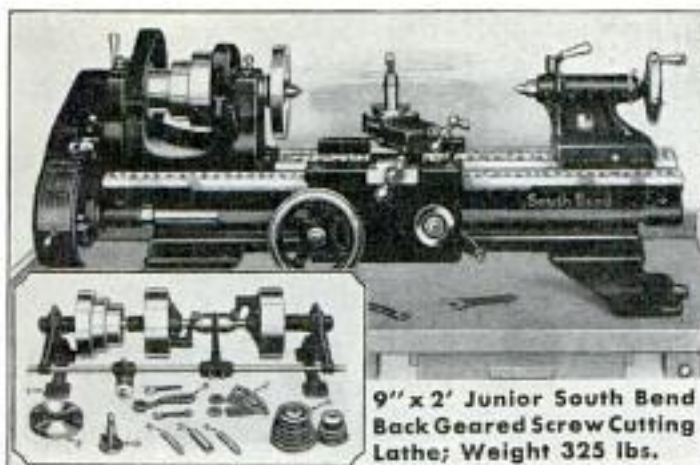
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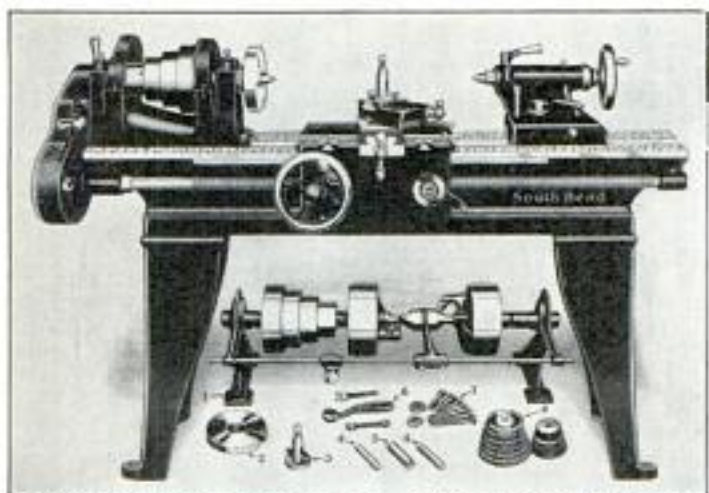
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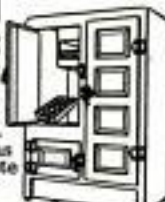
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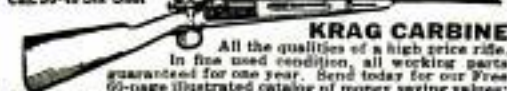
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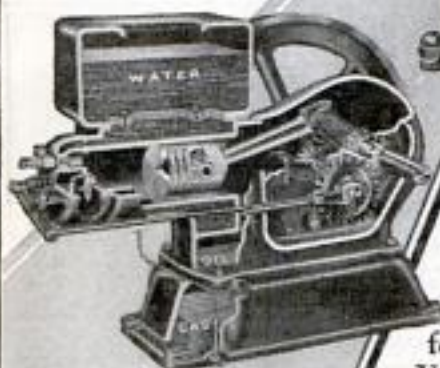
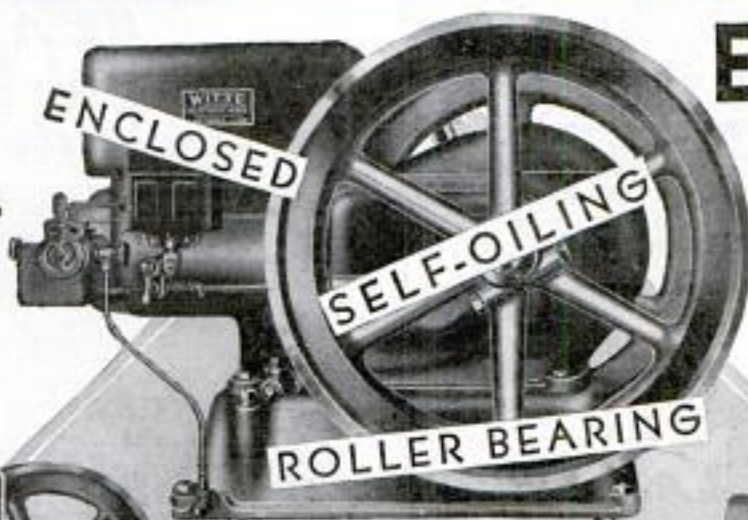
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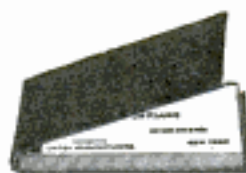


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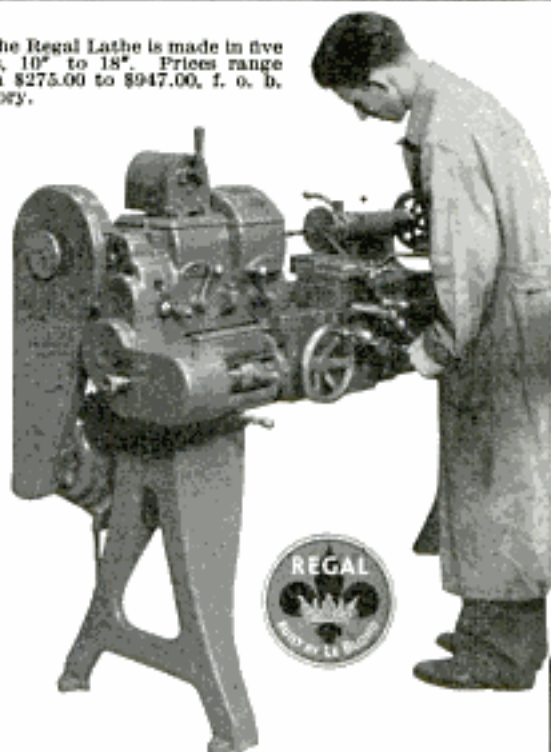
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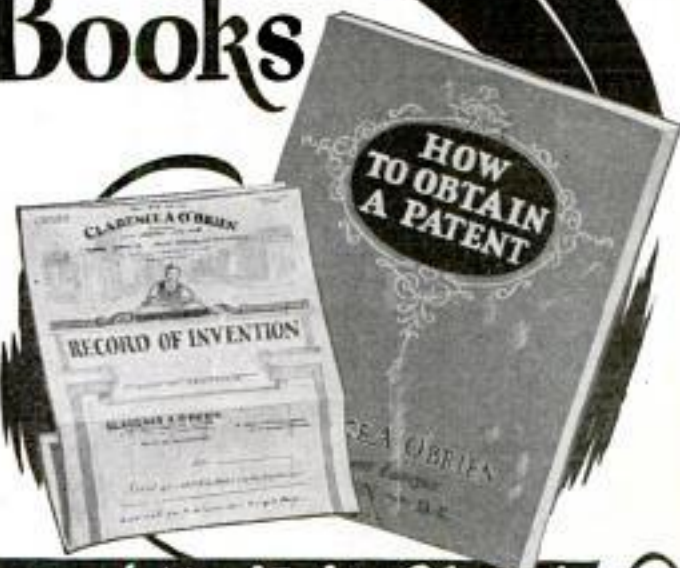
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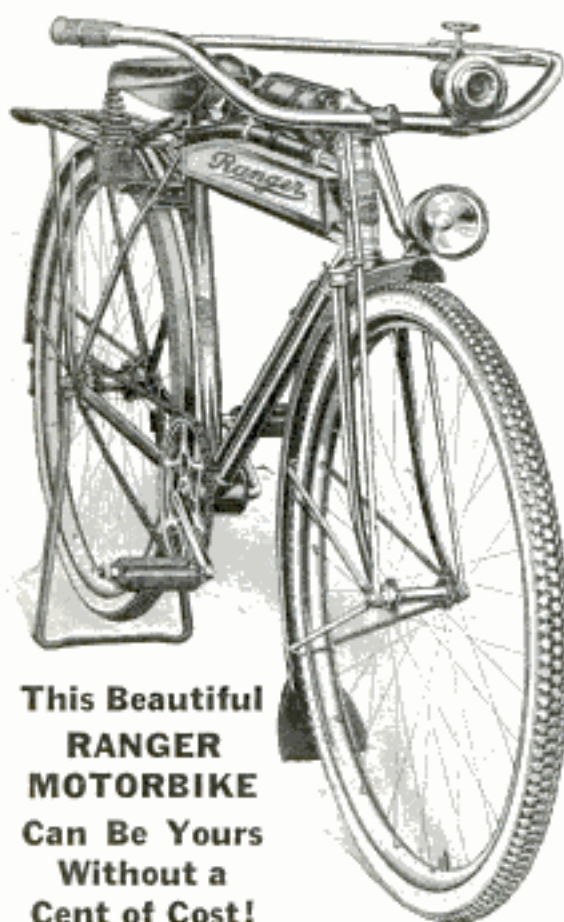
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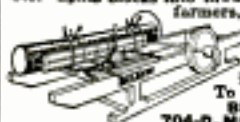
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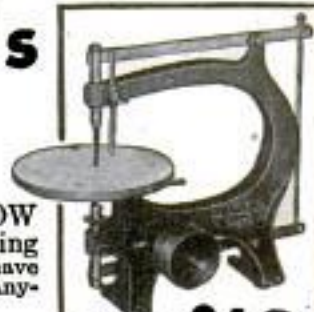
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EMPLOYMENT

Advice from the Head of a Great American Industry

"You can be sure, if you are a normal person, that there is a place for you," says Charles M. Schwab in his introduction to the valuable two-volume guide to employment "The Right Job." "The first step," continues Mr. Schwab, "is to decide exactly what one has, and in what kind of work it can be used to best advantage."

Then "The Right Job" starts right in to help solve this problem of getting a job.

How To Connect With That Job!

You have Mr. Schwab's assurance that there is a place for you (and who could know better?); you need not worry about that! What you do need to consider, in these times, is how to connect with that job! Or, if you are an employer, how you can get just the man you need for what you can afford to pay.

In one place the text of these two handy guides points out that if you would only take as much trouble in finding a job that fits you, as in getting your coat fitted, you would never be out of a job!

It's easy to use a little science in getting a job. Don't waste time applying where dozens are standing in line; don't write empy letters by the hundreds; don't insert characterless advertisements in papers—

How To Sell Yourself

The idea is, to analyze yourself to see just what you have to sell; make a list of the most likely places that could use what you have,

then go at it hammer and tong to sell yourself, just as if you were a salesman with a quota to make.

Does it sound difficult? It isn't if you have an instructor and guide to help you such as is found in "The Right Job."

Are you blonde or brunette? Narrow headed or medium headed? Mental or motive? Feminine nose or masculine nose?—You are told what general lines of work to consider.

Is your hand flexible? rigid? spatulate? psychic? conical?—



the elimination process clears your path a little further.

Subjects Covered

And so on through the 21 fascinating chapters of the first volume and the 37 chapters of the second volume. Here are a few of the subjects covered:—

Handicaps and how to overcome them—Where to look for a job—How to apply in person or by mail—the job higher up—studying human nature—self-analysis of character—jobs for those who can handle women—types for personal service—jobs for the ambitious and un-ambitious—jobs for leaders and drivers.

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Hundreds have profited by the new ideas, practical helps, wise advice, shrewd analysis and the dozens of actual examples set forth in these books. This is the EMPLOYMENT book of the day that one of the greatest employers of labor of all kinds thought so well of that he added to it by writing his introduction.

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Here is the practical book that is needed as no other guide and reference work is needed in these times. You are to judge for yourself before finally accepting it. Get these volumes in your hands for a few days, read and study them over, examine the dozens of portraits, sketches, tables and diagrams, then decide for yourself whether or not you think this work is going to be worth real money to you—right away and in the years to come.

Don't delay! The Right Job is waiting for you today—this minute. This coupon brings you the help that clears the path of obstacles. Fill in, detach, mail it TODAY!

Don't Grope Any Longer!

Use a Little Science and Get the Things Out of Life That Are Coming To You

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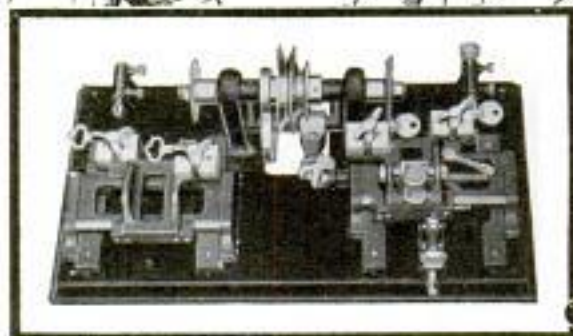
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Everybody uses keys . . . every day. Many thousands of keys are replaced or duplicated every day . . . for homes, offices, factories, garages, automobiles, luggage, desks, etc. There's good money in the key business and it's all cash and steady the year 'round. Now it's easy for you to get into this profitable business . . . with a

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This perfected NEW machine is a marvel of simplicity, accuracy and speed in cutting all kinds of keys . . . cylinder keys, flat keys, bit (house) keys, automobile keys. So easy to operate that a boy can do the work perfectly. Experienced locksmiths declare it superior to anything they have ever seen. Its patented features assure a smooth, finished, perfect-fitting key in one operation, in 12 to 20 seconds.

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The Foley Key Machine is made in several models to fit every need and sold on easy payments if you wish. A small investment starts you in this money-making business.

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Amazing electrical invention starts car, truck or tractor motor without choke. Saves plenty gas, oil. More speed. HOT SHOT sparks BLUE if ignition O. K. — RED if faulty. Draws big crowds. Sells on sight. 25,000,000 prospects. 100% profit at \$1.50. Gold mine for agents. "\$25 a day easy," says Akeman. "Rush 500 HOT SHOTS," says Klint. "Send 200 more," says Berg-Williams. "We want exclusive." "Never saw anything to beat it." "My first winner." Selling like wildfire. Your best bet part time—full time. **FREE Sample Offer. Act QUICK.**

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Startling offer. Famous spraying outfit. Includes GV full liquid pressure, adjustable, non-clogging \$30 gun having 10" swath at 12 to 20 lbs. pressure. Ideal for spraying paint, varnish, enamel, lacquer, etc., the power way. Saves time, labor and does better work. Big opportunity to make extra money with it. Has Kellogg air cooled compressor. This \$78.50 outfit—now only \$37.50.

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Complete with Spray Gun, Fan and Round Spray Tip, 1/2 H. P., 110 V., 50 Cycle, A. C. Motor, Air Filter Tank, Pop-off Valve, Connectors and 20 ft. Hose. Send \$5.00 deposit. Balance C. O. D. Money back if not satisfactory. Send for circular on larger and smaller spraying outfits now selling at very low prices.

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Quincy Compressor 1 1/2 H.P.
\$19.50 Value for \$12.50



Steel base.
3 steel wheels. Wt. 70 lbs.

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"Old Ironsides" is now being exhibited by the Government. The price of a nicely constructed model is usually \$100.00. If you build one from our set you have a wonderful profit. We furnish all parts cut to fit and ready to put together; full instructions and carefully numbered diagrams; hull fully shaped and sanded—price \$6.00.

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Improved Up-To-Date 8" Bench Saw INVALUABLE TO HOME AND SHOP

This design embodies five exclusive features: (1) An Automatic Lifting Device, controlled by a conveniently located hand wheel; (2) Table can be tilted to any angle up to 45°; (3) The saw blade is completely enclosed and guarded beneath the table; (4) An opening is provided at the bottom of the saw enclosure for attaching a bag to collect the sawdust; (5) A hardened and ground shaft is used for mounting the saw.



Saws lumber up to 2 1/4 inches thick. This husky Bench Saw can now be purchased for **\$16.95** only. Motor and base extra.

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Hotter than Coal and no dirt



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Double Blue Flame Burner for cook stoves, ranges, and parlor circulators. Burns with beautiful clean blue flame.



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Mysterious New Invention Offers Agents Up To \$40 a Day

So startling, so absolutely new, so peculiar is this strange discovery that agents who have already taken it on are smashing daily profit records. The greatest crowd gatherer you ever saw. The minute you demonstrate this clever invention people are bewildered. They want to know how it "stiffens," "hypnotizes," "shell shocks" thieves. The need for this scientific protection is so great—the big profit possibilities are so almost unlimited and easy—that now we will actually pay you just to demonstrate this amazing thief chaser. You don't need to sell a single one to make this money. Just stand on the street by your car and make it perform its magic wonders that set your audience agog and bring quick profits. No use wasting your time any longer with "piker" propositions. \$40, \$50, \$75 a day is not too much to expect, is it? If we did not feel sure that you could make as much money as other men with this uncanny new discovery we certainly would not be willing to offer you pay just for demonstrating it. The protection it gives—its utter queerness—its strange power to put fear into thieves—and the fun it gives motorists make it the easiest, fastest selling, biggest money-making opportunity for you in many years.

We Pay You Just To Show It To Motorists

The market is so tremendous—orders are pouring in so fast—that we can afford to do almost unheard of things for our local distributors. Not only will we pay you just for testing it, but we will actually send you a Free Sample offer for your own car so that your car and accessories will be protected and to start you demonstrating it. Yet that's not all. We actually offer to pay you cash for merely testing it on your car. Now we have territories for 1,600 more county distributors and 100 district managers on this generous pay plan. With our nation-wide advertising plans ready to start at once, distributors should be literally flooded with orders. We have worked out a new plan so that you don't have to do any selling or demonstrating to car owners to make big money.



FREE SAMPLE OFFER

Rush the coupon for your Free Sample offer—offer to pay for demonstrating and plan that gets you big money without doing any selling or demonstrating to car owners. Send no money. Just coupon. This is not an order. Nothing will be sent C. O. D. This Sample Offer is yours free of all cost. Just mail coupon now.

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I accept your generous Free Sample offer of your amazing new "thief hypnotizer" with understanding that this offer costs me nothing now or ever. Nothing will be sent C. O. D. and I am not obliged in any way to buy anything or to become your distributor. You also offer to actually pay me for just testing it on my own car. Please send details of your offer of pay for demonstrating it, and also your plan that offers me big money even without demonstrating or selling to car owners. If I become your local distributor you agree to give me exclusive territory.

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Start to Play Very First Day

This Year Give Yourself
Lifelong Fun
Profit and
Popularity



PARENTS!

What greater gift can you confer on your children this year than lifelong fun and entertainment?

Love of music means love of home, an appreciation of the finer things in life. Here is a chance to give your boy or girl that love without the tedious practice that most instruments require. The Xylorimba is easy to play. No teacher is needed. Practice is actually a joy.

Remember, the Xylorimba is the guaranteed product of a company established nearly half a century ago—a company that stands back of every promise it makes.

THINK of the best Christmas gift you have ever received. Multiply the pleasure it gave you by ten, and still you have only an idea of the joy you can give yourself this Christmas if you act at once.

Start to Play the Very First Day!

Haven't you, like millions of others, envied the fellows who "bring down the house" with snappy xylophone or xylorimba numbers? Haven't you longed to create your own music, to be looked up to wherever you go, to be able to make real money in spare time? If you have, this ad spells O-p-p-o-r-t-u-n-i-t-y. The xylorimba—wonderful for home, in demand at dances and gatherings—is nevertheless the easiest of all instruments to play. In fact, on the very day you get yours you play simple melodies, even if you can't read a note of music right now. In a few weeks you astonish your friends and family. All your life you have the joy that comes to those who can entertain.

Plays 20 Minutes; Gets \$20!

Ralph Smith, Chicago, played twenty minutes at wedding; his "pay" was \$20. Harry Breuer, New York, has made thousands of friends thru his xylophone selections on the radio.

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And now J. C. Deagan, Inc., (world's largest manufacturer of xylophonic instruments) has made it so easy to own a xylorimba that nothing stands in your way. Sizes and styles to fit every age and pocketbook. A five-day free trial that eliminates risk. Free, easy lessons that make teacher unnecessary—and, best of all, such easy payments that they are hardly noticed.

Will You Investigate?

Everyone wants to be popular. Everyone wants to make extra money. Everyone wants to be center of attraction at gatherings. But these advantages don't come by themselves. Opportunities must be seized. This is your opportunity—will you pass it up without investigation? The accompanying coupon will bring our big FREE book to your door. It tells all about the Deagan line, the free trial, the easy payments. Remember, no cost or obligation! Simply fill in and mail the coupon—but do it before it slips your mind. Today is as good a day as any. Do it NOW!

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to Popularity

Send for
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BUT I've noticed recently that more of my girl friends are smoking CHESTERFIELD, and I asked why.

"One of them said that CHESTERFIELDS really are milder and taste better—that there is nothing strong or sharp or bitter about them.

"Another one spoke up and said that she too liked the taste of CHESTERFIELDS; but that she was especially pleased with the package—so neat and attractive. Chesterfields—she added—are *made* right—properly filled—and burn evenly; and she thought possibly they were using a better cigarette paper.

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