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NEW VORK, SATURDAY, JANUARY 4, 1896.


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## Nor the Week Ending January 4, 1896.

























## the modern bicycle

The enormous amount of capital represented by the bicycle industry has been noticed in these columns before. Orizi nally the velocipede found no application except as a toy. In the early days adults as well as children took up the bicycle as recreation pure and simple, its propulsion over the ordinary roads being so laborious as to make it a vailable only under very ex eptional circumstance
In the old velocipede the inelasticity of the frame made it hard to drive, and it was only rendered endurable from the point of comfort by having a saddle mounted on springs. Slumbering among the patent records meanwiile was an invention which was destined to transtorm the primitive bone shaker into a convey ance of ease and comfort and to minimize the inequali ties of the road. The application of this invention now known as the pneumatic tire, the adoption of a slight change in proportions. and the use of multiply ing gearing for the increase of speed, were all tha were wanting to make the modern bicycle.
The development of the cycle, notwithstanding, was slow. First came the old-fashioned high-whee bicycle, the possible diameter of whose wheel was fixed by the size of the person riding. By special lever are arrangement the size of the wheel was in creased in some cases up to 7 or 8 feet in diameter. After various efforts at front-driven low or safety wheels came the modern safety, driven by the rear wheel. Solid India rubber tires were still in use, and various attempts were made, and with wore or less
success, to introduce springs into the frame, so as to moderate the jar incident to the inequalitits of the road, until the pneumatic tire was introduced. The modern bicycle is the result.
Two exhibitions of bicycles and accessories are to follow each other in rapid succession during the next two weeks-one in Chicago and one in New York. In February a third exhibition is to be held in Denver The Scientific American, realizing that compara tively little is known by the general public of the
methods of manufacture adopted in the modern bicycle factcry, and that many points in modern bicycle construction are but little understood, has determined to present its readers with the methods of construction and machinery used in the production of a first-class wheel.
The exhibitions alluded to above will show the present development of the machine, which, in conjunc tion with the electric railroad and the automobile carriage, is doing its nart to make the horse drawn ve hicle in great part a thing of the past. In them will be represented the latest modifications of this most in teresting mechanical achievement, which enables a man to increase his speed from four wiles an hour to twelve or fifteen--a machine in which the study of joints has received great attention and where the art of connecting steel members of a frame has been brought to the highest perfection-in which the subject of bearings has been worked up to consummat excellence so that a ball beavig wheel will travel any appreciable wear.
Merely as an example of the truss, a bicycle repre sents a veritable achievement, for its frame may be considered as a truss spanning a distance between the front and rear wheel axles, and in the case of quadruplet and quintuplex wheels the truss may bave to carry nearly a thousand pounds.
The most healthful sign of what cycling really means is its employment by business men, by the farmer and by government officials. The cycle is be ing used by the police of different cities, by the post men and by street inspectors. It is being used with the greatest success by the signal service department of the army, and cycle drills in the regular army wil soon be among the tactical evolutions in this country as they have long been abroad.
As an example of the practical use of the wheel in the regular army, Lieut. Hugh D. Wise's ride from Sackett's Harbor, N. Y., to Governor's Island, in the harbor of New York City, may be cited. Mounted on an $181 / 2$ pound racing wheel, and loaded with a pack representing the heavy marching order equipment o the regular army, the distance of about 400 wiles was made in 84 hours. The heat of the weather, the sandy roads, and the mountains traversed made the ride an unusually trying one, but six hours' sleep being ob tained during the entire trip. Considering the extreme lightness of the wheel, it stood the trying ordeal of the trip extremely well, and the light racing tires stood with but a few punctures until one gave out near the end of the trip. The riding speed was $123 / 4$ miles an hour. Lieut. Wise is in the regiment of the Ninth Infantry, U.S.A. Such service as that represented by this ride might be invaluable in time of war or riot. One of the bushings split and six hours were lost by the rider in making a new one at a common black smith shop on the road. The performance shows the efficiency of the wheel for $d$ spatch purposes
The great perfection of the bicycle depar
ball hearings, which eliminate sg.m
reduces so largely the rolling friction between the wheels and the road by its principle of recuperation of energy. To some slight extent these improvements have been introduced among horse-driven vehicles, but a curious moral is to be drawn from the fact that it is only when man became his own vehicle propeller that the utmost refinements in the abolishing of resistance were introduced. It still seems as if the lesson of the modern bicycle had not been fully appreciated by the carriage builder. Within little more than three years the ordinary road wheel has been re duced in weight from forty or forty-five pounds is wenty pounds or even less
Little further development in this line is to be, howver, looked for immediately. Probably the lowest limit of weight for ordinary use has now been reached, and the minor points of width of tread, length o wheel base and similar features of proportion have been pretty well $6 x e d$.
America has made the most wonderful progress in he development of the wheel, and her manufactur ers have been so alert and enterprising, competition so keen, and the public so critical, that the American wheel is to-day the most beautiful mechanism and the lightest and easiest running of any wheel manufac tured in any country. The most defective feature of the wheel is the tire, which is very perishable and which is ill calculated to withstand the severe exac ions of our bad country roads. It is believed, horv ever, that great improvement will be made in this line during the coming season.

## A RETROSPECT OF THE YEAR 1895.

The past year has been distinguished as much, un fortunately, by the loss of great leaders in the world of science and art as by the number and value of the discoveries and achievements that have marked it progress. A death roll which contains the names of uur own Professor Riley, United States Entomologist, and of James Dwight Dana, and on the other side of and of James Dwight Dana, and on the other side of
the water the names of Pasteur and of Thomas Henry the water the names of Pasteur and
Huxley, is a sad one to contemplate.
Engineering. - In this department the greatest event of the year was the opening of the North Sea and Bal tic Canal, which has a total length of $61_{1} \frac{3}{10}$ miles and cost $\$ 39,000,000$. About the same-time was opened the Harlem Canal to the north of New York City, which, though not remarkable for its size or cost, will have great commercial and strategic value, as uniting the East and North Rivers.
The Puget Sound and Lake Washington Canal connecting the waters of the Pacific with a large fresh water lake in the Northwestern State of Washington is progressing favorably. Of canals projected we note in the United States the Atlantic Coastwise Canal row Philadelphia to New York, the Cape Cod Canal and the canal from the Atlantic to the Great Lakes The projected Nicaragua Canal has been somewhat set back by the report of the commission of experts who have stated that the preliminary estimates wer too small. It will be a far more costly work than was at first supposed.
During the year the contract has been let for cutting the longest tunnel in the world-the Simplon Tunnel the longest tunnel in the world-the Simplon Tunnel,
through the Alps. It will be $121 / 4$ miles long, and will through the Alps. It will be $121 / 4$ miles long, and will
consist of two tunnels, spaced 56 feet apart, one for each line of rails. The contract price is $\$ 13,750,000$.
Other great works that have been steadily advanced during the year are the Chicago Drainage Canal, in Iilinois; the Peryar Dam, in India, which, when completed, will be 178 feet high, 1.300 feet long, and contain $5,000,000$ cubic feet of masonry ; and the great Siberian Railroad from Russia to the Pacific.
Transportation.-This year will ever be memorable or the great ad vance in railway speeds both in America and England. The remarkable long distance speed developed in the Lundon-Scotland race, in England was followed by a similar acceleration in America, of both of which we give the results:


There has been a steady increase in the weight and power of locomotives. The driving wheels are being made larger and steam pressures are increasing, 180 to 200 pounds to the square inch being common.
Electrical traction has received some very inportant applications, notably in the 96 ton electric locomotives of the Belt Lin:e Tunnel, Baltimore. These are doing excellent work, having on one occasion hauled a 2,000 ton train with facility and without any tendency to slipping of the wheels. Another important application of the system to a standard gage railway in this country has taken place on the N. Y., N H. and H. Ry., where a trial speed of 60 miles pe: hour has been obtained with a passenger train. In moance a 90 ton
electric locomotive, of the Heilman type, has been tested in experimental work.
Electric street traction has continued to grow in favor. In 1887 there were only 13 electric roads in the United States; to-day there are 850 roads with a tota mileage of 10,000 , representing an investment of $\$ 400$, 000000 . In this counection it is interesting to note that the possibilities of canal towage have been tested in both the old and new worlds; here in the form of a traveling motor, working separately from the boat and in France by the use of a motor upon the boat it self, hauling upon a chaia laid in the bed of the canal
Under the head of transportation the year will be celebrated as seeing the practical development of the horseless carriage, or motocycle. In the Paris-Bordeaux race over 60 vehicles started; and the first two prize winners covered the 360 miles at the respective rates of 15 and 14.9 miles per hour, many of the other contestants making excellent time. In the Chicago race the winner wade a speed of over 5 miles per hour through a course that was blocked with snowdrifts and mud-the results of a blizzard of the day pre vious.
The bicycle continues to enjoy an enormous and ever-increasing popularity. It has wou its way this year into the highest circles, and when indulged in with moderation it has received increasing medical in dorsement. This year has seen an extended use of wooden and aluminum rims, narrow treads, and larger bearings.
In naval and marine engineering, the year has shown that there is a continued tendency to increased size and speed in ships. In regard of speed a noteworthy performance was the U. S. steamer Columbia's transatlantic trip, at an average speed of 18, 4170 miles per hour. This is far besond anything on record for a warship on a run of that distance. In the merchant marine, the run of the Cunard steamship Lucania, from Queenstown to Liverpool, 240 knots in 10 hours, is the record performance of the year; and it is even more creditable than her transatlantic record of over 22 knots per hour for the whole trip. The Buenos Ayres, a cruiser built at Newcastle for the Argentine Republic, steamed $23 \frac{2}{10}$ knots on a six-hour trial There is noticeable a growing tendency to increase the power of the quick-fire secondary battery of war ships, and to decrease the weight of the heavier guns The enormous energy of quick-fire is shown in a com parison of the energy of fire per minute of the Buenos Ayres, a 4,500 ton cruiser, with that of the Royal Oak a 14,000 ton battleship. In the former case it is 304,844 foot tons, as against 292,830 foot tons in the larger boat.

In the United States Navy we have seen the launch of the Brooklyn, an improved New York. The Iowa which, in power of heavy gunattack, will be the most formidable warship in the world, is nearing comple tion; and this year sees the practical completion of that famous trio, the Oregon, Massachusetts and In diana.

A noteworthy event of the year was the speed at tained by the torpedo destroyer Sokol. In making $30 \frac{1}{4}$ knots, she was the first boat of any kind to pass the $30-\mathrm{knot}$ limit.
The status of the United States merchant marine has been greatly raised by the addition of those two splendid vessels, the St. Louis and St. Paul, of the American line. They are of American material "from truck to keelson," and are the equal, and, in accom modation, the superior, of anytbing afloat.
The naval battles of the Japanese war have verified existing theories as to guns and armor. The develop ment this year has been in the direction of higher ve locity of projectiles and lessened weight and caliber of guns. At Elswick, we are told, "a muzżle velocity of 4,800 foot seconds has been obtained with a charge of cordite." This is nearly double the highest velocity of recent years. In armor the United States has continued to lead the world ; and in other countries the develop ments have been along those lines of iuprovement first laid down by our manufacturers. The American system, which, briefly stated, presents intense hardness of face rather than thickness of metal to the shot, has up to this year succeeded in smashing the hardest shot that struck it. Reports now come from Russia of a successful perforation by a shot which is made on some secret system, which is supposed to consist in attaching a separate point, which is made of softer metal, to the head of the shot. Perhaps the most important event in the electrical world was the opening of the great Niagara Falls electric plant. Other successful plants for long distance electrical transmission of water power, that have been opened or enlarged this year, are those of Sacramento and Oregon City respectively in California and Oregon.
The Glasgow Hydraulic Power Supply, opened this year, is remarkable for the high pressure, 1,120 pounds to the square inch, at which it is operated.
The most important event in the field of chemistry was the discovery of a new constituent of the atmo sphere-argo:-by Professor Ramsay and Lord Rayleigh. The discovery of this element explains the dis-
crepancy which chemists have alrays found between
the density of nitrogen obtained from the atmospher and that obtained from chemical compounds. Atmo spheric nitrogen was always heavier by the amount of rgon that was present with it.
This year has seen the development, in useful commercial form, of acetylene, a brilliant illuminant which is obtained by the action of water upon calcium carbide. As compared with the other hydrocarbons, uethane and ethylene, the ratios of illuminating power are : methane $5{ }_{1}^{2}{ }^{2}$, ethylene 70 , acetylene 240 .
In photography we note that at the soiree of th Royal Society at Dublin this year, Dr. Joly, of Dublin, presented some photographs in color, which showed "the same fidelity of reproduction that char acterizes the camera."
The notable event in the medical world has been the successful treatment of diphtheria with antitox ine. This is one of those great triumphs of medicine whose benefit to mankind is beyond possible estimate Professor Roux announces 74 per cent of cures on 300 cases, and Professor Erlich 85 per cent on 163 cases.
The geographical world has welcomed home this year from Polar expeditions Lieutenant Peary, the Jackson-Harmsworth expedition and Professor Borch grevink. The efforts of the latter gentleman will probably result in the organization of an Antarctic xpedition.
The present disturbances in the Turkish empire and the gathering of the European fleets suggest a pos sible rearrangement of geographical maps in Eastern Europe at an early date.
The industrial world has to record in America the holding of the Atlanta Exposition, at Atlanta, Ga. and in Europe, the acceptance of the designs and the xecution of other preliminary arrangements for the World's Fair to be beld at Paris in the vear 1900. The Atranta Exposition will always possess special histori cal significance. It marks the coming of age, the ripen ing into the strength of full manhood, of what has ery aptly been termed "the New South."
The owinous war cloud which darkened the relation ship of the United States and England in the closing days of the year will be chiefly remarkable in history for the widespread expressions of mutual regard and goodwill which it immediately drew forth in profusion n both sides of the water, and for the equal abhor rence with which the possibility of what was aptly termed a fratricidal war was regarded by all classes o society in both countries.

## Henry J. Newton.

The accidental death of this old veteran, yet modern photographer, 72 years old, on December 23, 1895, we are sure will be regretted by his many friends and others interested in photography. While crossing Broadway from the east to the west side between 'wenty-third and Twenty-second Streets in this city, on Monday evening, December 23 , he accidentally fell in front of a Lexington A venue cable car which had just started, and before the car could be stopped he was crashed, and lived but five minutes.
Mr. Newton was born in Connecticut in 1823. He married and settled in New York in 1850. For the past thirty-five years he had lived in the For $\mathbf{y}$-third Street house. He was a member of the firm of Light, Bradbury \& Newton, manufacturers of pianos, and in his business and through judicious investment in real estate in the northern part of the city, he amassed a comfortable fortune. A number of years ago he re-
tired from active business and devoted himself to tired from active business and devoted himself to
amateur photography. He was president of the New-ton-Merritt Bronze Company, of Nyack, the business being conducted by his son.
He began the practice of photography soon after the introduction of the daguerreotype, and by research and experiments was able to suggest and introduce several useful improvements in photographic manipuation.
Having acquired the art of drawing and painting, and noticing the usefulness and adaptability of pho tography for obtaining details which it would be difficult to remember, he became infatuated with the new discovery and devoted himself earnestly to its improvement and perfection. He had his laboratory and skylight arranged on the top floor of his residence where he pursued his experiments. He recommended the use of nitrate of ammonia in the silver bath for the sensitizing of albumen paper, by which the need of prelim inary fuming with ammonia is avoided.
Abont 1876-77 he improved the collodion-bromide emulsion process and prepared an emulsion by which dry plates as sensitive as those by the wet plate pro cess could be made and used at any convenient time. He further suggested the use of the fixed alkalies such as carbonate of soda in developers in place of anmonia, and later, with the introduction of the gelatine dry plate process, advised the use of vellow prussiate of potash in the pyro developer, which gave the latter greater vigor and produced more brilliant negatives. He also recommended the single solution iodide of mercury intensification method for gelatine plates.
Since the introduction of the coal tar developers Since the introduction of the coal tar developers he
suggested certain modifications in their use for the
development of prints on bromide paper, advising particularly the addition of, to a metol and hydroquinone developer, barium hydrate as yielding velvety blaciz prints.
He made many beantiful photographs in Central Park, of the landscapes, sheep and other animals, and was also an expert in the development of instantaneously exposed plates.
He was idtntified with several photographic societies, and had been president of the photographic section of the American Institute for many years: also at one time he was vice-president of the Society of Amateur Photographers, of New York. Seldom has any amateur continued such a lively interest in photography as Mr. Newton 'did, and the photographic world has been much benefited by his investigations.
The funeral occurred on December 26, at the Church of the Divine Paternity, corner of Forty-fifth Street and Fifth Avenue, and was largely attended. Dr. Eaton and Dr. Collyer each paid eloquent tribute to Mr. Newton's memory.

Manufactured Iron and steel.
The event of the week, as reported in the Iron Age or December 26, was the opening of the new set of bids or the construction of the Appraisers' Stores in this city. The figures submitted are the following:

|  | Bessemer. | h. |
| :---: | :---: | :---: |
| Post \& McCord, New York |  | \$339,550.00 |
| Benj. Hyde, Cbicago. | 339,880.00 | 339,800.00 |
| Pennsylvania Steel Company | 341,313.00 | 345,591.00 |
| F. J. Hyers, Hamilton, Ohio | 344,400.00 | 366,400.00 |
| M. Giblin, New York | 352,220.00 | 356,220.00 |
| Edge Moor Bridge Company | 371,500.00 | 374,500.00 |
| C. A. Schneider's Sons, Washington D. C. $\qquad$ | 377,583.00 | 377,583.00 |
| Passaic Rolling Mill Company. | 385,953.00 | 385,953.00 |
| Youngstown Bridge Company..... | 405.987.00 | 408,734.00 |
| New Jerses Steel and Iron Company... | 406,600.00 | 406,600.00 |
| Berlin Iron Bridge Company. | 419,844.00 | 425,947.00 |
| Leach \& Son, Chicago. | 429,393.00 | 398,763.00 |

The lowest bid made some time since was $\$ 419,000$, but since then the plans have been modified, and where they formerly called for about 7,000 gross tons of material, the new plans, on which the above figures were made, required only about 6,000 net tons of material. It will be noted that quite a number of bidders quote exactly the same prices for Bessemer and for open hearth steel, while with a number of others the difference is only slight. We believe that this is the first conspicuous instance in which this has been brought out in the structural trade, the usual custom being to ask somewhat higher prices for open bearth. It is a somewhat striking commentary on the ability of the basic open hearth to come close to Bessemer in cost, on rigid specifications. We understand a Pfttsburg mill has taken the material. We quote for large lots on dock: Beams, 1.68 c . to 1.75 c .; angles, 1.55 c . to $1 \cdot 60 \mathrm{c}$.; universal mill plates, 160 c . to 165 c .; tees, 1.75 c . to $1.80 \%$; channels, $1 \cdot 70 \mathrm{c}$. to 1.80 c ; steel plates are 150 c . to 1.60 c . for tank, 1.65 c . to 1.75 c . for shell, 1.75 c . to $1 \cdot 90 \mathrm{c}$. for flange, $2 \cdot 10 \mathrm{c}$. to $2 \cdot 25 \mathrm{c}$. for fire box, and $2 \cdot 25 \mathrm{c}$. to $2 \cdot 50$ e. for locomotive fire box, on dock. Charcoal plates are $2 \cdot 25 \mathrm{c}$. for shell, $2 \cdot 75 \mathrm{c}$. for flange, and $1 / 2 \mathrm{c}$. advance for fire box quality. Refined bars are 1.35 c . to $1 \cdot 50$ c., and common are $1 \cdot 25 \mathrm{c}$. to 135 c ., on dock. Soft steel bars, $1 \cdot 30 \mathrm{c}$. to $1 \cdot 3 \mathrm{c} \mathrm{c}$.; steel hoop, $1 \cdot 60 \mathrm{c}$. to $1 \cdot 75 \mathrm{c}$. base. Steel axles, $1 \cdot 65 \mathrm{c}$. to $1 \cdot 80 \mathrm{c}$. scrap axles, $1 \cdot 70 \mathrm{c}$. to 180 c . ; links and pins, $1 \cdot 65 \mathrm{c}$. to 180 c . Best iron boiler rivets, 3 c . to $3 \cdot 25 \mathrm{c}$. delivered. Steel rivets, $2 \cdot 15 \mathrm{c}$. to $2 \cdot 25 \mathrm{c}$.

Cycle Notes.
There are no very marked improvements in the bicycles for 1896, with the exception of larger tubing and barrei hubs. To those accustomed to a small hub, he barrel hub looks clumsy, but it allows the use of arge
A tire stuck full of knives, tacks, etc., has been on exhibition in a Broadway store window, New York, for some time. This tire contains a layer of cork between the tubes. A cross section of the tire shows the cork to be crescent shape and one-third of an inch thick in the widest part. It is inclosed between two tubes of rubber, each of which is a seamless tube. The cork lining lies within the running surface of the tires, and if the outer tube is cut or torn, the inner air tube, being protected by the cork, remains good. It is said the practically puncture-proof quality does not seem to interfere with the resiliency of the tire.
The parcel carrier, which is a tricycle with a capacious carrier in the rear, is now a familiar sight in New York City. They are much more economical than delivery wagons.
French wheelmen have adopted a code of signals whistle. The whistle is much used in France in ference to the bell.
A bicyclist in England who killed a man by ing him down on the road was indicted slaughter, and is now serving a four months' of imprisonment at hard labor.
A New York expressman who ran dow woman was sentenced to nine months' im for reckless driving.

## THE TRIBUNE BICYCLE

Within the past three years, the American bicycle industry has grown up to dimensions which fairly entitle it to be considered representative of the country and of the day. Every day sees hundreds of wheels of high and low grade made in the factories of this country for the American and foreign market. Three years ago the English bicycle was considered by many the best wheel, and the possessor of such was apt to consider himself better equipped than his friend who rode one of American manufacture. Now, all is changed. A visitor to England or to the Continent, if a cycling enthusiast, cannot fail to be impressed by the superiority of American wheels as contrasted with the foreign ones, and no wheelman really au fait in his subject would dream of buying his wheel abroad, so superior is the American make. The industry has brought about an enor mous development in the manu facture of special tools and of parts of bicycles.

Many assumed bicycle manufac turers simply buy these parts and do their own assembling. But for the production of the absolutely high grade American bicycle, a factory is required which will turn out practically all the parts of the wheel manufactured, for unless such is done one concern cannot be answerable for the perfection of the whole machine
We select as the representative of such a factory the works of the Black Manufacturing Company, of Erie, Pa., a company which pro duce the highest grade of whee and which put it on the market purely on its merits without the
adventitious advertisement of paid riders. The wheel made by this company, the "Tribune Bicycle," embodies the best possible practice and is correspond ingly free from structural variations of unproved merit.

The tubing, whose walls are of 20 gage thickness, is of American make, the company having found that English tubing could not be obtained of sufficiently even quality. At the junctions of the tubes forged connections are employed. These are received in a solid state and are machined out, drilled and turned, until only a shell of the original material is left. Each connection has projecting nipples which enter the ends of the tubes, and the whole is so accurately made that when the ends of the tubes are placed over the nipples the frame will hold itself together without further fastening. The tubes are of uniform diameter throughout and are simply cut of proper length, so that their natural strength is unaffected. The most striking instance of the preis in the crank bracket. This is received as is in the crank bracket. This is received as a massive forging weighing 3 pounds $2 / 8$
ounces, in general shape a cylinder, with four ounces, in general shape a cylinder, with four
solid projections. This is put into the finish. ing machine and finished. It comes out with the solid cylinder drilled out so as to present a large aperture through which the crank shaft is to go, and its ends faced off and finished for the reception of the ball races. The four projecting umpples are drilled out and are also turned down on the outside so as to fit accurately the outside of the tubing. The bracket now weighs 8 ounces; all the rest has been converted into drill chips. One of the typical connections is that used for the head of the rear forks, which forging we specially illus trate, in order to show how solid a construction is given to this vital point.
The frame has now to be brazed together. The pieces are placed in a massive iron jig or template, adapted to receive them and retain them in position, and which holds horizontally the entire frame. This template is mathe matically accurate. While held therein, holes are drilled through the connections and tabe ends and pins are driven in, pinning all the parts together. When removed from the jig the frame is perfectly rigid. It now goes to
braziers, who, with the best quality of brass with large cas blowpipes, braze all the parts, quid spelter penetrating all the joints and running out around the pins. The frame oes to the filers, after the borax has been off it, who, with file and emery paper. go e connections and over the tubing, polishing removing every excrescence, which, it will be gives the frame an absolute hand finish over ace.
$s$ taper toward the end, and to produce this
taper cold swedging is employed. The swedging ma chine carries a heavy head like a lathe head or chuck which rotates in a horizontal axis, and within which are eight hammers, which by the action of the ma chine move in and out in radial directions. A piece o cold tubing pushed into the machine and fed up by hand is subjected to a multiplicity of blows and has it dianeter rapidly reduced, the workman being able to give it any desired taper. The metal thus tapered is lattened and bent to the proper curve to give one sid of the fork.
The cups and cones for the ball bearings are made on automatic turret lathes, the turret carrying in some cases as many as five tools. A bar of tool steel which may be 20 feet long is introduced into the machine and


VIEW OF EXTERIOR BUILDINGS-BLACE BICTCLE. MFG. CO.

The aim of the constructor of this typical American wheel has been to secure simplicity and produce an absolutely standard article. Its criterion is its quality pure and simple. There are, however, some noveltie ntroduced that are especially worthy of illustration One of these affects the crank and crank shaft mech anism, the crank being secured to the shaft in a new way. V-shaped teeth are formed upon the crank haft and upon the aperture in the pedal arm. This aperture in the pedal arm is split and provided with tightening screw. To attach the crank arm to the haft, it is thrust over the end of the shaft and the tightening screw is turned up, when it is secured a igidly as if all were one piece of metal. Those who have struggled with the old-fashioned cotter will rea ize the advantage of this crank, which is instantl released with two or three turns of

The handle bar is made adjust able by an arrangement of equa simplicity and efficiency. The socket in the head which receive it is threaded. On the center of the handle bar is brazed a sleeve threaded with the same pitch o screw. The socket is split and pro vided with a tightening screw The screw is loosened, the handl bar thrust through the socket and screwed into place. When at th desired angle the screw is tight ened and the whole becomes prac tically one piece of metal By re versing the handle bars, they can be used in up-turned or down turned position.
The sprocket wheels ought not to be spoken of as a novelty now. They are cut to the cycloidal or
which shape and cut off from it bearing after bearing which drop from it every few seconds without any at ention from the workman. A liberal supply of oil i kept in constant circulation through the machine, fall ing upon the cutting tools. The bearings thus finished are purposely left 0.005 of an inch too large. They are then screwed on a mandrel in a special lathe and the final finish is given by hand. They are then tem pered by secret process with sperm oil and polished, coming out with a beautiful straw color, equal in finish to any steel tools made.
The standurd finish of the machine is black enamel
 theoretically correct curve, which avoids all friction of the chain against the teeth. This has long been the pecialty of the Black Manufacturing Company, but ow the system has apread amons other comipanie and cyeloidal sprockets are characteristic of severa ther first-class wheels
We also illustrate the system of truing up the wheel Each wheel is mounted on a gaging frame, and the workman, by setting up and loosening the nipples brings the rim into an absolutely perfect plane. The steering arrangement of the tandem machine de serves attention. Sprockets are carried by the front and rear steering posts, and thes sprockets are connected by chains and rods so as to insure unity of steering action between the fron and rear handle bars.

Wood Preserving in Switzerland.
A simple, effective, and cheap way of preserving wood from de cay is practiced in Switzerland in the preparation of posts for the telegraph service A square tank, having a capacity of some 200 ca

ons, is supported at a height of 20 feet or 25 feet above the ground by means of a light skeleton tower built of wood. A pipe drops from the bottom of the tank to within 30 inches of the ground, where it is connected with a cluster of flexible branches, each end ing with a cap having an orifice in the center Each cap is clamped on to the larger end of a pole in such a manner that no liquid can escape from the pipe except by passing into the wood. The póles are arranged parallel with one another, sloping downward, and troughs run under both ends to catch drippings. When all is ready, a solution of sulphate of copper which has been prepared - in the tank, is allowed to descend the pipe. The pressure produced by the fall is sufficient to drive the solution, gradually, of course, right through the poles from end to end. When the operation is ended, and the posts dried, the whole of the fiber of the wood remains permeated with the preserving chemical.-Work.

011 of Cassia as a Refractive Medium.
Oil of cassia has a higher refractive index than cedar oil, and Dr. H. G. Piffard finds it brings objects examined in it into sharper contrast. In a paper read before the New York Academy of Medicine, he stated that he had worked with a sample having a refractive index of $1 \cdot 593$. Bacilli examined in this oil exhibited an unrivaled bril iance and sharpness of contour. The minuter details lso, such as fas distinctness impossible in cedar oil. The oil of cassia, like the oil of cloves, tends to abstract the color from like the oil of cloves, tends to abstract the color from
bacilli stained with some of the aniline dyes, a disbacilli stained with some of the aniline dyes, a dis-
advantage not shared by cedar oil, but it is stated advantage not shared by cedar oil, but it is stated that this does not take place with sufficient rapidity to interfere with the cliagnostic examination.

## Ice Caves of Japan.

A correspondent to the London Field gives the following account of a wonderful cave in Japan :
Some eight or nine miles from Shoji, in the woods, is the entrance to the great ice cave we had come so far to see, a natural circular depression or basin in the ground in the middle of the forest, some thirty yards across and about forty feet deep. At the foot of one of the sides is a dark opening in the lava, a few feet down which may be seen the top of a wooden ladder. This is about twenty feet long, and at the foot of it are a heap of blocks of lava, down which we scrambled for some thirty or forty feet more, till a floor of solid ice, more or less flat, was reached. Very careful progress along this had to be made to avoid slipping down and extinguishing the torches. For the first fifty yards frequent blocks of lavarise through the ice of the floor, while further on there is nothing but ice. The lava roof is sometimes thirty or forty feet above one's head, sometimes only four or five feet from the floor. The light of the torches glanced continually on icicles many feet long pendent from the roof. Presently we passed some large blocks of ice, which had been cut by the country people for sale at Kofu, some miles off. At nearly four hundred yards from the entrance about twenty wonderful ice stalagmites, from two to five feet in height, rose from the floor close to a lava wall forming apparently the end of the cave, to meeticicles hanging from the roof from which water at this time of the year continually drops on to them. The tops of these stalagmites form hollow bell-shaped cylinders, giving out a faint note like a gong when struck ; they are partly filled with the water which drips on to them from the icicles above. Soon by the side of them, on the left, a low arch in the lava on the level of the floor, about three feet high, may be seen. Down this is a strong current of air; there is a rapid descent for some thirty five feet, and thence the course of the cave has been followed for another two hundred yards or so, but owing to the strong current of air which constantly extinguishes the torches, and the smallness of the passage, which slopes down rapidly from the entrance, no detailed description of it can be given ; but undoubt edly the cave runs on for some distance, perhaps to another outlet, for the current of air is very strong at the extreme point to which any one has yet penetrated.
The ice has probably remained frozen in the cave from the winter months, the action of the higher summer temperature being insufficient to do more than affect the surface of the ice floor, form a few pools of water, and melt part of the ice stalactites and stalagmites. The temperature of the cave in summer seldom exceeds $35^{\circ}$ Fah., and that in the declivity or basin in the ground at the entrance some $10^{\circ}$ or $12^{\circ}$ higher ; on going up from the latter to the level of the ground in the wood, a rise of some $20^{\circ}$ on a warm day is at once experienced.

## The Argentine Cruise Buenos Aires.

The latest cruiser turned out by the Elswick firm for a foreign government has just made her trials and has made a speed which, if not altogether unprecedented, is most creditable to her designers, and must be satisfactory to her owners. The length between perpendiculars of this ship is 396 feet; her beaill 47 feet 2 inches; and normal draught 17 feet 7 inches; the displacement being rather over 4,500 tons. It has the usual pro tective deck and in general design resembles all the cruisers that have been turned out by this firm. The guns, carried in protective positions fore and aft, are two of the new 8 inch quick firers, while between these, in the open between these, in the open
battery, are ten other quick battery, are ten other quick
firers, four of them being 6 inches and the others $4 \cdot 7$. In addition, there are six-
teen three-pounders and eight one-pounder guns, with five tornedo discharge tubes. The machinery, supplied by Humphrys \& Tennant, consists of two pairs of inverted direct acting, compound engines, steam being supplied by four double-ended and four single-ended boilers. The power used on the run was $14,000 \mathrm{H}$. the steam pressure being about 15.5 pounds and the vacuum 28 to 29 inches. The speed attained was 23.2 vacuum 28 to 29 inches. Th
knots with natural draught.


RYAN'S IMPROVED MECHANISM FOR OPERATING DRAWBRIDGE GATES.
bridge engaging a pinion on a shaft which has at its other end a crank arm, a wrist pin on this crank arm engaging a rod pivotally connected with crank arms on the posts. This rod is made up of a number of parts, made endwise adjustable by turnbuckles, and has at its middle a loop or eye into which projects the wrist pin. The pinion shaft is carried by a pair of hangers, one of which permits partial movement to the end of the shaft carrying the pinion, enabling the latter to accommodate itself to changes in the vertica position of the end of the bridge, the end of the shaft being normally upheld by a coiled spring. A cam on the under side of the bridge also engages an anti-fric tion roller on a bracket embracing the pinion; whereby the latter and its connected parts are depressed, when necessary, to the proper position for engagement with the rack. Provision is also made for closing the gates as desired, when the bridge is closed and at rest.

## Where Pennies are Coined.

It is not generally known that all the minor coins of base metal, such as pennies and nickels, are made at the Philadelphia mint, and that nearly $100,000,000$ pen nies are coined here every year. This large number is occasioned by the fact that thousands of pennies are lost annually, and the government has some difficulty in maintaining a supply. The profit of the govern ment on their manufacture is large. The blanks for making them are purchased for $\$ 1$ a thousand from a Cincinnati firm that produces them by contract Blanks for nickels are obtained in the same way, eooting Uncle Sam only a cent and a half apiece
Gold is coined in Philadelphia and San Francisco. Not enough of it comes into the mint at New Orleans to make the coinage of it worth while. Gold pieces are the only coins of the United States which are worth their face value intrinsically. A double eagle contains $\$ 20$ worth of gold without counting the one-tenth par copper.

Extraordinary Railroad Into the Black Hills.
A remarkable piece of engineering is to be seen on what is known as the Spearfish branch of the great Burlington Railroad system in the Black Hills, over which a Chicago Record reporter recently traveled. This branch runs from the little town of Englewood, This branch runs from the little town of Englewood,
ten miles south of Deadwood, in a northwesterly diten miles south of Deadwood, in a northwesterly di-
rection, to the town of Spearfish, a distance of thirtyone miles. For a greater portion of the distance afte leaving Englewood the road is steep up-grade, the grade being at several points three and four feet to the hundred, finally reaching the very summit of the Black Hills, after passing around innumerable curves of so abrupt a nature that passengers are led to won der how the train can keep the track, and through numerous cut that, have been blasted out of the solid rock.
At one or two of the most dangerous places on this remarkable road safety switches are in use In descending the grade should the train get beyond contiol switches will switches will carry it around the points o mountains and up a stee grade, enabling the en gineer to regain control o the train. The road is ballasted with broken rock, not even a shovelfu of dirt being visible on the entire roadbed.
The cost of constructing the thirty-one miles of road was $\$ 1,750,000$. The engine in use are 100 ton engines but, owing to the stee grades, they are unable to haul more than three load ed ore cars.
At one point the road makes a curve of seve miles to reach the highe grade, and, if the track were on a level, the uppe one would be within few hundred feet of the lower track of the "loop." Notwithstanding the dangers attendant upon
of the gate is limited by an adjustable stop, in connection with a coiled spring, preventing injury to a peron who may be caught between the gates as they are closing. The sidewalk gates are yieldingly held by coiled springs attached to the post and engaging opposite sides of each gate.
In opening or closing the gates the posts are turned in opposite directions, each post being moved a quar
ter of a revolution by a toothed rack carried by the
railroading on this winding mountain road, but few ac cidents have occurred. At intervals trains are stopped or the purpose of testing the air brakes, and the ut most care is taken to prevent disasters. On the entir thirty-one miles of road there is not more than two or three hundred feet of continuous straight track.

The deepest artesian well is at Budapest. Depth 8,140 feet.

## bICYCLE FRAME IMPROVEMENTS.

The accompanying illustrations show the methods ased in putting together the sheet steel frame connec tions and the continuous crank shaft and cranks of the 1896 bicycle of the Barnes Cycle Company, Syracuse, N. Y. These frame connections are made by punching from a fine grade of drawing steel the necessary blanks, and forming them with special tools in press, so they will fit inside of one tube, going through a slot in the tube, the outer end to be formed so as to a slot in the tube, the outer end to be formed so as to
it in another tube which is milled out the proper form to butt up against the first tube. These connections have pointed continuations which act as reinforcings, stopping the vibration, and lessening the chance of broken frame tubes from this cause. Besides these connections there are other pieces formed up to fit in each half of the main connection so as to give a braz ing surface at the bottom, and one entire side also on the curved side, which, after being brazed up with the other pieces, form the strongest possible joint in use All of these connections are riveted together and riveted to the tubes before being brazed, and are put together in such a manner that they would hold, i necessary, without being brazed. This pattern of connection is used in both heads, seat pillar and bottom bracket connection, as shown in Figs.. 2 and 4. The ear fork connection also of this machine has an in ternal joint which is left smooth on the outside, and is made entirely of sheet steel formed and brazed as in one piece. The handle bar and seat post fastenings of this particular machine are made by reaming out the lower end with a taper reamer, and inserting a brass and taper nut, which, when drawn up by the long screw seen in the cuts, spreads the lower end of the tube, which is slotted, and holds it firmly in position. After a few seasons' use this has proved to be a most atisfactory method of fastening the handle bar and seat posts. In the lower end of the seat posts, the tube of which is lighter in gage than the handle bar post, a reinforcing tube is first brazed in, making the tube at that point of double thickness, this being reamed out with a taper reamer and not allowing any chance of spreading the seat pillar tube in the frame.
The saddle (Fig. 5) is held on the straight seat post by a hollow screw and clamp which holds the springs firmly on the upper end of the post, which is milled out the proper shape to fit the springs after the necessary reinforcings have been brazed in. The long, slim screw which tightens the brass nut at the lower end of the seat post passes through the hollow screw, which hoids the saddle in position on the post, both of these screws being operated by an ordinary monkey wrench, a flat spanner or a T-shaped socket wrench.
The crank shaft forging is nade of a high grade crucible steel in one piece, and the bearings are all of crucible steel, hardened, tempered and ground afterward, so they are perfectly aligned. The stop cone on the crank shaft (Fig. 3) is on right-hand thread, which is self-tightening against the sprocket when machine is running forward. The adjusting cone on the opposite end is slotted, and the washer has two small projections, as shown in the cut. engaging these slots, and, in connection with the projection on the inside of the washer, which fits a slot milled on the crank shaft prevents the cone from working tisht or loose, and keeps the bearings perfectly adjusted. One of these machines has been ridden for some time with the lock nut merely turned up with the fingers, which held it firm enough to not loosen, although the lock nut is intended to tighten up with a wrench per fectly solid
The bearings case are screwed in the bottom bracket, the right one having a right-hand thread, and the left one having a
left-hand thread, so they both remain screwed up tight and are not affected by the revolving motion of the bearings. These machines are made in several patterns, including the Special, the White Flyer, the Superba, the Racer and the White Flyer Tandems.

JAPAN is going to build up her commercial navy by iving subsidies to shipbuilders for evers ton above 1,000 , and to shipowners for all ships of 1,000 tons that can make ten knots an hour, the subsidy being increased for every 500 tons additional burden or every knot additional speed.


BICYCLE FRAME IMPROVEMENTS-HANDLE BAR, SEAT POST, CRANK AND SADDLE CONNECTIONS,
obtained with the 11 inch Draper telescope, although it was very low, faint, and near the sun. On this date, and on December 19, it was also seen by Mr. O. C. Wendell with the 15 inch equatorial as a star of about the eleventh magnitude. An examination with a prism showed that the spectrum was monochromatic, and closely resembled that of the adjacent nebula. Although the spectrum is unlike those of the new stars in Auriga, Norma, and Carina, yet this object is like them in other respects. All were very faint or invisible for several years preceding their first known appearance. They suddenly attained their full brightness and soon began to fade. Like the new stars in Cygnus, Auriga, and Norina, this star appears to have changed into a gaseous nebula. Harvard College Observatory Circular,

## New Submarine Boat

The Goubet resembles a whale in shape, being spindle shaped and measuring 26 feet in length and about 5 feet 6 inches in diameter in the middle, with a capacity of 10 tons. It is cast in three sections of gun metal, which are bolted together. The middle section is surmounted by a dome, also of gun metal, about 1 foot high, by which access is obtained to the interior. The hull is about 1 inch thick in the middle and about one-third of this only toward the ends, but this gives sufficient resistance to navigate atany depth in the English Channel. The boat is propelled by a screw, which also serves the purpose of a rudder, the shaft being jointed to enable of its being moved right or left. The horse power is extremely small (one or two), this, it is said, being sufficient under water, where there is no wave making, to give seven or eight knots. The motive power is supplied by an electrical battery. The boat may be rowed backward or forward by a pair of fin-like arrangements to the fore. When the boat is in harbor the dome emerges. When this is closed, and the boat sets out on the warpath, water is let into compartments in the lower part of the boat, which gradually sinks. The quantity of water is regulated by very ingenious automatic apparatus, and when the Goubet is sunk to any required depth, at that depth it remains, the screw propelling it in a horizontal plane.

## American Fruit Packages.

American fruit packages are becoming more and more popular in the Mediterranean trade. It is believed that the fruit producers of Italy will adopt the more modern fruit packages used in the United States. An importer of fruit, resident in New York, has recentIy visited Italy, and was present at a conference held by the ministry of agriculture of Italy, and he showed them the various boxes, crates, baskets, and the like which are used in the United States. The Italians hat never before seen such pa:kages, and their complaint was that they had neither the wood nor the machinery to manufacture them. The New York mer chant told them that, as the United States produces the shooks to make boxes for their oranges and lemons, it would be an easy matter for the same country to supply the same packages, at a nominal cost. If these are generally adopted, the United States lumber inter ests will be benefited. In any event, as the Italian fruit grower be comes acquainted with our modern appliances, he will either purchase the manufactured article in this country or will buy proper machinery and wood here to develop that indus try. At all events, it means an enlarged demand for hard wood fruit packages from the United States, either in the form of wood or the manufactured article. N. E. Lumberman.

## Aluminum Coffins.

Coffins are now mad of aluminum. Like the modern square buria casket, the aluminum coffin is made of uni form width, with square ends and verti
cod with a heavp mould cal sides and ends. It is finished with a heavy mould with pilasters at the corners, and has a rounded moulded top. It is provided with extension bar moulded top. It is provided with extension ba handles. The aluminum casket is not covered, but finished with the metal surface burnished. It is lined in the usual manner. The weight of a six foot alumi num coffin is 100 pounds. A six foot oak casket weigh aoout 190 nounds, and a cloth casket of the same siz with a metal lining about 175 pounds. Other me tallic caskets weirh from 450 to 500 pounds. Th cost of aluminum coffins is from $\$ 750$ to $\$ 1,000$.

## [Antionf's Bulletin.]

## Preparing silver Paper

We have for some time past felt the need of a good silver printing process suitable for intermittent work when silver printing may only be required at intervals of weeks or months. Albumenized paper, if kept in stock, is likely to be found spotted, when wanted, from the extreme damp of the rainy season; and, on the other hand, if the weather is at all dry, the prints curl up and are difficult to keep in good order unmounted. The varieties of gelatino chluride paper (P.O.P.) are very difficult to work in this steamy climate, the paper does not keep in good order, is expensive and not always obtainable when required.
We have latterly been using plain salted paper containing a good quantity of gelatine in the salting solution, but even with this it is very difficult to obtain bright prints except from very strong negatives, and the image was always more or less sunk and flat. Increasing the gelatine and adding a little chrome alum to harden it gave much better results, but it was difficult to prepare the paper with a good, even coating without a proper machine for the purpose.
I was very glad, therefore, to see in the British Journal of Photography for August 9 a paper, read by Mr. G. H. Moss before the South London Photographic Society, on "The Preparation of Plain Salted Silver Paper," and more so, on trying his formula, to find that it answered perfectly and practically solved the problem, so far as our work is concerned, and proved itself to be an effective, simple and inexpensive silver printing process, with many special advantages of its own. It is wore suited for thick paper than for thin, and the prints show a rich tone, with plenty of brilliancy and detail in the shadow.
The main peculiarity of Mr. Moss' process is, that no colloid material, such as gelatine, albumen or starch, enters into the preparation of the sensitive paper beyond that already contained in the sizing, the advantage of this being that the unstable compounds, which gelatine and albumen form with silver salts, are absent or only present in very small proportion.
The difficulty was to obtain vigor and keep the image on the surface without the colloid, and after many experiments he adopted the following formula for the salting solution :

Whe bichromate gives vigor to the image, and may be increased for very thin negatives and lessened for hard and dense ones.
Whatman's drawing paper, or Rives' paper, is soak ed in this solution for three to five minutes, and hung up to dry. If not required at once, the salted paper can be kept, aud is said to improve by keeping, no doubt by the action of the bichromate on the sizing of the paper.
Tl e salted paper is sensitized by floating for about t wo minutes on the following bath :

| Silver nitrate. | . 400 grains. |
| :---: | :---: |
| Citric acid. | 150 |
| Water. | 10 ounce |

After sensitizing, the surface will be a light primrose and care must be taken to avoid air bubbles.
The paper when dry is very serisitive, and should be printed rather deeper than desired. The toning can be done as for P.O.P., with a bath of about half the strength. We have found the borax bath in ordinary use answer well. The prints must be well washed after toning and then fixed in hypo solution, 1 to 10 of water, for about ten minutes for thin papers, or up to
twenty minutes for rough and heavy papers. After fixing, the prints should be well washed for two hours in constant changes of water.
The paper keeps well after sensitizing, and this is a further great advantage. The absence of colloid material or of any sulphur compounds, as in albumenized prints, tends largely to the permanence of the prints. With reasonable care in fixing and washing, and by using fairly pure papers for salting, the prints may be expected to resist outside influences for a considerable period, not so long, perhaps, as platinum or carbon prints, but certainly much longer than silver prints prepared with albumen or gelatine.
The process seems really a useful one, well worth
attention, especially of residents in warm climates.
Col. J. Waterhouse.

## Gold Beneath the Lava.

The great lava flow covers a section of country in Idaho four hundred uiles in length by forty to sixty miles in width. It lies in the southeastern part of the State, on and along the course of the Snake River, and mostly on the north side of that stream.
After flooding the great plain lying to the south ward, the lava turned and flowed backward to the north. There it flowed into the mouths of the valleys lying between the foot hills, filling all the streams tinat flowed out toward the south. The streams thus checked and dammed presently found passages bethirty to fifty miles, to reappear as large springs or to
burst forth in cascades and tumble down the walls of basalt that border Snake. River. On the line of the back flow, up toward the northern foot hills, lies the most ragged and forbidding portion of the great lava plain.
These lava flows covered rivers, creeks, canyons, valleys, and even basin regions fllled with low hills. Many of the streams, gulches, flats, and basins in the country surrounding the lava-covered section on all sides have been wonderfully rich in gold, wherefore it is reasonable to suppose that many of those covered by the lava are also rich in the same way.
The Snake or Shoshone forms the great center of the Idaho river system. It has a course of 850 miles within the State, and, with its branches, drains nearly the whole country. The Clearwater, the Salmon, the Weiser, the Fayette, the Boise, the Lemhi, the Owyhee, and other rivers, tributary to the Snake, were wonderfully rich in gold. The Yankee fork of the Salmon and many other creeks were exceedingly rich in the yellow metal. Rich placers were found in the streams that formed the Boise River in 1862; in the year following in the tributaries of the Owyhee and many other places. The valleys of the Weiser and Fayette, constituting what was known as the "Boise Basin," was one of the richest placer regions ever found.
What are called basins in Idaho are not bowl shaped depressions, as many suppose, but are sections of low country surrounded by large mountains. Within the basins are many hills and creeks. The Flor ence Basin was astonishingly rich and many others were little behind it as producers. Prior to 1868 these basins and other surface diggings in little flats and on gulches produced $\$ 45,000,000$. Up to 1873 , by which time wost of the famous placers had been worked, the yield from the surface diggings amounted to $\$ 75,000,000$. Then began the rich discoveries in quartz, but placer mining is still continued and occasionally rich finds are made.
From what has been said of the rich deposits of gold in the basins, valleys, gulches, flats and streams of Idaho, it is reasonoble to suppose that under the great lava flow covering an immense area-not less than 20,000 square miles-in the heart of the auriferous re gion, must lie many exceedingly rich deposits of gold.
The gold placers of both California and Idaho are countless ages older than the lava flows. In California the channels of the ancient rivers beneath the lava are much richer than those of the modern rivers and placers. This is because the channels of the ancient rivers had served as bedrock sluices for untold ages before the disturbing lava flows began. The present rivers of California received the greater part of their gold by their cutting across and carrying a way great sections of the rich channels of the ancient rivers.
-Dan De Quille, in the Engineering and Mining Jour.

## our Defenseless Condition.

Senator Cullom, speaking recently on the Monroe doctrine, said:
In this connection I desire to call the attention of the Senate to a conversation which I see quoted here as having taken place in China between Mr. Curtis, a very able correspondent, and Mr. Li Hung Chang the Chinese Viceroy. Speaking to Mr. Curtis about this government, Li Hung Chang said:
"Your government and your people are very unwise they are not thinking of such things."
Referring to our naked condition of preparation for "P.
Particularly since the events that have occurred in China during the last year. The Japanese are a very aggressive people. They are a warlike people. They like to fight, and they are proud and arrogant. They do not care for the United States, except as a market for their silk and tea, and if your government ever in-
terferes with their plans, either at home or in the Sandwich Islands, you will find that their friendship is only a pretense they keep up to encourage your trade. If President Cleveland had responded to my appeal for intervention during the late war, Japan would have sent her army and her ships from our harbors over to your country and would have taken possession of you Pacific States."
Mr. Curtis says he tried to explain the situation to Li Hung Chang, but "the Viceroy sneered in a con temptuous manner," and said :
"Japan has an army of over 200.000 soldiers and the best guns in the world."
I suppose he realized that from China's experience in the late war.
"She has a larger and better fleet of war ships than the United States. She has ten times as many torpedo boats as your government. and her sailors know how to use them, while yours do not. You have only five ships on the Pacific coast, with a coast line of
3.000 miles to protect, and several populous and wealthy cities with no defenses whatever. You have no forts at San Francisco that could keep out the weakest gunboat in the navy of Japan, and a single ship of the Japanese navy could destroy every city on Puget Sound without the slightest difficulty in a week."

## Sorrespondence

## The Duryea Motor.

To the Editor of the Scientific American
In your issue of December 14 you state that of the four gasoline wagons in the Chicago contest, "The Duryea, the Benz-Mueller, and the De la Vergne wagons used modified Benz motors." This is an error in that the Masy wagon should have been reported as using a Benz motor, instead of the Duryea.
The Duryea wagon uses a motor of new and light design, and, like the wagon, thoroughly American. design, and, like the wagon, thoroughly American.
The Benz motor is a single cylinder, with a heavy fly wheel, and is supplied with gas from a carbureter
The Duryea motor is a double cylinder, with bal anced pistons, light fly wheel, and no carbureter at all. It was designed especially for the purpose, after several years of experimenting with wagon motors and is not in any sense a copy of or an improvement on any foreign motor.

Chas. E. Duriea.
Peoria, Ill., December 19, 1895.
Weather Hureau Reports on Envelopes.
We received a newspaper clippling from a Buffalo (N. Y.) correspondent advocating the use of the Post Office for disseminating Weather Bureau intelligence. We referred the matter to the Weather Bureau, and received the following reply
Scientific American, New York City :
Sirs: In reply to your communication of the 16 th instant, inclosing newspaper clipping and letter from your correspondent at Buffalo, relative to stamping weather forecasts on letters, I have the honor to inform you that the proposition is not to utilize the cancellation stamp, but the "back" stamp. The idea was suggested at the Convention of State Weather Service Directors held in Indianapolis, October 16-17, 1895, by Mr. Frank P. Chaffee, Local Forecast Official, Montgomery, Ala. As the plan was regarded with favor, efforts have been made to give it a practical trial. Should the tests which are now being made in a limited way result satisfactorily, it is possible that the plan may be put into general use. Very respectfully,

Willis L. Moore,
Chief of Weather Bureau,
United States Department of Agriculture.
The Bridge of an ocean Lincr.
Let us spend an hour with Captain Randle, of the American liner St. Louis, on the bridge in midocean. He first takes us into the wheel house. It is a room about ten feet long and ten feet wide, with a curved front. A wheel about three feet in diameter is placed in the center of the room, and you are surprised to see that the quartermaster keeps turning it almost con stantly. You have always thought that he had sim ply to keep his eye on the floating compass in the box directly in front of him and hold the ship steady in her course. As you look at the compass you see the ship veering now this way and now that as she rolls and plunges, or as one screw turns faster than the other, and thus pulls the ship around. It is bard to make two independent screws go at exactly the same speed, and so this man at the wheel is busy all the time turning the ship straight. He has to fight the waves and the screws and the winds at the same time and he is a busy man.
This steering wheel controls the ship by means of a small column of oil in a little tube. By turning the wheel this way or that the oil in the tube is forced up or down, and that opens or closes certain valves in the team steering gear four hundred feet away, and the udder is turned as easily as if a child had done it. In oost steamships the steam steering gear is controlled by hydraulic power-that is, by water-but the use of a column of oil is an improvement.
As you look about, you see fastened to the cornice, directiy in front of the wheel man, a little scale in black with white lines marked off on it. There is a dial on it, and as the ship rolls you see that this is a device to mark the degree of a roll. You may notice that it takes about a second for every degree of a roll. On each side of the room is another long black gage, and the dials point to certain figures, generally between ninety and ninety-five. These dials are little electrical devices, showing exactly how many revolutions the screws are making. The captain, at a glance, knows what is going on in the engine rooms.
Over in the corner of the room is another curious electrical device. It is a little box with a clock in it. The captain tells you it is the machine that controls the whistle in time of for. The law requires a long blast of the whistle at such times every two minutes. By pressing in a button on this little clock apparatus, and by setting the clock in a certain manner, the whistle is blown automatically for seven seconds every minute. There can be no error of man in that work. Just as sure as every minute comes around that whistle will blow seven seconds. Under the old way, when a man pulled the whistle cord, there was no exactness in the work. When the fog is over the button is released and the whistle stops.-Harper's Round Table.

## CETYLENE APPARATUS

## by T. OCONOR BLOANE, ph.d.

A very simple apparatus for the production of acety lene gas, which, if the proper proportions are preserved, will work automatically for many hours, is illustrated in the cut which accompanies this article. The general requirements for a successful acetylene gas apparatus make a gas holder of some kind almost a necessity. The varying level water pressure apparatus which we show in our issues of March 30, 1895, and December 7, 1895, are unsatisfactory, except as regards their simplicity of construction. In apparatus of their type, when the calcium carbide is to be replenished, complete cessation of the gas delivery is required; and after the replenishing has been effected some little time is required to get the apparatus into working order again. From considerations of safety it is also in accordance with good practice that the apparatus shall automatically remove the water from the carbide when the evolution is too rapid.
In the apparatus shown, the gas holder, of about onehalf cubic foot capacity, is arranged for the storage of the gas. and with this gas holder is connected the evolution pipe and the apparatus in which the gas is produced. An excellent gas holder can be made, as was the one shown, out of two biscuit boxes, one inverted within the other A single pipe passing through the bottom of the outer vessel is cárried up to its top, and from this pipe the inlet and outlet pipes branch off below the bottom of the tank. The gas holder proper floats like an inverted bell on the water contained in the tank. All this part of the construction is the regular gas holder construction as used by gas engineers. From the center of the gas holder bel a cord is carried upward, pass ing over two pulleys on a simple frame and then hanging down, and from its outer end depends a water vessel. This may be weighted, if necessary, to act as a counterpoise, but its object is primarily to supply the element of safety in providing means for automatically removing water from the carbide.
The evolution apparatus consists of a wide mouthed bottle with tightly fitting cork. Through an aperture in the center of the cork a tightly fitting rod passes which carries at its lower end a basket of wire gauze In this basket the carbide is placed. A second tube passing placed. A second tube passing tightly through another aper ture in the cork leads to the gas holder. If this bottle is half filled with water and the basket is lowered until the carbide touches the water, the gas will at once be evolved with astonishing rapidity and the gas holder will rise. As it reaches approximately the proper height, the wire could be drawn up by hand and the evolution stopped, but to avoid this necessity a connec tion is made between the vesse suspended from the string of the gas holder bell and the evolution bottle. A hole is drilled through the glass of the bottle about half way up the side and tube does not make a watertight joint a glass tube can be forced through the rubber one to compress it against the glass of the bottle. From this aperture a rubber tube leads to a nipple in the bottom of the suspended vessel. The effect of this is that as the holder rises the suspended vessel descends and presently begins to receive water from the evolution bottle, so that as the bolder reaches its upper limits an inch or more depth of water will be withdrawn, leaving the carbide of calcium above the surface.
The mode of operation is obvious. The bell of the gas holder is placed at its lowest position, the carbide basket is charged with some lumps of carbide, the cork is placed in the bottle and the wire is forced down by hand until the bottom of the basket is a quarter or half an inch beneath the surface of the water. The gas rapidly evolves and the holder rises. If the evolution is too rapid, the basket may be raised In a few minutes the holder is full and the suspended vessel contains perharis half the water. Now the bas ket is lowered until its bottom is about at the wate level or perbaps a shade lower. If the holder descends, more water runs into the evolution bottle and gas is produced; if the holder rises, the water leaves the
carbide, thus antomatically causing the evolution to cease. . An approximately constant level of gas holder is thus maintained with an almost exactly constant

If it is necessary to replenish the carbide basket, all that is necessary is to close, by means of the spring wire pinch cock, the communication between the gas holder and evolution bottle. If the gas is being burned, this does not interfere with its delivery. After the new material has been introduced the basket can be replaced, and lowered, and all will go on as before. As considerable calcium hydrate accumulates, the water connection is made well up the side of the evolution bottle, to keep the solid material out of the India rubber tube. The bottle may be cleaned out from time to time by shutting off the two spring cocks if necessary, or at any rate the one on the gas evolution tube, leaving the operator free to uncork and to wash out the evolution apparatus. It is well also to give the carbide basket a thorough cleaning between the additions of the carbide.

The Virtue or Grapes, Oranges, and Pumel
Very few people are aware of the medicinal qua


HOME MADE ACETYLENE GAS PLANT.

Embossing Dies Made by Photography.
The writer devised in October, 1881, the following method of etching brass embossing dies, which is now for the first time published. The trouble in photo-en graving brass dies for embossing book covers and other purposes is that the mordant used is so strong, and the depth required so great, that there is difficulty in getting a coating on the relief portions of the die that will protect them absolutely from the attacks of the acid mordant.
Further, the etching is an intaglio one instead of relief. That is, the black lines of the design are sunk in the brass plate, instead of being left in relief as in ordinary photo-engraving. Therefore the process described here can be applied to etching on glass, steel or any other surface wherein an intaglio result is required.
We will suppose that the designer has made his drawing as usual in pen and ink for reduction. An ordinary photo engraver's negative is made of this drawing in reverse. The brass is first cleaned with a strong solution of potash and then surface-finished with willow charcoal, as in preparing zinc. After wash ing well under the tap, flow the brass with the follow ing solution: Well-beaten egg albumen, 1 ounce; powdered bichromate of ammonium, 25 grains; aqua ammonia, 5 drops; water, 8 ounces This solution should be poured on one coruer and be allowed to flow off the diagonally opposite corner, and this operation re peated until the solution has drained from each of the fou corners. The plate is then dried in a dark room with a gentle heat, while in an almost vertica position.
The brass plate is now sensi tive to light and should be exposed under the negative for one minute in sunlight or thre or five minutes in the shade After which it is taken to the dark room, heated slightly, jus to remove the chill, and inked evenly and lightly with a glue or leather roller and any kind o printing ink. This last is said intentionally, for the ink is no to become part of the acid-resist
ing coating as in other processes
After the brass plate is inked it is laid for a minute in a tray of clean cold water, and the inked surface rubbed over wit a tuft of absorbent cotton. It will found that the ink readily leaves all portions of the bras except where the light has acted through the negative. When the plate has been lightly rubbed over its entire surface with the cotton, the design should show as a positive in black lines of ink with the bared brass as a background. Th plate is now dried
It might be said here that, in the finished dye, the design now in black ink, must be sunk in the plate, and the problem before us is how to cover the uncovered brass with a coating impervious to acid, and remove the ink design so that the meta underneath it may be attacked by the acid
This is how it is accomplished
ties of grapes; but these they possess. The pulp is utritious and the juice contains sugar, tannic acid itartrate of potassium, tartra
Without doubt the woman. of eating a great deal of fruit is the gainer of health and appearance
The grape fruit, or shaddock, so called from its dis coverer, Lieutenant Sharldock, or to mention its sof $t$ Chinese name, pumelo, is highly prized by those who live in malarial localities. It is a charming rival to quinine and boneset, and is driving them from the field. She who eats her grape fruit with a spoon from the natural cup, or relishes it served as a salad may gladden her heart with the reflection that she is not only pleasing her palate, but benefiting her health. Like oranges and lemons, the grape fruit has great medicinal virtues. If you are of a bilious tem perament, says a writer in the Washington Times, eat grape fruit: if fevers threaten, eat grape fruit, but in this latter case, adds the writer, do so only at the advice of a physician, as there may be certain tendencies which the grape fruit would only aggravate. The omplaint is often made that this fruit is extremely bitter and unpleasant. It is only the white inner rin which is so, and this should be carefully removed.
of dragon's blood powder is firs made and filtered through cotton. This is fiowed on the brass plate containing the inked design and tho roughly dried. Then it is flowed, while in a horizonta position, with spirits of turpentine. This penetrates the dragon's blood coating, so that with a tuft of cot ton the ink design can be washed away, leaving a negative image on the brass, which is now ready for tching with nitric or chromic acid, chloride of iron or the other mordants in use. When the "biting" has proceeded to a sufficient depth, the plate can be rolled up with a strong etching ink and dusted with resin as usual.
All etchers will appreciate the value of this process, which enables them to make a relief, or positive, plate from a positive on paper or glass, and a negative, or zunken, design from a negative.-Anthony's Bulletin

## New Variable Star

A variable star recently discovered by Mr. Chandler presents some very remarkable features (Astronomi cal Journal, No. 358). In the singularly short period of $5 \mathrm{~h} .31 \cdot 15 \mathrm{~m}$., the magnitude of the star varies between 8.9 and 9.7 , so that three or four of the principal phases may be observed in a single night.

THE UNITED sTATES BATTLE SHIP IOWA.
One of the new battle ships now being constructed at the Cramps' ship yards, the Iowa, is represented in the accompanying illustration. She is one of the most formidable of our war vessels now in course of construction, and the tests of the heavy Harveyized nickel-steel armor with which she will be plated were described and illustrated in the Scientific American of November 9 .
The first keel plate of the Iowa was laid August 5,1893 , and it gives one some idea of the great amount of labor required to build such a vessel when it is esti mated by the Bureau of Steam Engineering that she will not be ready for final delivery to the government until about July, 1897. It is expected that the Iowa will be launched in February or March.
The Iowa was designed by the Navy Department to meet the requirements of the naval appropriation bil of July 19, 1892, and her cost was not to exceed $\$ 4,000$, 000. The dimensions are as follows

break up before entering the vessel. On top of the 14inch armor a horizontal deck $23 / 4$ inches thick is worked, and from the ends of the side armor to the extremities of the vessel a similar deck 3 inches in thickness is provided. Above the armor decks, belts f cellulose to prevent the inrush of water in the event of the vessel being injured are provided. The hull is built on the cellular system, with inner bottom, and great attention has been given to the subdivision of the vessel into a large number of watertight cowpart ments, each provided with its own means of pumping and draining. The machinery and boilers are arranged in six watertight compartments. The engines are of 1,000 horse power, of the inverted, direct-acting, triple expansion type, driving twin screws.
The smoke pipes are in height 100 feet above the grate bars, and the performance of the boilers unde natural draught is expected to be a great improve ment over boilers in existing naval vessels.
The ventilation and incandescent lighting plants of the vessel have been especially studied, in order to in sure comfort and health to all on board.
Electric search lights of great power are provided capable of lighting up a zone about the vessel through which no torpedo vessel can pass unnoticed, and the machine guns are so disposed as to bear upon all por-
to give cocaine again to make sure of his speed. Th action of cocaine grows more transient as the use in reases, and when a long period of scoring follows before the race begins, drivers give a second dose secretly while in the saddle. Sometimes the horse be comes delirious and unmanageable, and leaves the track in a wild frenzy, often killing the driver, or he drops dead on the track from the cocaine, although the cause is uuknown to any but the owner and driver. Some horses have been given as high as twenty grains at a time, but this is dangerous and only given to worn-out animals, who may by this means win a race. It appears that cocaine is only used in running races, and as a temporary stimulant for the time. It is claimed that the flashing eyes and trem bling excitement of the horse is strong evidence of the use of cocaine. - Quarterly Journal of Inebriety.

## The Advantage of Being a Blacksmith.

Among the seven trades which a student in mechani cal engineering must learn at Cornell is that of the blacksmith. Occasionally therc is a protest, but it is never heeded. One dude ten years ago was unusually averse 'to soiling his hands. But he had to work at the forge just the same. Last fall be went to Profes sor Morris and thanked him for being compelled to


THE UNITED STATES BATTLE SHIP IOWA.

The main battery consists of four 12 -inch breechloading rifles and eight 8 -inch breechloading rifles mounted in turrets. The 12 -inch gun turrets are armored with solid Harveyized nickel-steel plates of 15 inches thickness. and the 8 -inch guns are protected by armor of 8 and $51 / 2$ inches in thickness. All this armor is treated by the Harvey process, which gives the plates a casehardened surface, gradually shading off to a soft back.

The secondary battery is made up of six 4 -inch rapid-fire breechloading rifles. These rifles throw a rapid-fire breechloading rifes. being fires ten times per minute. These guns are protected with light armor against machine gun fire, and are disposed so as to have as great a range of fire as possible. The auxiliary battery consists of twenty 6-pounder and nine 1-pounder machine guns, with six torpedo tubes.
The protection to the hull and machinery is afforded by a steel belt of 14 inches maximum thickness, covering over seventy per cent of the load line. This belt extends from 4 feet 6 inches below the load line to 3 feet above it. Above this belt to the main deck bevel between the 12 -inch gun turrets, a belt of 4 -inch armor is worked to cause shell loaded with high explosives to
tions of this zone; and should a craft by any means learn blacksmithing. "Why ?" asked the professor. get through this area of light and gun fire, stout torpedo nets reaching from water line to keel are ready to receive the torpedoes discharged.

## Use of Cocaine on the Race Track,

Within a recent period cocaine has come into use on the race track, as a stimulant. Horses that are worn and exhausted, or are uncertain as to speed and endurance, are given ten to fifteen grains of cocaine by the needle under the skin at the time of starting, or a few moments before.
The effects are very prominent, and a veritable mus cular deliriuin follows, in which the horse displays un usual speed, and often unexpectedly wins the race. This agitation continues, and the driver has difficulty in "slowing down" the horse after the race is over not unfrequently the borse will go half round again before he can be stopped. The exhaustion which fol ows is not marked, except in the great thirst and loss of appetite. Sometimes diarrhea and trembling fol low. But good grooms give unusual attention to rub bing and bathing the legs in hot water and stimulants. The general effect on the horse is depression from which he soon recovers, but it is found essentia
"Why, you see," replied the former dude, "I am now superintendent of a uine a way back in Colorado. 8 Last summer our main shaft broke, and there was no one in the mine but myself could weld it. I didn't like the job, but I took off wy coat and welded that shaft. It wasn't a pretty job, but she's running now. If I couldn't have done it, I'd have had to pack that shaft on mule back and send it 300 miles over the mountains to be fixed, and the mine would have shut down till it got back. My ability to mend that shaft raised me in the eyes of every man in the mine, and the bos raised my salary.'

Water Vapor in the Atinosphere of Mars.
When Professor W. W. Campbell, not long ago, re ported that he found no water vapor in the atmosphere of Mars, by careful study, by the aid of the spectro scope at Lick Observatory, astronomers were generally surprised, because that matter was supposed to be settled quite conclusively. Now it turns out that M Janssen has recently informed the French Acaremy of Sciences that he has determined the existence of water vapor in the planet Mars by means of the spectro scope.

## THE WHITE ELEPHANT KEDAB

White elephants have for many years been an object of veneration in Burma and Siam. The fortunate individual who found a white elephant in his possession sold it to the king of one of those countries, obtaining therefor, it is said, certain titles to nobility, exemption from taxation and from capital punishment and a sum of money determined, it is said, in some cases, as the amount of silver coin which be could push along a smooth surface with his little finger. The largest sum ever obtained, it is said, was won by a Chinaman, who assid uously practiced pushing weights, strengthening his hand so as to be able to push along the largest amount of silver possible. Some years ago a partially white elephant was in the Barnum \& Bailey show, which animal perished in the Bridgeport fire. There has been recently imported into this city, by the firm of De Silva \& Gaylord, a perfect example of the white elephant, an il lustration of which we present to our readers.
The sacred beast is recognized by certain signs. In addition to the light color of his skin, he was required to have five white hoofs on each foot, he had to show a pink color about the ears, and the hair about the lip was required to be light in color, and the tail to have no tuft of hair upon its end. All these characteristics are shown by the example we illustrate, from a photograph taken by our artist in this city.

The animal was caught wild near Palembang, in Southeastern Sumatra, on June 17, 1895, and is supposed to be about eighteen months old. Its height is three reet niue inches and it weighs about five hundred pounds. The little creature is perfectly do cile and content in its captivity and allows itself to be fondled and played with at liberty. It has been named Kedah. In Sumatra the value of the white elephant is not gen erally known, and the cap tors of this animal wer not aware that they could have sold it to the King of Siam. Had it been found by those having knowledge of this fact, it would probably neve have left the East It is rally the only really the only elephan white tove to this country. Europe has never possessed one o any kind.
White elephants are now only to be seen within the inclosure of the King's palace at Bangkok. Siam There are four there now which animals, owing to the peculiar religious tenets of the Buddhists faith, are absolutely unpurchasable. The doc trine of the transmigration of souls teaches that these aninals are inhabited by the souls of Siamese kings.

The white elephant which was with the Baraum \& Bailey show was procured with great difficulty by Mr. Gaylord, in Burma. The present animal of the Sumatran variety, an absolutely perfect example of the elephant albino, is one of the most interesting and curious zoological specimens ever brought to this country. The color is a very light gray, and the skin is peculiarly soft and delicate. About the end of the trunk and about the ears it runs into a light pink tint, and the hoofs are a beautiful cream white. The animal is a male, and is expected to attain a height oi seven to eight feet
Its importer, Mr. J. B. Gaylord, has spent many years in collecting animals for exhibition, having in the course of his experience gone twenty-two times around the globe. He brought Kedah howe by sea through the Suez Canal, the journey taking fifty days Kedah arrived rather thin and worn after its trip, but is now in prime condition and bids fair to attain a good old age.

## Good Advice to Young Women

In a recent sermon to young wowen, the Rev. Dr Taimage made the following sensible remarks
"Make it a matter of religion to take care of your physical health. I do not wonder that the Greeks deified health and hailed Hygeia as a goddess. I rejoice that there have been so many modes of maintaining and restoring young womanly health invented in our time. They may have been known a long time back, but they have been popularized in our day-
lawn tennis, croquet and golf, and the bicycle. It always seemed strange and inscrutable that our human race should be so slow of locomotion, when creature of less importance have powers of velocity, wing of bird or foot of antelope, leaving us far behind, and while it peems so important that we be in many places in a short while, we were weighed down with incapa cities, and most men if they run a mile are erhausted or dead from exhaustion. It was left until the last decade of the nineteenth century to give the speed which we see whirling through all our cities and along the country roads, and with that speed comes health. The women of the next decade will be health ier than at any time since the world was created while the invalidism which has so often characterized womanhood will pass over to manhood, which, by its posture on the wheel, is coming to curved spine and cramped chest, and a deformity from which another fifty years will not have power to make rescue. Young man, sit up straight when you ride. Darwin says the human race is descended from the monkey, but the bicycle will turn a hundred thousand men of the present generation in physical condition from man to moukey. For good womanhood, I thank God that this mode of recreation has been invented. Use it wisely, modestly, Christianly. No good woman needs to be told what attire is proper and what behavior is right. If anything be doubtful, reject it. A hoydenish, boisterous, masculine woman is the detestation o all, and every revolution of the wheel she rides is toward depreciation and downfall. Take care of rour
nillione for Chicago University.
Chicago University was on December 14 the recipient of another million dollar gift, the donor being Miss Helen Culver, of Chicago. The conditions of the gift are that it shall be devoted to the increase and sprea of knowledge within the field of biological science.
It is provided that the donation shall develop the work now represented in the several biological depart ments of the university by the extension of their re ources; that it shall be applied in part to an inand experimental station and to a marine biological labor atory, and that a portion of the instruction supported by the gift shall take the form of university extension ectures to be delivered at suitable points on the west side of Chicago, the lectures to be as free from technicalities as possible and the results of biological re earch. Especial attention is to be devoted to the adances of science in sanitation and hygiene.
One-half of the sum given may be used for the pur pose of purchasing land and for the erection and quipment of buildings. The remainder is to be inested, the income therefrom constituting a fund for the support of research, instruction and publication. According to the terms of Mr. Rockefeller's recen offer, he will also now add another million dollars to his former generous gifts.

## Prevention of Influenza

Dr. C. Graeser, of the German Hospital at Naples points out* that the timely and continuous adminis tration of quinine during influenza epidemics may undoubtedly prevent infection, and cites in sup port of this opinion-in holding which he does not


THE WHITE ELEPHANT KEDAH
rash which makes up ninety-nine out of one hundred novels, or by eating too many cornucopias of confec ionery. Take care of vour eyes by not reading at ours when you ought to be sleeping. Take care of your ears by stopping them against the tides of gossip hat surge through every neighborhood
'Health! Only those know its value who hav ost it. The earth is girdled with pain, and a vast proportion of it is the price paid for early recklessnes close this, though, with the salutation in Macbeth

Now good digestion wait on appetite, And health on both.'"

## New Material for Spools.

Apropos of an article in a recent issue of the Scien ific American in regard to the thread spool indus ry, Mr. T. E. Keunedy, of Centerville, Louisiana writes that there is a wood growing plentifully in that State which is peculiarly adapted to the manufac ure of spools. The wood is known as tupelo gum It does not split or check; it is light and a very fine uniform grain. It is not adapted to uses where it is to be made into objects of any size, as it is liable to warp. It will not readily burn, and is not durable when exposed to the elements.

In our article describing the Lovell adjustable handle bar, in the Scientific American of December 28, Fig. 2 of the illustrations, representing the bar No. 5. The latter in reality is an enlarged view of Fig. 2 and shows the mode of adjustment.
stand alone - his experi ences with regard to a re giment of huzzars station ed at Bonn during the epidemic wavc of $1889-90$ Hc has previously pub lished these facts, but again refers to them in consequence of an article which appeared this year in Paris medical jour nal, stating that experi ments on rabbits showed quinine to be inactiv against the infection of influenza. His facts ar simply these: that for period of twenty-two days he administered to each man of one of the squad rons of the regiment 0.5 gramme - i. e., about grains-of quinine hydro chlorate, and that the numbers attacked by in fluenza in this squadron were far smaller than thos who succumbed in each of the other squadrons even in those occupyin the same quarters Thu during this period there were attacked in the first squadron twenty-two men, in the second seven, in the third nineteen, in the fourth forty-two, and in the fifth thirty-two. Now it was the second squadron that underwent the quinine treatment, and of the seven men attacked three fell ill on the first day of the trial, two on the third day, and one on the fourth and fifth days respectively. After that no cases arose in this quadron, although fresh attacks continued to occur in other detachments. Dr. Graeser is persuaded that this experimentum crucis justifies the conclusion that quinine has a specific action in influenza, and that when administered at the appropriate time and in sufficient dose it may prevent an attack in a person exposed to infection. Such an experience, he holds, is of more weight than any experimental results in animals.

## atomic Weight of Helium

By heating in a hard glass tube a mixture of manganese carbonate, pulverized cleveite, and potassium pyrosulphate, and passing the resulting gas over hot copper oxide, phosphorus pentoxide, and powdered magnesium, N. A. Langlet has succeeded in obtaining helium perfectly free from nitrogen, argon, 'and hydrogen, when tested spectroscopically. This gas, when weighed in the usual manner, proves to be exactly twice as heavy as hydrogen, the usual standard, its density in relation to air being 0.139 . Guided by purely physical considerations, the experimenter arrived at the conclusion that the molecule of helium, like that of argon and of mercury, contains only one atom. Hence the atomic weight wust be taken as 4
(1)
$\dagger$ Revae de Medecine, 1895, No. 2.

## Protecting the Hands in Photographic Manipulations.

The British Journal of Photography says: Metol seems to be gaining, rightly or wrongly, an unenviable character for the injurious action it is said to exercise on the hands of its users. But, be it ever so hurtful, is there any reason why it should be allowed to exert its ill effects? In the development of negatives, only the extreme tips of the forefingers and thumbs need be wet with the solution, and then only the front portion of them, where the skin is the thickest. In most instances, in handling injurious chemicals, it is only when they come in contact with the thinner portions of the skin-as on the back or between the fingersthat any harm results. However, India rubber finger stalls, costing but a few pence each, are to be had at all rubber shops, that will perfectly protect the fingers from all pernicious materials. They are much more extensively used by photographers, both professional and amateur, on the Continent that they are here Being exceedingly thin, they are by no means uncomfortable to work in. It is curious to note the effect that different chemicals have on different persons.

## An Artificial Ice Rink.

A new skating rink at One Hundred and Seventh Street and Lexington Avenue, New York City, was opened December 14.
The interior of the new palace is dazzling. Ceiling and walls are hung with artificial icicles, illuminated by 2,000 electric lamps of various colors. There are two galleries, large enough to seat 5,000 spectators. Eighteen hundred persons can find room on the ice surface at one time.
The pond is frozen artificially, the cold being produced through the evaporation of anhydrons ammonia in coils of hollow copper tubes. The heat is abstracted from a brine solution surrounding these coils, the freezing point of which solution is lower than that of the water in the skating pond. Long rows of tubes filled with this frigid brine and communicating with the freezing apparatus lie below the surface of the ice and prevent its softening.

## THE PUNNETT COMPANION SIDE SEATED BICYCLE.

The bicycle has now reached a typical construction from which there seems to be slight tendency to deviate. Absolute novelties beyond the details are more and more rare. The companion side seated bicycle which we represent is, however, ose of the novelties of the year. The tandem bicycle, which has met with considerable success where the desire is to have company on a ride, is more or less criticised on account of the position of the riders, one of whom must be behind the other. In the bicycle which we illustrate it is proposed to have the two riders seated side by side, as in the old-fashioned "sociab'e" tricycle, and yet to have the two riders carried by two wheels only. The two cuts are self-explana tory. The long axle of the rear wheel enables the use of two sprock ets at its extremities so far apart as to permi of each one being acted upon through a sepa rate pair of sprockets each actuated by a sepa rate rider. There is a triple head and a du plex frame, the latte carrying two saddles placed side by side at a proper distance apart for two riders to occupy also side by side

It is said that a dif ference of 100 pounds weight in the two rider is not noticeable, and that a person who is ignorant of riding can be taken out on this wheel with perfect safety. The system of mounting is peculiar For the first one who mounts, the wheel is in clined to one side and this rider takes his 0 this rider takes his or her place on the lowe is then pulled back to an upright position and the second rider mounts by the pedal, and so the start is made. The dismount is made in the same way, reversing, of curse, the operations. The two saddle posts are connected, it will be observed, by a crossbar. At the center of the crossbar is a special socket. When a single person is riding the wheel the saddle is transferred to the central
position and the rider sitting there drives the machine by one of the right hand and one of the left hand sets of pedals. This, of course, produces considerable lost motion in the pedal action, but it at least is possible for a single rider to take care of and todrive the wheel to and from the place of appointment with his friend. Jt is not a wheel depending absolutely on the presence of two riders. The wheel shown in the illustrations is made by the Punnett Cycle Mfg. Co., Rochester, N. Y.

## A HANDLE BAR BICYCLE BELL.

The illustration represents a bicycle bell attached to the outer end of one of the handles, without dis figuring it or offering any impediment to the free use


## Do People Ever Forget Anything?

The brain of mankind has been defined as a kind of phonographic cylinder, which retains impressions made upon it through the medium of the senses, par ticularly through the eyes and ears. If this be true, memory mast depend for its intensity or retentive qualities upon the degree of observation with which the record is made
Nor is this all. If memory's record is kept in the shape of indentations upon the folds of the brain mat ter, are they ever entirely effaced? In other words, do we really ever forget anything? May it not be that the inner depths of the brain memory havestored up recollections of things which are never again purpose iy turned to. perhaps, but which instantly spring into being and flash through the mind whenever we heal or see something which recalls them?
There are several well known mental phenomena which strengthen this theory. We know that memo ry often brightens during the last moments of life. and there are cases on record where Germans, French, Spaniards and others, who, falling ill in this country years after having entirely forgotten their native lan guages, recovered and used them upon their death beds.
There is a theory that in all such cases the brain folds have relaxed, just as do the muscles and cords of the limbs and body, and that by so doing they expose the mind's monitor indentations (recollections), which were long since folded up and put away as material that could not be of any particular use. - Family Doctor.

Deliydrating Alcohol
Recommended by H. Wislicenus and L. Kaufmann The reagent used is amalgamated aluminum, which can be prepared in a few moments by treating alumi num filings, free from oil, with caustic soda solution until a brisk evolution of hydrogen is produced, then washing once suparficially with water and allowing a half per cent solution of corrosive subimate to act for one or two minutes upon the metal, which is still moist with weak alkali solution. The whole operation is rapidly repeated to remove a black scum which forms, and the product is quickly and thoroughly washed with water, alcohol and ether in succession, and is pre served, if necessary, under low boiling petroleum ether Aluminum filings are on the market, at least in Germany, at a reasonable price. The amalgamation of mis metal changes its chemical properties in a rethis metal changes its chemical properties in a re-
markable manner, so that it decomposes water viomarkable manner, so that it decomposes water vio-
lently, and it even becomes hot spontaneously from the action of the moisture of the air, with formation of white flakes of aluminum hydroxide. The reagen has no action upon alcohol and ether, but it react promptly with any water contained in them. Th authors especially re commend the substance for use in organic chemistry as an entire ly neuiral reducing agent.-Berichte deu tsch. chem. Ges, xxviii 1323, June, 1895; H. L W., Amer. Jour.

## The Simplon Tunnel

The convention be tween Italy and Swit zerland for the con struction of the Simplon Tunnel was signed a few days ago. The pro gramme of works to be followed is that already begun by the Jura Simplon Company, the Swiss Federal Council and the Italian Govern ment. Italy undertake to construct approac lines from Domodossol to Isella, a distance o $101 / 2$ wiles. The Italia Government itself doe not grant any subven tion, but will use its in fluence to induce the provinces and towns of northern Italy interest ed in the scheme to provide a sum of 4,000 000 francs. Italy will however, grant for 99 years an annuity o
through a tubular casing in one side of the handle, and terminating in a thumb piece. By pressure upon the thumb piece the hammer is forced back against the resistance of its spring, and released to deliver its blow, the push rod being returned to its normal posito fit various sizes of handle bars.

3,000 francs per kilometer for the portion of line in Italian territory, which is calculated to be equivalen to a capital sum of $1,500,000$ francs. Switzerland wil have to provide a subvention of $15,000,000$ francs, of which $4,500,000$ francs will be found by the Confeder ation and $10,500,000$ francs by the cantons and towns interested.

RECENTLY PATENTED INVENTIONS Engineering
Fire Box for Boilers.-Edward Ingleton, Pottstown, Pa. This fire bos has a horizonta water leg at cach side at the bottom and a single water
leg in the middle at the top, with two separate series of water tubes, each series on one side and extending from the lower to the upper water leg, the tubes being close
together and constituting a flame-tight tubular box which is conveniently detachable from the boiler for cleanin and repairs. This fire bos is so connected with the inte rior of the boiler that a perfect circulation is obtained. The improvement is especially designed for locomotive and traction eंngines.

## Railway Appliances.

Switch Working Mechanism.-Robeit W. Farrell, Vincennes, Ind. Connected with the rails, according to this improvement, is a spring barrel
with spring-pressed piston rod pivotally connected with a with spring-pressed piston rod pivotally connected with a
switch stand, a dog on the barrel engaging a shoulder on the piston rod, while a counecting lever extending par allel with the track is moved by striking arms on the rack to trip a lever to tilt the dog. The imprave the ripping devices being then actuated by a passing tram engine to automatically close a switch.
Street Railway Car.-Willard R. Doclson, Jermyn, Pa. This is a car designed to be carily transformed from a winter to a summer car. The receving the windows of the winter car, so that the win lows may be moved into auxiliary guides and the whole disconnected from the car. Different sets of seats are
also provided, the change being readily made from one to the otber.

## Electrical.

Holder for Telephone Receivers. Fergus W. Martland, Fall River, Mass. This hoder serigned to suthout making it necessary to hold the ar of the ne hand. A spring-pressed sldiding rod is connecte with the telephone switch and an arm pivotally connected with the rod carries the receiver, a segment holding the arm in any desired inclined position to bring the re

Rorat
Renovating Storage Batteries. John Trowbridge, Cambridge, Mass. This inventor ha eved a method of renovalinglead accumulators by re ry b b ery has been charged, replacing them by amalgamated inc plates, then discharging the battery, remoing the battery while it is recharged; the negative elements are hen again removed and the zinc plates inserted an until the battery has been restored to its normal efficiency

## Mining.

Ore Crusher.-August H. Schierholz, an Francisco, Cal. This is a strong and simply contructed machine to facilitate the crushing, pulverizing, nd amalgamation of ores, and comprises a pan in which ng journaled in a frame. while a duriving arm engages blocks held vertically adjustable on the frame to permit the rollers to move
under treatment.

## Techanical

Machine for Treating Metal Rons.-John Doughty, Philadelphia, Pa. This machine site directions, the racks recciving between them a bundle of rods to be treated, means for imparting a reciproating motion to the racks, end plates engaging the ends of the rods, and a feed table extending between the racks. The machine is designed to facilitate the rapid
mpering, cleaning and straightening of the
float Valve.-Joseph W. Chamber lain, Bangor, Me. This valve is designed to open and
close a full waterwas instantly, affording a flow of waer as large as the pipe supplying the valve will disharge, while the construction is simple and inexpensive. The valve is more especially designed for use in
connection with a house tank, where the ordinary float alves open but a small paseage for the water if only a small amount is drawn from the tank.

## Agricultural.

Cultivator.-Charles E. Booi, Danorth, Ill. This is a machine designed to be drawn by three horses, and it is provided with equalizing de-
vices whereby the strain on the team is reduced to a minimum, the draught being taken from the rear portion of the machine, and the side draught not being sustained by the team, nor the harness injuring the animals. All the
cultivator blades may be readily raised from the ground cultivator blades may be readily raised from the ground,
and the machine made to travel on supporting wheels, and the machine made to travel on supporting wheels,
one at each side. The machine also comprises a goone at cach side. The machine also comprises a go-
pher cultivator of simple and inexpensive construction and thoroughly under the control of the operator.
Labeling Plants, Etc. - Frederick R. and Clara J. Chapman, Dunedin, New Zealand.
This invention provides a convenient movable and read ily adjustable label standard, which will present the labels directly to the observer at any desired angle, and proviles also a special form of label. The label holder consists of a standard and a donble hook formed of a wire whose middle portion is bent or twisted about the
heat of the standard. and the label is composed of a heat of the standard. and the label is composed of a plate having a brace which chiverges at an angle, the
end engaging the body of the standard or carrier.

## Miscellanente.

Galendar Clock. - Alfred E. MeCol lum, West Leisenring, Pa. This invention relates to
calendars attached to and driven from watches or
clocks, and consists principally of a rotatable sleeve car-
rying the month hand, a shaft rotating in the sleeve be. ing driven from the clockwork, and there being on the shaft a dooble hand, the hands etanding at angles, and one indicating the day of the month and the other the day of the week. The positions of the hands are adjusted
Automatic Disinfecting Device.Emil Taussig and Michael Sheridan, New York City This is an improvement for toilet rooms, comprising a rocking liquid holder for disinfecting fluid that is tilted for the discharge of a gaged amount by draught er-discharging aevice peing a siphon-controled wis novement of the liquid holder when it is rocked.
Hydraulic Air Compressor. - Albrecht Kalthoff, New York City. This is an improve-
ment more especially designed for use in beer pumps and similar machines, the compressor being simple in construction and not liable to get out of repair, automaic in operation and utilizing the pressure of the water the best advantage. A spring-pressed main valve con-
trols the inflow and outfow of the water to and from th compresion cylinder and the valve has a hollo stem forming an alr inlet and a leakage water discharge a spring-pressed valve engaged by the stem connecting with the general water discharge.
Splicing Scissors.-John A. Myers, Monroe City, Ind. Each blade of these scissors is pro ing adapted to receive the end of a strip to be splice and the other being circular, for use in splicing cords. One of the blades also has an additional cutting edge near its point. The improved device forms a combin various household uses.
Boiling Eags.--George Fundinger and lderico Nessi, New Brighton, N. Y. To accurately an automatically regulate the co desired, these inventors have devised an apparatus in which a clock mechanism is connected with an egg receptacle, with means for submerging the eggs and raising them out of the water the end of a certain time, the time required for boiling being regulated by moving an adjusting lever on an inde

Cherry Stoner. - Emil Zeitfuchs Portlana, Oregon. To remove the pit from the fruit without mashing or injuring the cherry, this invento provides a device in which a suitable base forms an open
bottomed seat for the fruit, while attached to the base is a spring wire guide and spring for a plunger adapted to through the stem opening of the fruit.
Dish Cleaner.-Albert J. Finlay and Charles Wilson, Silverton, Oregon. According to thi compound, adapted to be kept heated on a stove, has an inner basket in which dishes may be placed, the baeket being raised and lowered by turning a crank supported in standards at the sides, the water being forced up
around the dishes on the downward motion of the basket, and draining off on its upward movement.
Clothes Line Pulley. - Johan J Leuzinger, West New Brighton, N. Y. This is a pulley contraction of the line, and the clothes pins on the line may be readily passed around the pulley without being forced from the line or from clamping engagement with the clothes. The pulley has a hub and radiating wings, the outer face of the pulley between the wings being concaved, and each wing having a recess and depression in

Chair Attachment for Sewing Ma-chines.-Jane A. Adkins, Atlanta, Ga. The curved ections, whose forward extremities are adapted for tachment to a sewing nachine frame, and the rear lege use, the chair may be so folded as to not required for use, the chair may be so folded as to occupy but little
room and disposed of beneath the table of the machine or within its cabinet work
Removing GARBAGE.-Wolfgang
Goetz, New York City. An apparatus for this work designed by this inventor consists principally of a wheeled wagon body having at its top a receiving spout closed by a slide, a gate at the rear being held in an open or partly open position. A box seated on the wagon spout has drop bottom doors, the box having a cover of which signed to facilitate the removal of garbage without scat tering portions in the street, and spreading disagreeable odor
Window. - William Wallace, New York City. This inventor provides a window arranged
to permit of readily cleaning the window panes on both sides from the inside of the room, the two sashes being readily swung downwardly and inwardly into an open position. A bar hinged to the lower rail of the upper top rail of the lower sash, while a slotted arm or hasp pivoted to the free end of the hinged bar swings down to receive a knob or turn button in latches mounted in the top rail of the lower sash.
Gate. - Abner Yates, Yates Center, Kansas. This is a gate which may be opened by thone latch bar when the gate is closed being adapted to be operated by the wheel of a vehicle, or by the pressure of the hand or foot of a person seated therein, or on horseback. 'The improvement is designed to be durable and
inexpensive, and the construction is very simple.
Latch. - Nestor Lattard, New York City. This is a simple and inexpensive latch lock whic may be applied to the leaves of a table without affecting plate and side plate, the latter having an opening to re plate and side plate, the latter having an opening to re-
ceive a keeper, and the latch bar has a head at one end and a handle at the opposite end, a spring normally holding the la
ing opening.

Match Box.-Isaac O. Day, Ottumwa owa. This box has in its op a vertichy plate to proje it through an opening in the top of the box At each operation of the mechanism of the box, by the pressin of a thumb piece, a single match is expelled and simulaneously ignited, being held upright on the box whe ighted.

## Designs.

Handle for Spoons. - Austin F Jackeon, Taunton, Mass. Scroll, fluted and ball ornamentation on the front of the broad portion of the spoon
hande, and flowers and foliage on its back, are the leadfeatures of this design.
Bracket.-De Witt C. Bowen, Kansa Bity, Mo. This bracket has an upright member and curved members, the whole somewhat resembling a le

Glass Dishes. - Henry T. Broden rooklyn, N. Y. Three designs have been patented his inventor for glass dishes, such as bowls, plates an ugs, all of the designs having prisms crossing one an nultiple pointed stars and oval and polygonal panels.
abdominal Supporters. - John H. Kellogg, Battle Creek, Mich. This is a supporter pad webbing.
Note.-Copies of any of the above patents will be furnizhed by Munn \& Co., for 25 cents each. Please send name of
of this paper.

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Whittemore, architect, East Orange, N. J.
A Colonial house at Madison, N. J. Perspective ele vation and floor plans. Cost complete $\$ 5,500$.
Architects, Messrs. Child \& De Goll, New York City.
3. A Colonial dwelling at Montclair, N. J. Two per spective elevations and floor plans. Architect,
W. E. Bloodgood, New York City. A unique design.
wo perspective elevations and floor plans of a house recently erected at Brick Cinch, N. J., at a cost Mr. F. R. Hasmman, Orange, N. J.
View of the new City Hall, Philadelphia, which been erected at a cost of over $\$ 20,000.000$. The half acres. Is absolutely fireproof. The height of this building is 547 feet $31 / 3$ inches, being, with two exceptions, the highest building on the earth. The exceptions being the Washington Monument and the Eiffel Tower. The next highest building on
earth is the CologneCathedral, which is 510 feet.
6. View of the facade of the magnificent new Boston McKim, Mead \& White, New York City.
Residence at Bensonhurst-by-the-Sea, L.I. Two per spective elevations and floor plans. Cost complete
Perspective elevations and floor plans of a cottage a Oakwood, S. I., recently erected
complete. An attractive design.
Miscellaneous Contents: Testing house pipes and
drains.-A combination bathtub and washstand, illustrated.-The permanence of modern dwellinge and public works.-An improved steam and ho -How to fix paper on drawing a large factory -How to fix paper on drawing boards.-A quick wixtures, illustrated. - A single track parlor doo hanger, illustrated, -An improved furnace grate illustrated.-Cements in mason work.-An improved furnace, illustrated.-A regenerative gas heater, illustrated.-

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## The Fallied subject

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price.
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narked or
(6686) H. J. H. asks ho ${ }^{*}$ w to make aronatic sulphuric acid. A. Sulphuric acid, 31/2 fi. oz.; matic sulphuric acid. A. Sulphuric acia, 312 f. oz.;
alcohol, 30 f. oz.; mix. Add $11 / 2$ oz. powdered cinna-
mon; powdered ginger, 1 oz.; digest for six days and filter
(6687) H. N. says : Please inform me how to get rid of red ants; their stronghold seems to be
in stone foundation of the building? A. 1. Powdered borax sprinkled about the infested places will extermito drive them away. Another plan is to grease a plate with lard, and set it where these infects abound. They prefer lard to anything else, and will forsake sugar for it. Place a few sticks around the plate for the ants to climb up on. Occasionally turn the plate bottom up over
the fire, and the ants will fall in with the melted 7 ard. 2. the fire, and the ants will fall in with the melted Tard. 2. Use a small amount of oil of turpentine, run
cracks with an ordinary $:=$, wing machine oil can
(6688) E. Le Q. says : You would oblige me very much if you would state whether coal tar applied (just under boiling point) is a good substitute for
paint for a new shingle roof? A. For a fair substitute for paint, take coal tar and lime (burnt, but not slaked), and boil them together in the proportion of 15 lb . lime to 100 ih. tar. Put it on hot. To pulverize the lime, sprinkle it with a little water and sift it. To avoid the tar boiling ver, stir the lime in the boiling tar very slowly. The
mixture must always be heated before putting on.
(6689) R. D. C. asks : What causes the lunar rainbow, visible at night in the Southwestern
States, especially in New Mexico? It is visible on a States, especially in New Mexico? It is visible on a
clear, cloudless night, the moon not being visible Lunar halos, coronas and rainbows, like those of solar origin, are produced by the reflection and refraction of the light of the moon in the condensing moisture in the air, which at the moment of formation of the halo or rainbow has become vesicular or converted into min-
ute globules of water. This is observable in the dayute globules of water. 'This is observable in the day-
time by a haziness of the atmosphere, but at night, owtime by a haziness of the atmosphere, but at night, ow-
ing to the darkness, the esky may appear cloudlese and yet be overcast with the haze necessary for producing a rainbow or halo. The principles of refraction and re flection involved in this phenomenon are described and illustrated in works on meteorology and natural philoso phy. The statement that the moon is invisible is not sufficient; the inference is that it may have heen just
below the horizon or partially hidden by clouds on the below the
horizon.
(6690) L. M. G. asks: What is the high average speed ever maintained by a train between stops? A. 540 miles in 512 minutes, or at the ratc of 63/4 miles per hour continuous run. 2. What is
the distance between said points by the road the feat was accomplished on? A. Five hundred and forty miles by railway from London to Elinburgh, via West Coast route. 3. What is the English record fo long distance travel, time and points? A. On short
runs, the greatest speed was 75 miles per hour. 4. What is the A merican record for long distance travel? A. 19 miles in 174 minutes, on D., L. \& W. RR.; 147.84 miles in 130 minutes, 684 miles per hour, N. Y. C. \& H. R.
RR.; 510 miles in 47063 minutes, 65 miles per hour, L. S. RR.; 510 miles in $4701 / 2$ minutes, 65 miles per hour, L. S.
$\&$ M. S. RR. $\quad$ 5. On what roal is the fastest regular train in the world run? $\Lambda$. The highest average speed for a 100 mile run is 72 miles per hour, and for the entir run between New York and Buffalo on N. Y. C. \& H. R.
RR.. G41/4 miles per hour. The N. Y. C. \& II. R. RR. RR.. $\begin{aligned} & \text { H/4 miles per hour. The N. Y. C. \& II. R. RR. } \\ & \text { probably lead in the fastegt regular train service. Se }\end{aligned}$ probably lead in the fastest regular train service. See
Scientific American, Angust 31, September 21 , Octo ber 19, 9 , November 2,1495 , for interesting details of
high speed on railroads. high speed on railroads.


For which Letters Patent of the December 24, 1895, AND EACH BEARING THAT DATE.

 Ballon, E. .. De los Olivos
Barrel draine. C. Mitchei
Bearink, roller, W. M. Guncel
 edstead rastening, W. .H. Magalis.



Blowing refeetors. , machine for, i. H. Dolan..


 Box. See Fare box. Paper box
Bracket. Soe Lamp bracket.
Brake.
see Air brake.
Car brake. Elet.
Electric



 Can, See Oil can.
Can, W.Uhenho
Can opener. Kess


















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 Elevator. See Electri
Hydralic elevator.
Elevator. S. Spide.
Elevator controling me
operating .N. F. E. Hecrimanism, mechanism for
Elevator weils. device tor opening. .
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Fence stretchng machine, P. A. . Reid..............
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