
a Weekly Journal 0f practical information, art, science, mechanics, chenistry and manufactures.

## IMPROVED DUMPING CART.

In the annexed engravings is illustrated a novel form of dumping wagon, which is so constructed that its load may be dumped by tilting the body of the vehicle rearward in the ordinary manner, or the load may be shot down an in. clined chute attached to the rear of the body, the front portion of the latter being raised to facilitate the escape. The advantage of the chute attachment, for coal carts more especially, is obvious, since it admits of the load being delivered directly into the coal hole without being partially dumped into the street and gutter, or of being conducted at once to coal holes situated some distance back from the curb, thus saving considerable shoveling or transportation of the fuel in baskets.
$A$ is an extra frame, which is jointed to the rear part of the shaft frame and rests on a pillow block on the axle, tilting thereon to dump in the ordinary way, as shown in Fig. 1. The front end of said frame is fastened to the shaft frame by hooks and staples. The rear end has hinged to it the rear end has hinged to it the bed frame of the box, so that
the latter may be caused to rise the latter may be caused to rise at its front portion when the
toggle bar, B, is elevated by toggle bar, B, is elevated by means of a chain leading to the ratchetlever and shaft, C
In this position, Fig. 2, the In this position, Fig. 2, the
wagon is ready to deliver its contents to the chute, D, through the small gate, E. This gate has sides which form a portion of the chute, and is fitted in the main gate, F, Fig. 1, which last opens upward on hinges and is fastened by slide bolts and staples, the same devices combined with a compound lever serving to fasten both gates. The suspending rods, G, are connected to the chute by long staples, which allow the chute to be shifted along the rod to adjust it on the axle under the cart body for transportation.
The toggle bar, B, is jointed to the box frame so as to swing back. It can be adjusted over the chute when the latter rests on the axle; and by tightening its chain, the chute will be securely held in place The end frame is provided with striking pieces, to drop on the ground and sustain the shocks when dumping in the ordinary way.
Patented through the Scien tific American Patent Agency November 30, 1875. For fur ther information address the inventor, Mr. George B. Wiestling, engineer and superintenling, engineer and Mont Alto Railroad Company, Mont Alto, Pa.

The Death of the Captive Gorilla.
Gor th
The only captive gorilla in existence recently died in the Zoölogical Gardens, in Dresden The animal, a female, was long supposed to be a chimpanzee and it was only lately that, to the surprise of all naturalists, her gorilla characteristics were recognized. The story of the death scene of this almost human monkey is a remarkable one, since it goes to show that the animal was the possessor of feelings hitherto deemed absent among the brutes. Says a writer in the London Echo: "As Director Schopf (the director of the gardens) leaned over his favorite, the ape drew him toward her, placed her arm around the neck of her kind friend, and looked at him for some time with clear and tranquil eyes; she then kissed him three times, with short intervals between each salute, motioned to be laid upon her couch, gave her hand to Schopf-as though bidding farewell to a companion of many happy years-and slept never to wake again."

A vein of galena twenty-seven feet thick has recently been struck in the Yosemite mine, Bingham cañon, Utah.


## WIESTLING'S DUMPING CART

Francisco that the great bonanza kings, Messrs. Flood, O'Brien, Mackay, and Fair, are going to send one hundred and fifty tuns of the gold and silver bullion from their Consolidated Virginia Mine to the Centennial, and pile up the glittering bars in some conspicuous spot, so that all the world can see what one mine produces in five months! The value of the bars will be ten millions of dollars in United States gold coin! "If the idea is carried out, it will be the grandest sight among a million of grand sights, and I venture to say more people will visit this mountain of wealth than any other single thing in the buildings. Five millions of the bullion is now boxed up for shipment, and the balance will be ready in due season. Few people ever saw such a come scarce owing to the cattle disease ing the past six months.
vast sum as ten millions of dollars in gold and silver, all in one or several piles ; and I think the proposition of Messrs Flood \& Co., if carried through, will add much to the charm the wonder, the éclat, and the success of the Exposition."

## Torture by Electricity.

The punishment inflicted on garotters and on criminals who parpetrate brutal crimes on old people or on women, in England, is a whipping well laid on, and the effect is said to surpass any other means of preventing such crimes hither to devised. A recent English writer thinks that our sug estion relative to killing mur derers by the electric shock might be modified to suit the cases abovementioned ; and $h$ wants the legislature to au thorize the substitution of the battery for the lash, so as "to produce absolutely indescriba ble torture (unaccompanied by wound or even bruise), thrill ing through every fiber of such miscreants." No doub strong current, properly ap plied, would give infinitel plied, would give infinitel org; but unfortunately unlik , butunfor a sately, unlik e latter, its after effect might be serious. The lash does no permanent physica injury; but a too powerful current might shatter the ner vous system and leave the possessor possibly paralyzed thus condemning the sufferer to a penalty even worse than immediate death.

## American Meat in England.

The London Farmer bears testimony to the remarkable success which has been met with in transporting American beef to England, from New York city. Our contemporary says: " As the quarters were stripped of their canvas wrap pers and hooked up, the people gathered about, looked, and handled, and had to admit that, in quality and in clean mar ketable condition, the meat was equal to anything else on sale." Four carcasses were sent over in one recent lot, the average weight of which wa $1,200 \mathrm{lbs}$. The whole weight of the consignment was 50 tuns, and it met with a quick sale at 14 cents a pound. In the same refrigerating room the carcasses of 20 pigs were brought over in excellent condition, and fetched 12 cents a pound. We have already ex plained the means of cooling the storage compartment, the principle being simple, the maintenance of a dry, cold atmosphere. The "Roast Bee of Old England," we fear, wil find a dangerous rival befor long in the "Roast Beef of Young America;" for the facili ties for accommodating cattle here in New York have been greatly increased of late, and further enlargements of consid erable magnitude are contem plated, so that, if this refriger ator system, thus far tested in small way, continues to prove so efficacious, and its results re munerative, our enterprisin stock dealers will soon begin to ship whole steamer loads of beef and pork to transatlantic markets, where beef has be

## Novel Well Boring.

In various parts of Scandinavia the boring of artesian wells is done by means of a jet of water. A description of the pro cess is given in Dingler's Polytechnisches Journal. The stones, in the diluvial ground, which are a hindrance to such operations, are thrust to the one side if small; if large, they are shattered with dynamite, and the boring is thereafter pro ceeded with. In Kiel 22 artesian wells were thus bored dur

# Srientific Ammerian. 

# MUNN \& CO., Editors and Proprietors. published weekly at <br> NO. 87 PARK ROW, NEW YORK. 

O. D. MUNN. A. E. BEACH.

## TERMS.

## One copy, six months, potage included...........

Ten coples, one year, each 827 27, postage e tcluded.
er ten coples, same rate each, postage included.................... 29 he subscriber then recelves the paper free of charge.
Notr.-Persons subscribing will please to give thetr full names, and Pos Office and State address, plainly written. and also state at which time they wish their subscriptions to commence, otherwise the paper will be sentfrom
the recelpt of the order. When requested, the numbers can be supplied from January 1st, when the volume commenced. In case of changing resifrom January 1st, when tress, as well as give the new one. No changes can be made unless the former address is given.
If any of our readers fail to receive thetr numbers regularly; if the direction is not plainly written; if premiums are not received; or if there i
tault of any sortat this office, we will thank our friends to send us posta card complaints, and repeat the same, if need be, until the remedy is effect ed. Do not hesitate to complain. We desire to keep all matters between ourselves and patrons right and satisfactory
volume xxxiv., No. 8. [New Series.] Thirty-first Year
NEW YORK, SATURDAY, FEBRUARY 19, 1876.

|  |  |
| :---: | :---: |
|  |  |
|  |  |
| Aristocracy of al, the............: 118 |  |
| or steam |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| basses on iron, |  |
| matersink for boring |  |
| Cowt the |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Enines, packing (2) |  |
|  |  |
| Evese fatigue of the (50) |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## the scientific american supplement For the week ending F

## table of contents.

 Brazill at the Ees.
hibtin Notes.


 Tor Iroil
IV. LESSONS IN MECH
v. MED



Chinese Acrobats.
VIII. MSCELLANEOUS.-Stenographic Exhibition.-Mid-Ocean Tele$\underset{\text { VIII. MISCELLLAN }}{ }$

COMBINED RATES
 be sent
of tion
Remit
gent


The Cow.
If civilized people were ever to lapse into the worship of animals, the cow would certainly be their chief goddess. What a fountain of blessing is a cow! She is the mother of beef, the source of butter, the original cause of cheese, to say nothing of shoe horns, hair combs, and upper leather. A gentle, amiable, ever yielding creature, who has no joy in her family affairs which she does notshare with man. We rob her of her children, that we may rob her of her milk, and we only care for her that the robbery may be perpetuated. Household Words.

## SEA LIONS

The crowds that hang around the sea lions' enclosure at Central Park are a standing proof of popular interestin these remarkable animals. The whole houseful of land lions
tigers, and other carnivora, near by, commands a smaller au tigers, and other carnivora, near by, commands a smaller au-
dience; and even the monkeys are neglected for the yelping dience; and even the monkeys are neglected for the yelping
pack of semi-aquatic performers without. That the exclama tions of the onlookers should often betray the haziest possible notion of the real character of sea lions and their plac in the animal kingdom is not surprising; even professed naturalists admit a plentiful lack of knowledge with regard to them, as their natural history has been studied, for the most part, only in a limited and fragmentary way,scarcely single species having been fully investigated. Millions have been slaughtered for their skins, but those engaged in the murderous traffic care nothing for the scientific interests of their victims. Naturalists of exploring expeditions have made isolated observations and brought home a few skin and skeletons. But for connected and expended studies of hese commercially valuable and scientifically interesting creatures, we are indebted mainly to the report of Mr. Elliott, who was sent out by our government to investigate the seal ing and other resources of our lately purchased islands in he North Pacific, and to the observations of Captain Mus grave, who beguiled the tedium of a twenty months' enforced sojourn on the Auckland Isles by watching the species in habiting that region.
Visitors at Central Park have the privilege of seeing the argest collection of sea lions ever brought together in a mu seum. The Zoölogical Society of London,which leads Europe in this department, has had only three live ones, and now as two, the first one (also the first ever seen alive in Europe) having died some years ago. Nor are European museum much better provided with dead specimens. But thanks to the exceeding popularity of "seal" fur, a lively interest has been aroused in regard to the animals which furnish it: an
interest which, a recent English writer hopes, will be fruitful in putting a stop to the hideous and needless barbarities which threaten the speedy extinction of this valuable class of sea animals : or at least,if they must submit to immutable aws-immutable lawlessness, rather-and be gathered to he dodo, the solitaire, and the northern manitee of two cen uries ago, we may at least be able to point to ample remain in museums, and accurate d
According to the naturalist just referred to, Mr. John Wilis Clarke, there are nine well authenticated species of sea lions, thus distributed: in the North Pacific three, ottaria ursina, o. Gillespii, and o. Stelleri; in the South Pacific, around Cape Horn, and in the South Atlantic as far north as Rio de Plata, two species, o. jubata and o. Falklandica; around he Cape of Good Hope and the adjacent islands,one,o. pucilla or antarctica; around Australia and New Zealand, two,
o. Hookeri and o. labata; and around Kerguelen's Land,one, gazella
Curiously, sea lions are unknown in the Atlantic except in extreme south, though the Atlantic abounds in true seals, from which the sea lions differ in several particulars. The more obvious difference is the possession of external ears, which seals lack. They have besides a long, mobile, flexible neck, whereas in seals the neck is short and scarcely erceptible. Then their limbs are still available for locomo tion on land, while those of seals have lost all power of sup-
porting the body out of water. Lastly,they possess the fatal porting the body out of water. Lastly,they possess the fatal
gift of under fur, which gives them their commercial imporance, and threatens to cause their untimely extermination.
Just now popular interest in sea lions centers in the species of the North Pacific. From time immemorial two
species (o. stelleri and o. Gillespii) have inhabited an island in San Francisco harbor. Protected by the civic authorities, they have multiplied enormously,threatening the entire destruction of the salmon once so plentiful in all Californian ivers. The fish commissioners demand a reduction of their numbers, urging that the loss of salmon is too heavy a price to pay for the entertainment of the pleasure seekers of San Francisco. The latter deny the guilt of the city's protégés, and charge the obnoxious Chinaman with the destruction of the fish. It is pleasure and prejudice against reason and解 : which will win, it is hard to say
The second claim of the North Pacific sea lions to public interest arises from the circumstance that eighty per cent of the seal fur now supplied to the markets of the world comes from the islands of Behring's Sea,and the indications are that in a few years our Alaskan possessions will be the only source of this beautiful fur. Everywhere else the slaughter goes on without regard to system, age, or sex, and already very year have entirely depopulated. Not less than a millionskins were taken from the island of Masafuera, off the coast of Chili. In two years four hundred thousand skins were taken from a small island near Australia. From the South Shetland islands, three hundred and twenty thou sand were taken in 1820 and 1821, males and females being slaughtered indiscriminately, and the young left to die. It is hardly necessary to add that, in a few years, this horrid and The resorts of the sea lions of destruction.
The resorts of the sea lions of the north were discovered in 1786, and a Russian fur company was at once established. For thirty years from eighty to ninety thousand skins a year were brought away, the killing being done without regard to sex or system. About 1817 it was observed that the animals had diminished in numbers. For twenty years more the wasteful slaughter went on, until but a tithe of the origi_ nal number appeared. Then the slaughter was regulated disturbed. When the islands came into the possession of
the United States, the system was substantially continued, with the result of giving them almost a monopoly of the en tire seal fur trade. According to Mr. Elliott's calculation, a many as three million breeding seals annually congregate on the two islands, St. Paul and St. George, to which they re sort; the yearlings and males under six years of age he set down at two millions, making a population of upwards of ive millions. Only young males are allowed to be killed, and he number is limited to one hundred thousand. Females are not allowed to be molested, and no killing is permitted within several miles of the "rookeries," as the resting places of the females and their cubs are called.
When the time for killing arrives, usually in June, the illers select some "hauling ground" of the young malesor the old bulls do not allow them to associate with th emales-and, armed with clubs, get between them and the sea. The animals, startled by the sight of them and frightned by their shouts, scramble rapidly landwards, and ar eisurely driven to the killing grounds. In favorable weather hey can travel at the rate of half a mile an hour, the most ffective implement for driving being an umbrella. At th killing ground they are allowed to rest awhile, after which he fittest are selected and killed with clubs,a single blow on the head being sufficient for each. The rest are allowed to return to the sea. The skins are shipped in salt.
For many years the stiff coarse hair, which conceals the under fur, was plucked out by hand. It was finally discovered that the roots of the hair were more deeply seated han those of the fur, and that,by shaving the skin from th underside until the hair roots were cut away, the hair could asily be brushed away, leaving the under fur intact, thus reatly simplifying and cheapening the work of preparing the skins. Naturally, the fur is curly and of a light brown color; but as the ladies prefer a darker shade,the fur is dyed in which process the curls untwist and the fur becomes mooth. The government rents the islands for $\$ 50,000$ dol ars a year, and imposes a revenue tax of two dollars on each kin taken. According to late accounts, the population of he islands is steadily increasing, and it is proposed that the number allowed to be killed might safely be increased also In view of the probable early extermination of the fur-bear ing seals, so called, of other regions, however-at least, so great a reduction of their numbers as to make the taking of them unprofitable-it is to be hoped that no risks will be run in the only place where they have any chance of per petuation. Better under kill than over kill, even if the de mands of the ladies should be scantily gratified. Properly manage 1 , our Alaskan islands will remain for ever a source perhaps the only source, of this beautiful and valuajle fur Overhunted, or left to the shortsighted selfishness of profes. ional sealers, there is danger that it may soon be said of them, an Australian naturalist has said of another once produc ve region- I should as soon expect to meet a seu lion on London bridge, as on any one of the islands in Bass's Strait!

## PROGRESS OF THE PATENT OFFICE

Sixteen thousand two hundred and eighty-eight patents or new inventions were issued last year, ending December 31, 1875. This is by far the largest number ever granted in ne year, and is indicative of a growing spirit of liberality on the part of the Patent Office people towards the inventors of our country, which we hope will not only be maintained but increased in the future.
Last year we had occasion to call public attention to the extraordinary number of applications not granted, the fig ures for the year 1874 showing 21,602 applications made, and only 13,599 patents issued, leaving eight thousand applications for patents either rejected or undecided. We then stated in effect that in view of the statistics for $18 \% 4$, the Patent Office examiners appeared to considerit to be their high est function to prevent the issue of patents; but we showed that, in accordance with the spirit of the Constitution, it was their paramount duty to seek reasons for the encouragement of inventors by the grant of patents. It is gratifying to ob serve that the Hon. Mr. Duell, new Commissioner of Patents, has adopted the latter view, and has sought to reduce the action of his subordinates to the same liberal line of policy. It will be observed by a glance at the Commissioner's tabula statement, on page 120, that, although the number of appli cations made for patents during the year 1874 and 1875 is about the same, the number of patents issued in 1875 is greater, by more than two thousand six hundred, than the is sues of 1874 . There is room for further improvement, and we trust that the Commissioner will continue to insist upon the observance of a prompt, liberal, generous treatment of applicants for patents until all complaints in respect to rejections shall practically cease. The patent law makes it the duty of the Patent Office promptly to issue a patent to every applicant, no matter how small the invention, provided it contains a grain of novelty and utility. Allquestions of infringement are left for settlement by the courts; the Pat nt Office has nothing to do with them.
But there is one serious, fruitful source of trouble, continu ally going on at the Patent Office, which consumes much valu able time of officers, and occasions great expense and dissatis faction to applicants. We allude to the litigation pertaining to Interference cases. We are inclined to believe that these cases should be removed from the Patent Office and settled by the Courts. We should be glad if something practical in this respect could be enacted by Congress.

## A NEW ENGLISH RIVAL OF AMERICAN PETROLEUM

A new process of utilizing the gas of shale oil works has recently been devised in England, which, if we may trust the statements of the London Gracer, is to bring bette
are unable to make much headway against the large petro leum exports from the United States. An immense quantity of such gas is wasted in the production of paraffin. Every tun of carbonaceous shale destructively distilled yields from 2,500 to 3,000 feet of the gas, in addition to other products, and our contemporary places the amount of shale thus treated in England and Scotland at 600,000 tuns.
In some large works, this gas is directly collected and used for illuminating purposes in the vicinity; and at one time it was proposed to illuminate the city of Edinburgh by conveying the vapor from the Addiewell Works near by. The new invention, it is now said, provides a way of bottling this gas -that is,converting it into a highly volatile liquid, a gasoline, which may be found a staple and valuable article of com merce. The inventor is Mr. J. J. Coleman, F. C.S., and his machine is based on the well known principle used in such ice-making apparatus as that of Windhausen and Mignot, namely, that air, when compressed and then allowed to expand, produces cold, especially when, in the act of expanding, it is made to perform work, such as driving a piston in a cylinder. The shale gas, it appears, is first compressed ; then, after removing from the machine the collected liquid, the inventor causes the compressed gas to work an engine which delivers the exhaust gas at a temperature below the freezing point. The most ingenious feature of the invention is that the power which is first employed in compressing the
gas is in great part recovered by the expansion of the gas gas is in great part recovered by the expansion of the gas
in the act of producing cold: and owing to this result, when in the act of producing cold: and owing to this result, when
the machine is in full action, the steam may be, in a great the machine is in full action, the steam may be, in a great
measure, turned off. The gas thus works as it were in a measure, turned off. The gas thus works as it were in a
circle; but of course it is constantly diminishing in quantity and at the same time the loss is being made up from the condensers, which, in their turn, are attached to the retorts.
Very brilliant illumination has lately been obtained in Paris by saturating cosl gas with gasoline and then burning it with oxygen. With Mr. Coleman's liquid, it is believed, a similar saturation can easily be effected; and Messrs. Laid law \& Sons, of Glasgow, well known gas engineers, have undertaken the manufacture of the necessary machinery for treating a quarter of a million cubic feet of gas per day as an extended experiment. It is believed that about 2,000 gallons of the gasoline may be weekly obtained from this plant. Some of the material yielded will probably be naphtha; but the average specific gravity, it is stated, will range about $0 \cdot 684$. It is expected that there will be a large de mand for the product at one shilling sterling ( 24 cents) pe gallon.

## KENTUCKY WEATHER PROPHETS.

The weather prophet of Kentucky farmers, according to the Louisville Commercial, is the breast bone of a goose, a yearling goose; and on the strength of the prognostications of such a bone, that paper predicts that the coldest weathe of the present season will come after the middle of February
The rationale of the augury is extremely simple. The breast bone of a young goose is translucent, with cloud-like spots in places, which white spots denote cold weather. It is to be inferred that all the geese of any year have precisely the same cloudings on their breast bones, though this important circumstance is not specially noted. Nor is any information given with regard to the geographical area covered by the goose-bone prediction in any case. We beg the Commercial to investigate this matter more thoroughly, for the
benefit of the Congressional economists who want to abolish benefit of the Congressional economists who want to abolish
the Signal Service Bureau and all the sinecures incident the Signal Service Bureau and all the sinecures incident
thereto. Probably the family in Woodford county-who have so carefully preserved the little prophets for fifty years, and declare that not one of them has been wrong in its pre. dictions-would be able to clear up all doubts and difficulties on this score, and demonstrate the utter wastefulness of telegraphic " probabilities" when prophetic certainties are so easily procurable.
In this connection we may properly mention the proposition of another Kentucky gentleman, who has been telling the Cincinnati Christian Association how to impose a wintry climate on the poor naked denizens of the South Sea Islands, and transfer their balmy climate to our own shores. For a man rejoicing in the title Reverend, and a company styling themselves Christian, this project, we may be permitted to
say, is about the coolest we have ever heard of. But it is say, is about the coolest we have ever heard of. But it is
the scientific, not the moral,aspect of the proposition that we the scientific, not the
have to do with here.
At first thought, no undertaking would seem to be of more difficult accomplishment than the shifting of the climate of any hemisphere, massing all the cold in one part and all the warmth in another; but our reverend lecturer shows how it can be done with the utmost certainty and ease. Everybody knows that the south wind brings the warmth of sunnier climes, while the north wind brings arctic cold, provided, of course, that they blow long enough and far enough upon the earth's surface. And nothing is simpler than to suppose our country, we should enjoy a summer temperature all winour country, we should enjoy a summer temperature all win
ter. To most meteorologists the if in the case is a portententously large one, but not to the Rev. L. B. Woolfolk, of Lexington, Kentucky. He knows that the south wind is always on the surface of the earth, except during storms,
and even then the north wind never has but one track at and even then the north wind never has but one track at once. Consequently if we make a track for the north wind and keep it there, we shall have, everywhere else, a prevailing south wind and a genial climate. It is just as clear as that two and two make twenty-two. Now storms are always the result of a conflict between north wind and south wind. It is well known that heavy cannonading always raises a keep up a deuce of a racket where you want the north wind
to blow, and you'll certainly have the balmiest of south winds The learned lecight and left.
The learned lecturer proposes-and very wisely,seeing that the South Sea islanders are not able to resent the impositionproposes, we repeat, to make the Pacific Ocean the track of the boreal winds, by a perpetual feu de joie on the Aleutian Islands. We are told by the Cincinnati Gazette that he was eloquent in depicting the results of such an easy and beautiful re-adjustment of the winds. The deserts of Asia and America would be visited with seasonable rains; warm weather would blow up the Atlantic (not like dynamite, we trust) into the Arctic Ocean, bearing before it tropical waters, until the arctic coasts, swept with tropical winds, would become habi table; and the arctic seas, flooded with tropical air and tropi cal water, would become the highway of commerce,and ves sels would sail through open water at the pole, and every goose bone would become immaculately translucent, except
in the South Sea islands; and as the peoplethere do not keep eese,the change would signify nothing to them.
A word of admonition here. This is the Centennial year We know how it began, and can faintly estimate what terrific everberations will arise from time to time toward the cul minating day of the year. Now that Mr. Woolfolk has spoken, we know what a terrible succession of arctic waves e are liable to bring down upon ourselves, blasting ou crops and making the derided Ulster a Centennial necessity while the shiftless Sandwich Islanders and the rest will ask in endless south winds, needing not so much as ocket handkerchief for protection from the weather. With he earnestness of conviction, we say : Don't! For heaven' sake,keep still. If the yelling must be done and the powde burnt, let them be transported to the Aleutian Islands and
discharged there. It will be hard for the Aleuts; but they discharged there. It will be hard for the Aleuts; but they and fears. And as for the people south of them, let them -no: that involves a question of morals which is withou our sphere.

## OPIUM DANGERS.

It is a curiously suggestive fact that very few of the weekly journals, especially of literary nature, which go directly int amilies, can nowadays be examined but that somewher in their advertising columns are found announcements offerg radical cures for the opium habit. We have found these dvertisements abundant in fashion magazines; and indeed o widely spread are they, and so persistently are they kep before the public, that a stranger might seriously ask himself whether the mania for the drug be not as strong in this civilized country as in China. Two or three cases,o hose who have become addicted to the use of opium through its employment as a medicine during acute illness, have lately been brought to our knowledge; and some further inquir eads usto believe that the large majority of opium eater thus acquire their baneful taste. Dr. J. B. Mattison,in an ar iclein the Medical Record,strongly advocates this view, and e-inforces his conclusions with a timely caution to physi cians regarding the careless prescribing of the drug. It ap pars that, while alcoholic intoxication is decreasing through out the United States, opium drunkenness is increasing, an dealers in crude opium and the manufacturers of its al aloids assert that the importation of the one and the pro ductions of the other are rising rapidly year by year: so
much so regarding morphia, that at one of our largest manu facturing centers the supply is said to be insufficient for th mand.
Dr. Mattison adduces a most interesting array of instance proof of his views. Cases are mentioned of persons (who previously took opium to gain relief from the pain of sciatica, or neuralgia, or similar acute maladies) becoming confirmed inebriates, utterly unable to disenthral themselves,and swallowing their daily potion not as a means of gratification but as a physical necessity. Legislative enactments prohibi ting the refilling of an opiate prescription, or the dispensing of opium in any form, unless in pursuance of a prescription from the attending physician, would, Dr. Mattison considers accomplish an immense amount of good. It would not wholly check the vice, but would greatly mitigate the same
's In carrying out the reform", he adds, "'it should be the aim 'In carrying out the reform," he adds, "it should be the aim overy practitioner, when called upon to prescribe this most valuable medicine, to see to it that he exercises a dis criminating care in so doing, by careful inquiry as to the neurotic status of his patient from the standpoint of hereditary tendency, and, if necessity demands a somewhat prolonged administration, to watch most warily and guard most strenuously against the earliest indications of an appetite that, thoroughly established, will scarcely be denied,and which entails upon its unhappy possessor a darkness so dense a horror so indescribable, that death, at times, seems pre ferable."

## THE ARISTOCRACY OF ALL.

" Yes "-we hear it said, even in this "Centennial year o the Republic-" the theory of democracy is well enough but after all the real progress is the result of class distinc tions and privileges. Culture implies spare time and abun whi mort which must be supported by the labors of others. Only by the exemption of some from the drudgery of self-support is possible for civilization to exist, much less to advance. The assumption-it cannot be called an argument-i plausible,but it will not bear examination. However much the civilization of the past may have rested upon systems of privil eged classes, the civilization of today rests upon and is car ried forward by the working masses : not slavish toilers, kept down by class restrictions as of old, but freemen, who use their brains as well as their hands, and know that all things
are possible to intelligence and thrift. It is by those who personally earn the right to leisure time, very frequently in the process of earning it, that the great steps of human pro gress are taken. As Higginson cleverly remarks, history is not written by the privileges of the rich, nor, we would add by the privileges of the high born, but by the progress of the many. "Privilege traveled in its carriage with all clumsiess twenty miles a day; but when the people wished to go, steeds swifter than the wind were harnessed, and long line of steel stretched far away that they may go in speed and safety. Privilege could only send its messages by fires on hilltops, and thus communicate slowly joy or grief; but for the messages of the people, the flames were condensed in on park, and sent across continents and under oceans. Every here we find the failure of privilege the success of th hole. An aristocracy of all I want, where the humbles child may come from his cradle into a grand and glorious.

This is the ideal that was aimed at by those whose action e commemorate in this Centennial year. Its practica chievement may be celebrated a hundred years from now. The aristocracy of birth-hereditary rank, we mean, not in herited virtue, intelligence, and personal power-is done with its place has been usurped by what Higginson styles the ari ocracy of the dollar. In the struggle for position, wealth eads, for it has the advantage of power
To acquire wealth requires in the main the possession of orce, albeit rude and pushing. 'To keep wealth requires, ven more imperatively, personal ability. "So the aristocra y of the dollar is as foam on the waves of progress, bright vanescent, changeable as the wave itself. It represents ac ual power, not past possessions like hereditary aristocracy. But ability to hold is not a common inheritance. Natur is a verse to hereditary rank, and titled families soon run out unless sustained by plebeian blood; and still more heavil weighted in the race for life is hereditary wealth. Th ristocracy of birth is of the past. . The aristocracy of wealth rules to-day. But it too is doomed. There is but one stable aristocracy possible, and that is the aristocracy of all, based and universal labor The doers shall inherit the earth

## IMPROVEMENTS IN THE ORGAN

In another portion of this issue will be found an illustrated description of some new and remarkably ingenious applica tions of electricity to organs, by means of which an instru ment in one part of a hall is played from a keyboard located $n$ another and distant portion. The invention is one which asily suggests the possibility of the distance between the keyboard and organ being increased, and thus, perhaps, ma e a precursor of those possible electric devices to which w ave, in the past, alluded, and by which we may be abl to lay music in every house in New York city with as little difficulty as now is found in putting in the gas
While this idea may be called an advantage of electric music yet to be realized, the immediate value of the use of lectricity in the instrument rests on a different basis. Tha alue is the vastly increased facility in handling the key ffered to the player. There is a large church organ now in hiscityin which a force of 5 lbs. is required to push down each key. It is easy to calculate the amount of power which the organist must actually develop to play at all. For in stance, in the well known air o "Old Hundred" there ar 34 notes. Supposing each note to represent a chord to b layed by each hand, and each chord to average three notes, there are 204 notes to be pushed down a distance of, say, nch each for every verse or repitition of the tune. The time ccupied in singing the air is slightly over 1 minute. There re $5 \times 204$ or $1,020 \mathrm{lbs}$. are moved through a space of $\frac{1}{4} \mathrm{inch}$ in the above period by the fingers and elbows alone, equal t about $21 \frac{1}{2} \mathrm{lbs}$. raised 1 foot high in a minute, or $\frac{1}{1500}$ horse ower, approximately. The labor an organist has to perform a carrying through a long mass or choral service is consid rable. With the electrical organ this labor is entirely ob viated; the touch is lighter than that of a pianoforte
The builder of this new organ has succeeded in re producing the timbre and quality of the human voice by machinery in a manner which is certainly wonderful. The echo organ is located in the garret, at a point where thre angles of the roof meet, and the sound issuing from theopen pof its case is reflected down upon the ceiling. The effect s such that every sound heard in the auditorium, though aint, is perfectly clear. By drawing the vox humana stopclose copy of the similar arrangement in the celebrate Freiburg organ-and also the tremolo, the performer is en
abled to produce not merely a sound of the quality of the oice, but also one having the voice's natural defect-the $v$ rato or shakiness of tone. Under the circumstance of th illusion, aided by the fact that the sound comes from an op posite quarter to that in which the performer is located, it is exceedingly difficult to convince one's senses that they are deceived. The effect is substantially that of an actual choir The famous talking machine which was exhibited in thi country several years ago, by means of rubber vocal ar rangements, articulated words with great clearness, infin tely better, in fact, than the average vocalist in singing The difficulty was, however, the dismal monotone, and thi he genius of the inventor could not overcome. We there ore suggest a combination of the talking machine and o gan; both are played from key boards, and therefore the ma chine could be arranged to connect with the organ manual by a simple stop. Send the tones of the vox humana ech hrough the mechanical larynx, and there is a singing ma chine. Perhaps the time is not far distant when a congre gation will be provided with a mechanical choir.

## NEW WOODWORKING MACHINERY

In the manufacture of doors, sash, furniture, and patterns, as well as in agricultural implement, wagon, and carriage shops, etc., a large number of different operations, performed upon the same material, require separate machines, which occupy much space and consume much capital.
The present invention, recently introduced by Messrs. J. A. Fay \& Co., Cincinnati, Ohio, is an apparatus which combines the capabilities of several such machines, while embracing the essentials of convenience of adjustment, ease of operation and rapid production. It is adapted for planing out of wind, making glue joints, surfacing straight, taper ing, and beveling work, rabbeting, gaining, grooving, plowing, and beveling work,
ing, working circular ing, working circular
moldings, panel raismoldings, panel raising, squaring up bed-
posts, balusters, and posts, balusters, and newels, ripping, crosscutting, etc., the only practical limit being the capacity of the operator for methods of manipulation. It is con structed on a strong subtantial column of convenient hight, and can be belted either from bove or below; and the ron tables aresupport d on the column in planed pibbed was These table hays tical adjustment by means of hand wheels and bevel gears, for regulating the depth of the cut, and lateraladjustment to make a larger or smaller opening between the tables, according to the size of the head or cutter beng used. The tables have an arrangement by which the distance from the periphery of the cutter is maintained s they are raised or lowered. They are also arranged for receiving the slides of the gaining frame and other ing.

surrounding brass network to the top of the lamp, thereb heating the oil and causing it to take fire or to explode.
"The tube of a no-chimney burner should be not less than 4 inches long, instead of $1 \frac{1}{2}$ inches, the ordinary length; and the fixture which surrounds the flame should be so made as to leave the cap exposed, so that any cinders or fragments of the wick falling down may be seen and removed. These with oil is heand frequently take fire and burn unseen, thl explosive vapor. I have constructed a burner for my 0 w use, which I regard as free from danger. The tube is 4 or 5 inches in length; and the fixture which regulates the flame
end of the horizontally sliding valve stem is provided with slightly curved and grooved T bearing, D, over which and similar bearing, $\mathrm{D}^{\prime}$, in diametrically opposite direction from the former, a skein, E , of cotton is wound, of such thickness that the valve is firmly retained on its seat. The bearing or support, $\mathrm{D}^{\prime}$, is applied to a stationary arm, $\mathrm{C}^{2}$, of discharge ipe, $\mathrm{A}^{\prime}$, and the cotton or other suitable inflammatory mate rial stretched tightly on the supports by means of a screw leeve, $\mathrm{C}^{1}$, that turns on a thread of the valve stem, and in socket recess of bearing, $D$, so to act on the and sure the perfoch reach the valve-holding cotton skein, so as to burn the same, he valve is forced open by the pressure of the water there$n$, and the water is dis charged in all directions on the fire. The sprink er may be tested at any moment by simply cut ting the cotton skein, and instantly be read justed by winding a new skein around the bearing, and adjusting the stretching screw nut.

## Arand Zoologica <br> Laboratory.

A magnificent zoölo ical laboratory is to be founded in Naples Italy, under the contro of M. Dohru. It wil consist principally of a arge general aquarium in which will be col lected all the marin fauna peculiar to Eu ropean waters, togethe with eighteen specia quaria for the prial aquaria for the preser ler natural condition er natural conditions. or those who may be pro secuting original inves tigations into the habits of the fish. A largeli brary and anatomical collection will be added and provision will b made for a number of

J. A FAY \& CO'S. No. 3 VARIETY WOOD WORKER

made for a number of
is attached to the upper end of the tube, and has no connection with the cap, but is 3 inches above it. When in use, the lower end of the tube is nearly as cold as any part of the lamp. It is to be hoped that the numerous inventors of burn ors will furnish us something of

## AUTOMATIC SPRINKLER FOR EXTINGUISHING FIRES,

 Mr. Hezekiah Conant, of Pawtucket, R. I., has lately (November 2, 1875) patented an improved fire extinguisher, which consists in a sprinkling pipe to which water is admitted as soon as a tightly stretched skein of cotton or other fibrous material is touched by the flame.

Biy:t.


Fig. 1 represents a side elevation of the apparatus, and Fig. 2 a bottom view of the same. A represents the water supply pipe at the top or ceiling, which is provided, at suitable points and distances, with downwardly extending discharge pipes, $\mathrm{A}^{\prime}$, according to the dimensions of the rooms. Each pipe, $A^{\prime}$, is provided with a suitablevalve, whose stem, C , is extended in horizontal direction, and guided in a tight ly sealing side bearing, $a$, of the discharge pipe. The lower part of the discharge pipe is arranged with a sprinkler, B, part of the discharge pipe is arranged with a sprinkler, B,
that distributes the water in different directions. The outer
separate private laboratories, to be rented to universities or to governments. The subscription price is $\$ 360$ a year. Ital and Russia have each secured two places, Saxony one, and the Universities of Cambridge and Oxford each one Othe applications are rapidly being received, and it is believed that eventually the institution will be one of the largest and finest of its class in the world

## The Population of India.

Here are the results of the first census of the population of India, taken from the English documents, compiled by L' Union Médicale. India, with the vassal states of England and all their dependants, contains $238,830,958$ souls, which is equal to the entire population of Europe. To every squar English mile, there are, on an average, 211 persons. The largest city is Calcutta, and it possesses a population of 395 , 000 inhabitants. Bombay has 644,000 ; Madras, 398,000 Lucknow, 285,000. Their religious, in round numbers, amount to $140,500,000$ Hindoos ; 40,750,000 Mahomedans ; 9, 500,000 Buddhusts, Jews, and Parsees; the Christians amount to 900,000 , of which 250,000 are European, the other 650,000 are native. There are 23 different languages spokeu in India are native. There are 23 different languages spokeu in India
in the Western Provinces there are 300 different castes; in in the Western Provinces there are 300 different castes; in Bengal about 1,000 exist. There are employed by govern ment $1,236,000$ persons (the natives included); 629,000 (o which 819 are missionaries) are supported by religion; there are 30,000 religious medicants; 10,000 astrologers; 5 sorcer ers; 465 exorcists; 518 poets; 1 orator; 33,000 jurists ; 75,000 physicians: 218,000 artists, among whom are acrobats, ser pent charmers, and monkey showers; there are 137,000 agri culturists; 950,000 elephant and camel drivers and shep herds ; 22 professional gamblers; 5 pigeon trainers; 49 spies 361 professional thieves; 30 highway robbers; 103,000 men dicant vegabonds.

Artificial Butter in Copenhagen.
It seems that our friends in Northern Europe are not to be outdone in thebuttermarket by the French nor ourselves ; and one of them, named Diderichsen, has devised a new method of making suet butter, which differs in some of its details from that employed in this city some two years since. The suet is first washed in cold water, and cut up in fine pieces suet is fist washed in cold water, and up in pieces then it is placed in wooden resels and steam heat. About 1 per cent of soda, dissolved in some water, is added to the melted fat, which is cooked for a few hours. Fresh soda is added, and the boiling repeated, after which the mass is washed with boiling water and pressed through flannel. To this mass, while still warm, but not above $140^{\circ} \mathrm{Fah}$., 3 per cent of olive oil is added, and 3 or 4 per cent of sour milk, and the whole is then churned.

Salt of lemon is the best material for removing stains of ron mold, but it should be used very sparingly, as any excess will destroy the fabric.

IMPROVED TOOLS FOR THREADING BOLTS AND NUTS． The accompanying engravings represent improved ma－ chinery and tools for bolt－cutting and nut－tapping，manu－ factured by the Pratt and Whitney Company，of Hartford， Conn．The series of new machines lately introduced by this firm comprehends power and hand bolt cutters，die stocks， adjustable tap wrenches，and taps，adapted to the use of jewelers，machinists，bridge builders，mill owners，steam and gas pipe fitters，manufacturers of agricultural machines， sewing machine makers，gun makers，carriage builders，and all others requiring bolt－cutting and tapping implements．
The large engraving，Fig．1，re－ presents what is designated as the No． 3 bolt cutter，driven by pow－ er，and having a range for bolts from $\frac{5}{16}$ of an inch to 1 inch diam． eter，and of nuts of corresponding sizes．The head spindle is hollow， and is furnished at the front end with a chuck for securing the bolt to be cut，or for holding a tap．The spindle is driven by a three－graded cone，the arbor of which connects with the spindle by gears．The chasers forming the dies are held in collets（Fig．2），four in each，and secured in radial slots in the col－ lets by screws，permitting their ac－ curate adjustment．These collets curate in holes for their recep are seated in holes for recep－ tion on a revolving cylinder，mount－ ed on a sliding carriage，that is moved on the ways of the bed of the machine by hand wheel，rack， and pinion，as may be seen by re－ ference to the engraving．The cyl－ inder holds on its periphery nine of these collets，and a plate with dif－ ferent sized perforated recesses for holding square and other nuts for tapping．This plate is shown as pre－ sented to the chuck．One plate may be slipped out and replaced by anoth instantly．By removing a collet opposite the work，a bolt may be threaded to any distance desired．The cylinder containing the collets and the nut vise is instantly brought to the bolt，or the tap，by means of the hand wheel， and the cylinder is held in position on its center by a simple

Fig． 2

spring bolt．The threading of the bolt or the tapping of the nut is completed at one operation，the die or the tap cutting a perfectly full thread（without raising or squeezing），fully equal，it is claimed，to that produced on a screw－cutting lathe．The collets may be instantly removed，and may be replaced by hollow mills for pointing the end，turning the body，or squaring under the head of the bolt；and the bolt may then be threaded without removing it from the chuck． The hollow spindle allows bolts of any length to be threaded， and the geared head and three－graded cone gi
and a sufficient range of speeds The chas－ and a sufficient range of speeds The chas－
ers or cutters in the collets are sharpened， ers or cutters in the collets are sharpened，
when dulled，simply by grinding on an ordi－ when dulled，simply by grinding on an ordi－ nary grindstone；and any one of them may be duplicated，when broken，without the neces is economical in the use of oil，as all the chips and oil are received into the hollow bed，and the oil drains through a strainer into a re ceiver，from which it may be drawn to be ceiver，from which it may be drawn to be gain used．The ，furnishe with F．A．Pratt＇s patent reversing clutch which works with ease and certainty，and without jar or strain；and this，with the nut－ tapping apparatus and case－hardened wrench es，is sent as a part of the machine．
A larger machine，similar in construction and operation，has a range for threading bolts from $\frac{1}{2}$ inch to $1 \frac{1}{2}$ inches in diameter．This is known as the N 4 bolt cutter．Two others are built，intended for hand work， known as No． 1 and No．2，having respectively a range of to $\frac{8}{4}$ of an inch and $\frac{8}{8}$ to 1 inch diameters of bolts and taps． The company also build an open die machine，having a capa－ city of $\frac{8}{8}$ to 1 inch bolts，the dies of which are instantly opened，either by hand or automatically，to allow the bolt， when threaded，to be at once withdrawn，thus saving the time spent in running the bolt back through the die．The
dies may be instantly interchanged for the different sizes of bolts without absorbing any time in acjustment
The other engravings show a die stock，Fig．3，with the collet，and an adjustable tap wrench，Fig．4．The die stocks are made of five sizes，capable of cutting from $\frac{1}{16}$ to $1 \frac{1}{2}$ inches diameter，and Nos．2，3，and 4 may be fitted with dies for threading gas pipe of all the sizes up to and including $1 \frac{1}{2}$ inch pipe．These die stocks are drop－forged，in a single piece，from the toughest wrought iron，finished，and then case－hardened．The collets are held in place in the stock by


Fig．1－THE PRATT AND WHITNEY COMPANY＇S BOLT CUTTER．

The Spontaneous Combustion of Coal． The Revue Industrielle says that，out of all the ships laden with cargoes of coal exceeding 500 tuns，which sailed from England for regions south of the equator during the first nine months of 1873，and during the similar period in 1874 23 were destroyed by spontaneous combustion of the coal in the first year，and 50 in the second．These figures indicat 2 per cent of all the vessels in one case and 4 per cent in the other．It appears that the casualties are not imputable to any one class of coal，but to all classes without distinction The theory which attributes sponta neous combustion to the presence of pyrites in the coal may explain，up to a certain limit，the increasing number of accidents；because，before the augmented demand of late years existed，it was customary to free the coal more carefully from this impurity than is at present done On the other hand，Richter has shown that，for various coals experi mented upon，those which containe the most pyrites were not the mos exposed to spontaneous combustion According to him，air is rapidly ab sorbed by the coal，and the oxygen of the air then combines with the organic components to produce car bonic acid，with a development of heat．According to all probabilities however，the heat which determined the spontaneous combustion is due both to the oxidation of the iron and to that of the carbonized matters． This，zonfined in badly ventilated holds，speedily reaches a tempera ture sufficiently high to produce com bustion．

## An International Coinage．

Senator Sherman，of Ohio，recent ly presented to the Senate a resolu tion proposing a common unit of
spring bolts，which，when thrown back by the thumbs，per mit the collet to drop out，to be replaced by another for a different size of bolt．The chasers，as may be seen by refer ence to the engraving，are seated in radial recesses in the collets，and are held and adjusted by screws．
The tap wrench，Fig．3，is also drop forged，of the best ron，finished，and carefully case－hardened．It is made of four sizes，to fit the shanks of taps up to $1 \frac{1}{2}$ inches．There are two jaws seated in the body of the wrench，which are opened and closed by the thumb moving a cam disk，and held in position by a spring pawl．They hold the tap secure ly，preventing the danger of cramping and breaking the tap in using．
The threads of the taps and dies are cut to the United States standard，as promulgated by the Frankl inInstitute but the Whitworth thread，or special sizes，will be furnished as may be ordered．The taps are threaded and fluted before being relieved，the only way，it is claimed，in which they can be，with certainty，finished accurately to gage．In replacing one tap for another，or in duplicating a chaser，a perfect fac－ simile is assured，as the gages by which each piece is finished are themselves duplicated，one set being kept on hand，to be used only for verifying the accuracy of the working gage． The manufacturers have the reputation of using the best quality of steel in the taps and chasers，which are hard ened and tempered in the most careful manner．Every piece is thoroughly inspected，and none with visible imperfections re allowed to leave the works．The workmanship on these tools，the company affirm，is of the best，and they intend to insure entire accuracy in the sizes of the taps and dies，and the grades of the threads；so that the purchaser may be cer tain of obtaining these tools，at all times，of the best mate rial and workmanship，and without variation from standard izes．
The pipe taps are constructed on the same principle as the dies－that of interchangeability－the cutting portions being


Fig． 4.


THE PRATT AND WHITNEY COMPANY＇S DIE STOCK AND TAP WRENCH．
money for the United States and Great Britain and Ireland The proposition is to make the gold dollar the common unit slightly reducing the value of the dollar so that five dollars shall equal the British pound．It was referred to the com mittee on finance．

## A NEW BLOWPIPE．

Mr．Charles Rumley，of Helena，Montana Territory，has ately patented（November 23，1875）a novel form of blow－ pipe，engravings of which are herewith given．The idea is o afford an easy means of expelling the moisture which col lects on instruments of this description，when supplied with air from the mouth；and to this end，the pipe is divided，and the two portions enter a hollow globe，as shown in section

n Fig．2．In this globe is a central strip or diaphragm plate， against which the entering air impinges and which arrests the moisture and prevents its being carried along into the outer portion of the pipe．The globe has also a small exit opening，which，when the blowpipe is in use，is closed by a plug．In order to remove the condensed moisture，it is mere－ y necessary to remove the plug，and turn the globe so that the opening comes beneath．Blowing into the mouthpiece then drives out the water．This device，which is shown com－ plete in Fig．1，offers a simple means of keeping blowpipes clean without detaching any removable parts．

Bicarbonate of Soda a Toothache Remedy．
Dr．Duckworth，of St．Bartholomew＇s Hospital，London， has recently successfully used bicarbonate of soda as a re－ medy for severe toothache，when applications of chloroform， either externally to the cheek or to the ear，o， placed on cotton in the decayed tooth，failed； and when carbolic acid，applied as last men－ tioned，also proved inoperative．Pledgets of cotton，soaked in a solution of 30 grains of bicarbonate of soda in one fluid ounce of water gave almost instant relief．Dr．Duckworth considers that very frequentiy the pain is due to the contact of acid saliva with the decayed tooth；and therefore it is important，in cases of odontalgia，first to determine whether the sa－ liva has an acid reaction．If this be the case， then a simple alkaline applization，as above stated，is the most efficacious means of cure．
Cases of toothache are such common accom－ paniments to disordered stomach that there seems every reason for the truth of the above
inserted in longitudinal slots on the body of the tap，so tha any one of the slips，or cutters，may be removed，if injured and replaced by a duplicate，fitting in its proper and relative place，thus avoiding the re
These tools are manufactured under letters patent issued o J．J．Grant，assignor to the Pratt and Whitney Company Hartford，Conn．，who may be addressed for further infor－ mation．
author＇s conjecture．Doubtless on the same ground is due the efficacy of ammonia，so frequently recom－ mended，but which，if applied carelessly，is liable to recom－ more pain by burning the gum than already exists in the tooth．
Bicarbonate of soda is found in every kitchen，and hence no more handy remedy could be devised，while it is desti－ tute of any painful effects；and the rationale of its operation and its simplicity make us wonder why it bas not been thought
of before

## Cuntregumademte.

## The "Etheric" Phenomenon

## To the Editor of the Scientific American

Permit me in a few hurried words to return to the as yet unexpired subject of Mr. Edison's "etheric" force. Had I time, I would prefer to make my part of the discussion more exhaustive in point of enumerated contra-experiments; but enough remains, without, to expose the fallacies of the speculation. The only way in which I can account for the mystifications of several writers and experimenters on "the new force" is that they have become so involved in the pursuit of an idea that they absolutely are unable to extricate themselves from a position in which a thing, in reality perfectly ordinary per se, seems perfectly extraord
beheld under ultra-ordinary conditions.
The idea of J. P. H., who sees nothing inexplicable in obtaining a spark from an uninsulated wire laid upon wet earth and connected to an insulated source of power, although it has been endeavored to controvert him, strikes the bottom of the whole thing. There is no such thing as a non-conductor of electricity; there is merely a difference in degree of conductivity, an assertion of which dynamic electricity furnishes the proof. The only difference between dynamic and galvanic electricity is the difference of intensity. We use simply a battery to produce the galvanic current. This furnishes us with an atomic vibration of a certain force, which, unless the battery consist of a great many cells, say 2,000 , so that the force of the first cell is augmented by the separate forces of the 1,999 other cells, will not give suffcient intensity to disrupt or discharge. By sending the battery current through a helix,over which is placed a secondary helix of a great number of convolutions, the atomic vibrations of the battery current in the primary helix are multiplied as many squares of times as there are layers of the sec ondary wire around it, and the result is disruption or a spark
from the secondary wire, many inches in length. It is as from the secondary wire, many inches in length. It is as though we were to project a ball from a cannon, and, with in conceivable rapidity, supplement the primary force in succession with the force of a million additional cannon. It is not difficult to calculate the increase of impact in which intensity exists. For instance, if the primary helix shall consist of 6 layers of 100 coils of wire, we shall, in the primary helix alone, have increased the battery impact 36 times. Ta king the atomic vibrations of the battery at $1,000,000,000$ pe second, we have here alone $36,000,000,000$ impacts per sec ond. The secondary helix will consist of 500 coils, making the increased impact five times $36,000,000,000$, or 180,000 , 000,000 per second. The secondary helix will consist of 100 layers, and the impact by induction will be increased 100 times 100 times, or 10,000 times, giving an atomic impact of $1,800,000,000,000,000$ persecond as the result. Is it at all remarkable that this impact, or "kick," results in disruption, or forcing the electricity through what to the direct battery is practically a non-conductor? Or is it remarkable that, if the polarity of the impact is so instantly reversed that it is practically destroyed as soon as created, physiological or mechanical effects should not be produced in the $1,800,000$, $000,000,000$ th part of a second? I have let a person stand on the most perfect insulation, holding a wire leading to on end of sucha secondary wire, the other end of the secondary wire resting upon an insulator, and sparks have passed in
rapid succession from my finger, I standing upon a carpet, to rapid succession from my finger, I standing upon a carpet, to
the insulated person, often an inch or therabouts in length; the insulated person, often an inch or therabouts in length
yet the only circuit for the current was from the free end of yet the only circuit for the current was from the free end of
the coil (through the insulator, table, dry carpet, thirty feet of wooden floor, carpet, and mysself) to the person holding the other end of the coil. Supposing the free end of the coil had passed through 10 or 50 or 100 miles of wet earth, entire ly uninsulated, and finally the end were laid upon the table, what would have been the difference in the spark passing from my hand to the person? I answer, and any competen electrician will understand and acknowledge it, none what ever
I might have expressed myself in much stronger term than in my communication on page 36, but several consider ations prevented my doing so. I do not, therefore, charac terize the speculation as a deception, for the reason that th advocates of the etheric force may sincerely believe in it
but I do not hesitate to pronounce the whole thing, both as concerns the public and in a scientific point of view, as one of the flimsiest of illusions.
As stated in the article by Dr. Vander Weyde, on page 89 the conclusions of Dr. Beard are tinged with some disregard of the laws of static (or dynamic) electricity; and while Dr. Vander Weyde cannot technically agree with my views, I do not see but that he does so practically. He explicitly asserts his belief, precisely my own, as set forth in my communi cation, that the observed phenomena are due to induction induced electricity of alternating polarities; and excepting on some minor points, I do not see that Dr. Vander Weyde i
not an essential advocate-originative of my own position not an essential advocate-originative of my own position,
however much he may differ from me in respect of the theo ry of atomic vibrations, which is by no means a part of this discussion.
But assuming that the etheric force is something, the ques tion of its practical value is narrowed down to its utility a a telegraph; hence

1. To be of any real value it must be as direct and simple in its operation as the Morse telegraph; or
2. It must enable the construction of telegraph wires on an extremely economical scale; and this must cover the capabilities of the force in respect of a single wire as regards the capabilities of the Morse telegraph in respect of a single wire.

It clearly does not and cannot meet the first requirement Therefore it must do a great deal in respect of the second and how does it meet the second requirement?
The ordinary telegraph can be constructed, poles and all, or $\$ 150$ per mile; each additional wire on same poles fo $\$ 60$ per mile. As the etheric force is assumed not to require insulation, if we place its wire upon poles we shall save
merely 40 insulators at 12 cents a piece to the mile, or $\$ 4.80$ This certainly is not practical value.
If, on the other hand, we place our wire underground, it will cost us, naked, at the very least $\$ 150$ per mile, and the wire would not last so long as upon poles. Nor, certainly, is this practical value.
A higher speed of transmission than 500 words per min ute over a single line is useless. The automatic telegraph yields a greater speed, yet it is a practical failure, for it does not and never can meet the requirements of a busi ness telegraph, and I make this assertion while I am th nventor and possessor of such a system, obtained by con siderable study and an expense of many thousand dollars. Taken in all or any one of its bearings, I contend that I
have proved the practical inutility of the "etheric" force, have proved the practical inutility of the "etheric" force,
and this is assuming that we really have found something or other capable of something or other: whereas, when we scrutinize the subject, we find that we have only wild speculation as to having found something or other capable of
something or other, which, at best, even if realized, will cost something or other, which, at best, even if realized, will cost as much, cor nearly as much, as what we already have, affairs.
After all that has been made public, almost any person ought to be able to experiment intelligently with the etheri orce. About as easy a way to get a sight of this etherea therity is as follows


Take a bar of iron, F , and wind it with insulated wire tarting from the - pole of the battery, A, and passing in ne direction round to B ; then to C , and from C winding in he opposite direction around the bar, terminating at the con act point, E. From the + pole of the battery connect with contact point, D . Be careful to make the helix from battery to B and from E to C identical as to resistance in ohms and number of convolutions. There should be at least 10 layer f wire, the bar being about 7 inches long. The bar should be bent to form a horseshoe; when the contact points, D and E, are brought together, an armature is not attracted, as both ends of the bar are of the same polarity. Now separate the points, D and E, and you will get a bright spark, in whic he polar effect of one portion of the coil is instantly neu ralized by the polar effect of the other portion.
In order to bring the subject of the "etheric" force to ocus, I pronounce as utterly absurd, and challenge a de monstration to the contrary before competent and unpreju iced witnesses :

1. The statement that the etheric force can be transmitted ay from New York to Philadelphia, over a really uninsula tod single wire : that is to say, the wire, if an ordinary wire hall have such ground connections at different interven ng points that a galvanic battery current will be completey short.circuited and unable to pass from New York to, Phil delphia.
2. The intimation that the etheric force can be transmitted any distance, say one half mile, through the gas pipes of a city : provided there shall be no return wire, but simply an arth plate at the distant terminal, and that the area of the earth plate shall be the same as that of the ordinary earth late at telegraph stations, and that the earth plate shall be mbedded in earth no more moist than that through which he gas pipe passes.
As I am prejudiced, I cannot, of course, witness the inter esting proceedings I propose
W. E. Sawier.

New York city.

## The Original Oll City.

The readers of the Scientific American, or at least a many of them as are interested in the subject of the petro leum products, have a general notion of the machinery used for boring for oil, and for pumping, refining, storing, and
transporting it. To such readers, as well as to those who transporting it. To such readers, as well as to those who f how they do these things in Asia will not be unaccepta ble.
The peninsula of Apsheron, at the southwest corner of the Caspian Sea, abounds in naphtha springs. The oil wells, fif een yearsago, yielded anannual product of about 4,000 tuns which is now probably much increased. The wells find oi t an average depth of about 150 feet. These wells are bout 1 foot in diameter, and the pumping apparatus is among the most simple A tube, 9 feet long by 9 inches in diameter, furnished with a valve which opens when it
touches bottom, is lowered and raised by a steam engine. thishes bottom, is lowered and raised by a steam engine.
This machinery lifts in a day about 500,000 lbs. weight of crude petroleum. The tube is lifted clear of the ground and then (by hand) emptied into a conductor, whence it run to a reservoir, rudely dug in the ground. From this reser-
voir, the oil is dipped in buckets and transferred to leather sacks or barrels, for removal. The price of the crude art cle at the reservoir is about 10 cents for 100 lbs., or five imes cheaper than the usual price of crude petroleum in the ennsylvanian oil regions.
The steam machinery is driven with petroleum for fuel. A
the mouth of the firebox, a small stream of petroleum trick bs from a tap, and a steam blast blows it, in continuous jet of spray, into the fire. The same description of apparatus is sed on the steamboats which navigate the Caspian Sea The port of the district is Baku, having about 5,000 inhabiants and an antiquity which is shown by the fact that re mains of ancient buildings are found in the earth at a depth of 18 feet. Baku will soon be united to the Black Sea by railroad, now in process of construction, over a distance of about 200 miles. On this road, petroleum steam engines will drive the locomotives, and the Euxine or Black Sea and the Mediterranean will probably be traversed by petroleum-drive steamers. On the Caspian Sea, the boats burn petroleum a cost of about $\$ 1$ (one and a half Russian roubles) per hour, while for coal the cost is twelve times greater. In the Mediterranean and the Black Sea, the disparity would not be so reat; but the difference in cost would probably leave a arge margin in favor of petroleum. At Baku and on the peninsula, both petroleum and the gas which issues from the round are used in distilling and refining. They are applied in lime burning, and for various other purposes, cooking cluded, it is to be presumed. It is curious that, while or unnumbered ages petroleum has been so readily ac cessible at this and other points in the old world, its com mercial value was left to be ascertained in the new; and tha wenty-five years practical knowledge of the article in Ame ica has sufficed to make kerosene a leading article in the world's consumption and commerce. But the Asiatics-or to speak more correctly, the Russians-appear to have been good pupils, and are, in some respects, in advance of us, Their steam machinery may be rude; but they are before us n the practical use of petroleum as fuel. The Baku article said to be less inflammable than ours, its flashing poin being $40^{\circ}$ higher.
Baku is the chief city of a province of the same name now held by Russia, formerly a part of Persia, and stil largely populated by Persians. It is only within the mem ory of the present generation that the Russians reduced th formidable Circassian chieftains to obedience. That accom plished, Russian activity is now turned, as in other places, to the development of the resources of this country. On the peninsula where the oil is found is the "Field of the Eter al Fires," where the Guebers or Parsees (fire worshippers) of old had altars and temples; and the burning gas made the spot holy ground, the point of pilgrimage for thousands of worshippers. Now there are no pilgrims, or next to none he Persian inhabitants of the spot are more bent upon util zing the sacred fire than adoring it. Few altars remain, an heir few priests come from a distance to mortify the flesh, a the spirit is mortified by the desecration of the eternal fires he ancient cultus is burning out in lamps, furnaces, an steam engines. Tempora mutantur. Times are changed when the wandering correspondent of the London Telegrap (from whom we draw the recent facts in the above statement ould hire a despondent priest of the ancient superstition, by couple of roubles, to perform his incantations.

## Exhibition of Scientific Apparatus

The Science and Art Department of the British Government South Kensington Museum, is about to open a Loan Exhi bition of Scientific Apparatus on April 1, 1876, to remain pen until the end of September.
It will consist of instruments and apparatus employed for esearch and other scientific purposes, and for teaching. It will also include apparatus illustrative of the progress of Science and its appication to the arts, as well as such as may possess special interest on account of the persons by whom, or the investigations in which, it had been employed Models, drawings, and photographs will also be admissible, wherite originals cannot be sent. The apparatus may, in certain cases, be arranged in train as used for typical inves tigations: and arrangements will be made, as far as it ma be found practicable, for systematically explaining and illus trating the use of the apparatus.
Persons desirous of exhibiting should send to the Director f the South Kensington Museum, London, S. W., for fur ther information. Briefly, it may be said that the appara tus for teaching arithmetic, including calculating machines of every description, and for teaching geometry, with the instruments used for geometrical drawing, in copying, in making graphic representations, with models of all descripions, head the list. Measurement, kinematics, statics dynamics, molecular physics, sound, light, heat, magnetism electricity, astronomy, applied mechanics, chemistry, me teorology, geography, geology and mining, mineralogy crystallography, etc., and biology, are all to be represented with such fulness of detail as may serve to illustrate in most striking manner the means and materials of scientific research and advanced education. The Exhibition is favored by the savants of the continent as well as Great Britain There is a vast amount of similar material in the United States, some of it, such as the great collection in the Stevens Institution of Technology, of much historic interest, and no pains should be spared at the approaching Expositio o bring it together, and present it in a similar manner.

To cure the intolerable itching that always follows frost bitten toes. it is necessary to exclude the air from the affect ed part. If it is not accompanied with swelling, gum shel lac dissolved in alcohol, applied so as to form a complete coat, is the easiest remedy we know of. It dries soon, does not adhere to the stockings, and generally lasts until they are well. If the flesh becomes swollen and painful, plaster of good sticking salve are of great service; but if highly in famed, use any mild poultice that will exclude the air from the diseased part, and keep it moist, doing the rest.

NEW APPLICATIONS OF ELECTRICITY TO ORGAN BUILDING.
A concert organ has recently been erected in Chickering Hall, corner of Eighteenth street and Fifth avenue, ; $n$ this city, which is remarkable for the numerous entirely novel and ingenious electrical and pneumatic inventions which enter into its construction. The instrument is one of considerable magnitude, having three manuals, a compass of 58 notes, 29 pedal notes, 33 stops, and the necessary couplers and mechanical accessories. So far as the location of its parts is concerned, it is really three organs in one; that is to say, a portion of the pipes are on one side of the stage, a portion are some 60 feet away on the other side, while a com plete though small organ, used for echo effects, is placed on the roof of the hall and about 175 feet distant from the sin gle set of keyboards at which the entire apparatus is mani pulated.

The portion of the instrument which is directly in rear of the keyboards is provided with pneumatic levers, so that the pressure on a key, instead of acting directly upon the valve of the pipe to be sounded, opens a valve which admits air into a small bellows. The latter, in its movements, actuates the pipe valve, and thus performs the heavy work, so that the merest touch is sufficient to move the key. With the exception of this ingenious pneumatic device, all the rest is directly mechanical, and, since it does not differ from the usual church organ arrangements, needs no further refe rence. In the other two organs, however, are found the curious electro-pneumatic inventions which have seemingly re volutionized the art of organ building, for by their aid not only can new effects be produced, but one or a dozen organs can be played at once, and all their stops perfectly controlled, and this irrespective of whether they are located within ten feet or ten miles, or in fact any distance, from the player.
We propose to explain, by the aid of the annexed dia grams, first, how the pipes are sounded through pressing the keys, and, second, how the stops are manipulated. For the benefit of those unfamiliar with organs, it may be stated in advance that, by "means of stops, air is admitted from the main bellows into any desired set or sets of pipes. Each set of pipes gives a different quality of tone, and thus the performer may select just such sounds (flute-like, trumpet-like, etc.) as best suit the character of the music. Having regulated his instrument by adjusting the stops, his fingers, by pressing the proper keys, open the valves leading to the in dividual pipes, and thus the instrument is played. In order to apply electricity to the object first mentioned above, it will be obvious that the keys must act exactly as do the keys of an ordinary telegraph instrument, thatis, on being pressed down, they must establish a current which, passing over a connecting wire, actuates mechanism at a distance. This is precisely the case, so that the organist has no power to exert beyond the very light pressure necessary to so move the keys. Each key controls its own circuit; and as the mechanism is the same for each, a description of one will suffice for all.


In the diagram, Fig. 1, A is a part of the air chamber, in which air, led by an air trunk from the air bellows, is kept compressed. B is the pipe corresponding to the key whose operation we are considering. There is an opening between the air chamber and pipe, closed as shown by the valve, C. Attached to this valve is a small bellows, D. Through the bot tom of the air chamber is another orifice in which plays the double valve, E , the stem of which is continued downward and is attached to the pivoted armature of the electro-mag. and is attached to the pivoted armature of the electro-mag
net, F. Said armature is provided with a spiral spring, the net, F . Said armature is provided with a spiral spring, the
effect of which is to hold it away from the magnet and so to shut the lower part of valve, E, while holding the upper part open. This being the case, a portion of the compressed air in A will pass under the valve, but, being unable to escape at the orifice below, will enter the channel, $G$, and so ascend into the bellows, D. There will therefore be a constant equilibrium of pressure about the bellows, and thus the valve, C, will be pressed tightly shut against its seat.
When, however, the key is pressed, then the circuit is es tablished, and the magnet, $F$, becoming excited, draws down its armature, thus shutting the upper part of valve, E , and closing the lower part. The air in the bellows, then being free to escape through the passage, $G$, cannot equilibrate the pressure in the air chamber, and hence the bellows closes and at the same time pulls down and opens the valve, C. A blast of air is then free to enter and so sound the pipe. This
s'ate of affairs holds as long as the kgy is held down; but S'ate of affairs holds as long as the kay is held down; but
the instant it is released, the circuit is broken, and the va
rious parts regain their normal position. The apparatus is extremely sensitive, and in its prompt action even surpasses the damper movement of a fine pianoforte; so that, in fact, the quickest passages and shortest notes can be played with a
clearness, crispness, and brilliancy hardly otherwise attaina clearness, crispness, and brilliancy hardly otherwise attaina-
ble. Of course the intervening distance between this me chanism and the keyboard is practically immaterial so long as there is sufficient battery power. In the echo organ, pre viously referred to as located in the roof of the building, six Leclanché cells are found'amply sufficient, although there are some two miles of connecting wires. This very light battery power required, in fact, is characteristic of the whole instrument.
Having seen how each key is worked, we now pass to th means whereby the whole set of 58 keys is caused to con trol any desired set of pipes. In Fig. 2, A is an air chambe or wind box, fed as before from the main bellows. The small bellows, B, in this case is located outside of the chambe but communicates with it by the passage, C , in which is double valve, $D$, similar to valve, $E$, in the preceding dia

gram. When the upper part of valve, D , is raised and its lower part closed, there is a free passage for the air to pass from the wind box and into the bellows. When the valve is lowered, as represented, there is a clear passage from the bellows to the outside air. The stem of valve, D, is connected with an electro-magnet, E , arranged as previously described. There is, besides, another magnet at $F$, which controls a There is, besides, another magnet at $F$, which controls
moving armature, $G$, one end of which forms a latch and en moving armature, $G$, one end of which forms a latch and en-
gages with the armature of magnet, $E$. On top of the bellows are two pairs of springs, one pair, H, being in control only when the bellows is down, the other, I, being in like condition only when the bellows is inflated. $J$ is the stop in the organ, on the lower side of which is a switch which comes in contact with one or the other of the metal plates, K and L , according as the stop is pushed in or drawn out The lead of the circuits is first from plate, $K$, to magnet, E, thence to the upper spring of pair, I : from the lower spring of same pair to the battery. The second circuit passe from plate, $L$, to magnet, $F$, to lower spring of pair, $H$ from the upper spring of same pair to battery. The objec is to move the bellows, andthislast moves a series of switch es oscillating on a horizontal axis so as to establish connec
tion in 58 key circuits at once. When the stop is pushed in tion in 58 key circuits at once. When the stop is pushed in
as shown, there is obviously no.connection with the battery, because of the pair of springs, I, being separated. Supposing, however, the stop to be drawn out, then the switch on its lower side comes in contact with plate, L, the current passes and excites the magnet, $F$, which draws back its armature, $G$, and so releases the armature of magnet, E , the current of course continuing through the pair of springs, $H$, and so to battery. But the effect of releasing the armature of mag net, $E$, is to raise the valve, $D$, so that, as before stated, the air from the wind box is allowed to pass through the passage and into the bellows. The latter then rises, throwing over the 58 switches and so establishing the connection of the keys. But as this rising continues, the springs, H, separate. The circuit is thus broken. At the same time the pair of springs, I, come in contact. The bellows remains, however inflated, because the position of valve, $D$, remains unchanged,
no circuit being complete through the springs, $I$, and magnet, E, until the stop pushed in establishes connection with plate, K. Consequently the bellows will stand full and thus push the switches into action as long as the stop beside the keyboard is drawn out. When that stop is pushed in, the circuit closes, magnet, is, E excited, and valve, D, drawn down, cutting off any further supply of air to the bellows, and opening an escape for its contents. As valve, D, falls, the catch on armature, $G$, slips over the armature of magnet, $E$ and as the bellows descends, springs, I, once more separate and thus the parts are again brought to the condition shown in the diagram.
It will be observed that this is all done with an open cir uit: that the circuit, in fact, is always open, except just when changes are taking place, so that, with a battery like when changes are taking place, so that, with a battery like
the Leclanché, which stands out of operation when there is
o circuit, the exhaustion of the same is very slow and the There are variy light.
There are various other ingenious attachments of less importance than the foregoing, which are hardly necessary to be described. The credit of the inventions belongs to the builder of the organ, Mr. Hilborne L. Roosevelt, of New York city, and at some future time we shall probably recur to them gain.

## Beware of Him

A correspondent writes from Chatham, Ont., that a man, representing himself to be an agent for the Scientific american, had obtained a number of subscribers in that place and its vicinity. To make the deception more com plete, the fellow pretends to be an artist, and represents himself to be authorized by us to make sketches of machinery public buildings, manufactories, etc.; and he has probably received some money besides for his artistic services, but concerning this the writer does not speak.
If our friends would bear in mind what we so often repeat that no traveling agents are employed to solicit subscription for the Scientific American, they will save their money and preserve their tempers. We frequently get letters from persons complaining impatiently that they do not get thei papers, and adding, after relating the circumstances of their paying their money to some itinerating scamp, that, if he was not authorized to receive their money, it is our duty to follow him up and have him arrested for swindling. Such persons seem to forget that, if they had used the slightest precaution, they would have avoided being swindled. We ask the public to remember that we do not employ traveling agents; and if persons pay their money to irresponsible agents; and if persons pay their money to irresponsible
parties, they should not blame us or expect that we can parties, they should not
make their losses good.

Business Prospects for 1876.
Now that everybody has balanced his books and h s deter mined his profits for the year gone by, the future, in place of the past, has become the object of general concern, and ques tions as to the condition of trade and business prospects for the next twelve months are in every one's mouth. While we note no especially great activity in business circles generally, in our own case we certainly find much cause for self congrat ulation. Subscriptions to the Scientific American fo 1876 are literally pouring in, in numbers in excess of all previous years; and our new paper, the Scientific Ameri can Supplement, has met with a reception exceeding ou most sanguine anticipations, placing its success beyond a shadow of doubt. Than these facts no more gratifying evi shadow of doubt. Than these facts no more gratifying evi-
dence of the constantly increasing taste and demand for sci entific information could be found; nor could those, who, entific information could be found; nor could those, who,
like ourselves, believe in the advancement of the country's like ourselves, believe in the advancement of the country's
prosperity through the diffusion of useful knowledge, receive more flattering proof that efforts in that direction are by our industrial classes fully appreciated and rewarded.
We would ask all our friends who have not as yet re newed their subscriptions, and all who areengaged in forming clubs to send in their names as rapidly as possible. We con tinue to forward back numbers, dating from January 1, to all new subscribers, unless specially ordered to the contrary. Those who can conveniently patronize local news dealers, we advise to do so, since they then receive their papers free from the creases necessitated by the folding for the mail ; and at the same time they patronize a useful home enterprise, whic deserves their encouragement.

## A Remarkable War Ship.

In illustration of engineering progress, we give in this week's Scientific American Supplement (No. 8) an interesting article descriptive of the new British man-of-war Inflexible, with diagrams, showing the dimensions and made f operating her enormous guns. This ship is now in course fonstruction at Portsmouth. Her iron armor is to be two feet thick. The ship is 320 feet long and 75 feet wide, and is to carry two 81-tun guns. These guns will have an exterior diameter of 6 feet, 24 feet length, and 16 inches caliber. The projectile weighs $1,650 \mathrm{lbs}$, and over a barrel of powde ( 300 lbs.) is the firing charge. The vessel's engines will be of 7,000 horse power, operating on twin screws. The hul will have 127 watertight compartments. Altogether the In flexible is the most wonderful specimen of naval architec ture ever undertaken.

## Useful Recipes for the Shop, the Household. and the Farm.

Dried potatoes, which may be kept any length of time and which, when boiled with a little salt, are not distinguish able in taste from the fresh vegetable, are prepared as fol lows: After being peeled and cut into disks, they are treated with cold water to which has been added 1 per cent of sul phuric, or 1 to 2 per cent of muriatic acid. Washing in pure water follows, and the pieces are then placed on wire frames and dried in an oven. When done, the disks are of a slightly yellowish tint, and are transparent, like gum.
Dry earth treatment for ulcers has been found very suc cessful, Large, sloughy ulcers, after being washed, wer covered with a thick layer of earth, over which a piece of wet paper was placed as a support, the whole being neatly bandaged. In a few days the ulcers began to clear, and when the surfaces looked healthy and granulating, a dressing made as follows was used: A piece of muslin the size of the ulcer was immersed in carbolic oil (in the proportion of 1 part acid to 10 parts cocoanut oil); with this the sore of 1 part acid to 10 parts cocoanut oil); with this the sore moistened earth and a bandage. In a short time the healing process manifested itself satisfactorily, while all odor was entirely removed.

## IMPROVED SASH FASTENER

We illustrate, in the annexed engraving, a new and simple Sash fastener, which, when secured, prevents the opening of sashes from the outside, and also their rattling by the wind. A spring band or latch, A, is screwed at its flattened upper end to the sash frame. Its middle portion is bent toward the window frame, and its lower part is carried outward to serve as a handle. In the middle part is a perforation which locks, by the spring action of the latch, on pins arranged along the frame, and one of which is shown at B. By releasing the latch, the sash may be raised or lowered; and by catching the former over the pin, it is retain on the sash, back of the spring latch, defines the rearward motion of the
ing between the traps. In case the main drain pipe, B, does not communicate with the roof, as is almost always the case a crosspipe may be led therefrom to the pipe, D , so as to prevent any siphoning which might take place in the first trap of the apparatus through said main pipe. The sliding doors Thown above are for giving easy access to the interior.
The inventor, who is a practical plumber, claims that this device shuts out completely all sewer emanations from the house which it guards. He points out that it is practically impossible for the gases, even under any pressure which back througherated in the drain pipes, to especially when the convenient outlet offered by the roof pipe, $D$, is already open to them. No alteration of the plumbing arrangements of the building is required for its insertion, that operation of the building is required and as quickly and asily as that of placing being performed as quickly and as easily as that of placing
an ordinary trap in the cellar drain. The pipe, $F$, serves an ordinary trap in the cellar drain. The pipe, $F$, serves
as an efficient mode of clearing the first chamber in case any as an efficient mode of clearing the first chamber in case any
sediment should accumulate. It is provided with a valve as shown
For further particulars address the inventor, Mr. J. T Campbell, 1,284 Broadway, New York city.

IMPROVED BRUSH BINDER
Mr. John Blair, of Boston, Mass. has recently patented a new binder for the bristles of paint and other brushes, which, he claims, is tightly fitting and quickly ad justable, and holds the bristles firmly together where they are in connection with the ferrule. It consists of a continuous piece of soft rubber, which is attached by a cylindrical band in the bristles below the ferrule, and by connec ting the perforated yoke part to the ferrule and handle. The fer rule has side openings, which allow the head of the brush to be grasped.
In the engraving, A represents the improved brush handle or binder, which is slipped over the brush handle by its centrally per forated yoke part, B, until it is seated at the base of the same on the brisi e ferrule. The yoke, B, connects by its side pieces, $\mathrm{B}^{\prime}$, over the ferrule to the cylindrical main part, C, of the bridle, which is made in one continuous piece therewith, fitting tightly around the bristles below the ferrule, and binding firmly, yet yielding thereon, so as to prevent the paint from rising to the upper part of the bristles. The binder is used with the brush until the bristles are worn down, preserving, in the meantime, the upper part of the bristles in their original condition.

Discovery of an Ancient City.
It is related in Russian journals that, during the recen military survey of the steppes, east of the Caspian Sea, the soldiers discovered the ruins of an ancient city, the existence of which has been utterly unknown in modern times. Judg ing from the ruins, the city must have had a large and fixed


## Campbell's sewer gas trap

population. Several Arabesque minarets are still well preserved, and bear evidence of the skill of their builders. Remains of extensive aqueducts were also found, some of them still flowing with good drinking water. A number of incriptions were copied by the officers of the expedition, and brought to St. Petersburgh. According to a tradition of the Turcomans, the country was once very fruitful, and was watered by means of a canal. nutrition.-Becquérel.

## IMPROVED CARPET RAG LOOPER.

A new and simple device for securing together the ends of he strips of rags used in weaving carpets is illustrated in he engraving herewith given. It affords a very quick and asy way of performing the operation, and at the same time s so constructed that the rags cannot become caught or angled so as to necessitate delay to remove them from the pparatus. It seems to be an implement which will greatly facilitate the labor in hand carpet weaving
A is a triangular slotted blade, having a reduced shank, which is suitably attached to a V-shaped clamp, by which the device is easily and firmly secured to the edge of a table. At the heel of the blade are formed short projecting rms, to keep the strips from slipping under the blade. The

mode of attaching the strips consists in passing the shorte of the two strips, B, over the blade first; then the second or longer strip, C, is forced over, and, finally, the end of B is brought through the slot in the blade. Both strips are then simultaneously lifted off the blade, causing the strip, B, to be drawn by a loop through the slits in both strips, thus orming a weaver's knot, as shown at D. The end of strip. B, is then pulled out of the slot.
Patented November 23, 1875. For further particulars relative to proposals for manufacture, address the inven tor, Mr. W. H. H. Wyckoff, Lesser Cross Roads, Somer mat county, N. J.

Bacteria found in the Perspiration of Man.
Dr. Eberth, of Zurich, Switzerland, has found, says the Medical Record, by the aid of the microscope, in the sweat of the face some corpuscles which he considered as bacte ria. This view became confirmed when he examined the axilla, breast, and in ner side of the thigh of several persons in a state of perspiration. The sweat of these parts contained nearly alway enormous numbers of bacteria. In most cases they originated from minute bodies found upon the hairs in the mentioned regions, forming little nodules on them, and giving them a grayish or a brick color, They were recognized by the author as accumulations of micrococci. They may rapidly increase in number are smaller than the diphtherial micro cocci, and are nearly indifferent to re agents (concentrated acids, alkalies, alcohol, ether, chloroform) Iodine co lors them yellow. The vegetation of bacteria on the hairs may be observed in cases where they are changed already beginning in places which have clefts be $t$ ween their cells. The vegetation occu pies large spaces, especially in the direc tion of the longest diameter of the hair Dr. Eberth observed a mycelium and micrococci, and thinks that the latter are the fruits of the former. Other investi. gators observed colored sweat, red and blue, which contained micrococci. It was difficult to decide in these cases if the coloring matter was adherent to the micrococci, or if it was a product of the ve getation.

Organic Elements as Electro-Motors.-It appears, from the author's researches, that the interior of a muscle is negative, which indicates that there is oxidation in the inte rior and reduction at the exterior, and that all organized bo dies appear formed of-so to say-an infinite number of elec tro-motors, which intervene probably in the phenomena of

IMPROVED COUNTERSINK FOR BORING TOOLS. Mr. Richard J. Welles, of Kenosha, Wis., has recently patented an improvement in countersinks to boring tools, which is illustrated in our engravings. Fig. 1 is a side elevation of a boring bit with the countersink attachment. Fig. 2 is a side elevation of the attachment without the bit; and Fig. 3 is an end elevation. A and B represent the two pieces forming the countersink, said pieces being clamped on the bit shank, C, by screws, D, and having dowels, E, to aid the

Big. 1

screws in keeping them in position. F represents the cutting points or bits of the countersink. They are in form about a quarter section of a cone, and arranged with their cutting edges, $G$, parallel to the clamping screws, $D$, so that they work alike, whether clamped to a large or small shank, C and ample clearance is provided between the heel of one and the cutting edge of the other. $H$ is the gage or stop for regulating the depth of the countersink. It is a small bar, with a foot, I, at the lower end, clamped to one of the pieces of the countersink by one of the clamp screws by which the two pieces are clamped to the bit, the screw passing through a slot, J , in the bar, to allow the latter to be shifted up and down, according to the required depth of the countersink The pieces, $A$ and $B$, are rounded at the upper end, to ren der the attachment capable of turning on the surface of the stuff without catching and binding on any irregularities thereof.

HOUSEHOLD: DEVICES, GATES, AND HINGES.
Continuing our extracts from Knight's "Mechanical Dic tionary,"* we select, this week, a number of interesting il lustrations of devices pertaining to the dwelling, and also a Fig. 1.

series of engravings showing a variety of forms of gates and hinges.
In Fig. 1 are represented several kinds of
lamp chimney cleaners.
Beginning on the left, the first is simply a pair of brushes
*Published in numbers by Messrs. Hurd $\&$ Houghton, New York city.
attached to the end of bent wire springs, which hold the brushes out against the interior of the chimney. The second device is essentially the same, a handle being added and pads substituted for brushes. The third is a single pad without springs. The fourth has brushes of different shapes adapted to the straight and curved portions of the chimney. The brushes in this case are pressed outward against the chimney by bringing the handles of the implement together. In the fifth device, curved pads replace the brushes, and there is a modi fication in the shape of the handles.
In order to facilitate the somewhat difficult operation of cutting oil cloth, a
represented in Fig. 2, has been devised. In this the blade is Fig. 2.

notched and secured vertically in the lower portion of the handle; the latter is held above the floor by a caster. The edge of the cloth being placed in the notch, and its adjacent portion held, the knife, when pushed forward, makes a neat division, much more easily and accurately than it is possible to perform the same by hand, knife, or shears. The fireplace heater
shown in Fig. 3, is set within the fireplace, and serves to warm the room, the pipes discharging into the chimney. The

Fig. 4.
Fig. 3.


Rinthes- Line Itholder.
kind here especially represented is known as the Latrobe, and is base-burning. The pipe passes up the brick flue to heat the air which circulates between pipe and flue to the rooms above, into which it escapes through suitable registers.
Fig. 4 is a simple form of
CLOTHES LINE HOLDER,
designed to secure the line without necessitating the tying of the latter about its supports. It consists of a hook cast upon the main plate, and in a lug of the latter a serrated swing. ng segment is pivoted. The line is jammed between the ierrated portion of the segment and the hook. The attes.
shown in Figs. 5 and 6, are as follows: $a$ is a gate with ad ustable hinges operating on rings on the post, the fastening consisting of a movable latch and staple. $b$ shows a mode of setting up the gate, when the outer end sags, by means of the diagonal strut. $c$ is another form of setting up the outer end, by means of a tie slat. $d$ is a gate, whose top bar is pivoted on the post, the whole device being counterweighted by a box of stone on the extended bar. $e$ slides longitudi nally, its slats traversing on rollers. $f$ is a so a sliding gate, which has rollers to keep it level, whether open or shut. $g$ is a gate which slides half its length and then rotates on a bar at its mid-length. $h$ is a gate of pivoted bars, on the principle of the lazy tongs. $i$ is a gate having a set of pivoted slats which assume a vertical position when the counter weighted top slat is allowed to oscillate $j$ is a suspended weigh which sings in a is a wate is a gate suspended from pulleys and counterweighted. and $m$ are gates operated by equestrians or persons in vehicles by means of ropes.

Hinges,
which are probably the oldest devices of the kind now known, were crude affairs, and were very similar in construction to those made in our early Western log cabins. A pin projecting from the upper edge of the door was socketed in a vertical hole made in a bracket attached to the wall and a similar pin on the lower edge of the door was stepped into a socket in the floor or threshold. The illustration, $a$, Fig. 7, is from a model house, found in Egypt by Mr. Salt, and now in the British Museum. The doors of Egypt were either single or double, and were secured by bars and bolts, as seen in the figure. The hinge pieces were usually made of bronze. $b$ and $c$ show the upper and lower door pins and the sockets, in which the edge of the door is received and in which it is secured by bronze pins. The projection on the upper piece was to keep the door from striking against the wall. o shows the general form of a door in remains of
tone, marble, wood, and bronze. $p$ is a bronze hinge in the Egyptian collection of the British Museum. $q$ is the plan of he threshold of an ancient temple with the arrangement of the folding doors. $r$ and $s$ are four Roman hinges of bronze now in the British Museum.


The other hinges shown in Fig. 7 are designated according to the purposes to which they are applied, or with reference to some structural peculiarity of shape. Thus $i$ is a loose joint or self-shutting or blind hinge; $g$ is a screw and strap

Fig. 7.



#### Abstract

bstract from the Congressional Annual Report of for the Year Ending December 31, 1875 .  Balance to credit of Patent Fund, December 31, 1875............... $21,795.65$ Ampunt standing to reredit of Patent Fund in the Treasury of the United States, January 1, 1875. Treasury of the United States, January 1, 1875.\}, $\ldots \ldots$.

\section*{Statement of the business of the Office for the year 1875.}  nclusive. 


## Tota

Total number of
Total number on
Total number on
Total


In presenting this annual report, the Commissioner makes ment of business facilities at the Patent Office

1. To the corps of one hundred examiners now employed he asks for an addition of twelve more examiners. He also asks for the restoration of the grade of Third Assistant Es aminers; and suggests that the duties of Principal Exam rers ought to be defined by law.
2. He suggests that all decisions of the courts shall be published in the Official Gazette, such publication to have the same force and effect as if published by authority of th ourts.
3. The publication of the back patents-those granted be tween 1836 and 1871-is urgently called for, as a matter o he highest importance.
4. The improvement of the Patent Office library, by an nnual appropriation of $\$ 5,000$, is suggested
5. The necessity of enlarging the Patent Office is conclu ively shown. From five to twelve persons are now com pelled to occupy rooms averaging each not more than twenty feet square, this space being also reduced by the cases fo letters, papers, etc. ; while models have to be tucked away in the attic.
The Commissioner's Report is one of the most straightfor ward, practical documents ever issued from the Patent Of fice; and we hope that Congress will adopt the excellent sug gestions it contains.

DECISIONS OF THE COURTS.
Supreme Court of the United States.











 ent node, be it better or worse, is, in substance, an application of the same
princlple.
Wnen ine inventor says: $I$ recommend the following method,' he does








 to entitile a plaintiff to recover for the violation of a patent, he must be the
original inventor, not only in relation to the United States. but to other parts
of trine worli. Even if the plainiti did not know that the discover had been
made betore, still ne cannot recover if it has been in use or describea in

 food, vegetable food, and, other perishable articies a long time from perish-
ing or becom ing useless
same escribing the nature or the invention, and the manner in which the
same to be performed, he says:





 shall have taken place, at which period the same is to be closed.
The poin nos following are embraced in this patent.
tood it is for the purpose of preserving for a long time animal or vegetable
foo. o. The articlesthus to be preserved are to be placed in tin or other vessels,
so arranged as toe xclude commundatation with te external and
3. An aperture may be left in the vessel, at the choice of the operator, un-







 half, then puncture, seal while hot, and continue the heat for about two
hours and a half.,
At the close the inventor says that what he claims to secure by the patent
is the new artic of manu



























 We do not tiscuss the other questions.
The decereot othe court below must be reversed, and judgment ordered
in favor of the defendant below.

## NEW BOOKS AND PUBLICATIONS

port on the Compressive Strength, Specific Gravity, and
Ratio of absorption ofthe building Stones in the United tates. By O. A. Gillmore, Lleutenant-Colonel of the Corps of Engineers, Author of "A Treatise on Limes, Cements, ete."
New York city: D. Van Nostrand, 23 Murray and 27 Warren New Yo
streets.
This book contains Lieutenant-Colonel Gillmore's offlcial report, to the ere partly reported on to the end of July. 1874. The present volume car les the investigation one year $f$ rther, and gives some very valuable and nteresting facis and information, which, taking into consideration the
rapid growth of the use of artificial stone, is of the highest practical importance.
digest of Opinions of the Judge advocate General of the Army, containing a Selection of Official Opinions furnished be-
tween September, 1862, and July, 1868. Edited by Major W Winthrop, Judge Advocate. Washington, D. C.: Government Printing Office.
The scope of this work is fully set forth in its title, and it will be found pront
and ith ment Printing Office.

## A volum ear 1874.

james W. Tufts' Cataiogue of Soda Water Apparate Rog ton, Mass.
A handsome volume, superbly illustrated
namometer Experiments on Spinning Flax. By E. Cornut Chief Engineer of the Association of Steam Po
of Northern France. Lille, France: L. Danel.
An interesting little treatise, of great practical value.

## Stcent gurcticau and fareign "eatents.

## NEW MECHANICAL AND ENGINEERING INVENTIONS

IMPROVED STOPPING MECHANISM FOR SPINNING JACKS. William W. Sinclair and Edward Galvin, Mottville, N. Y.-This driving belt of a spinning jack in case the squaring band breaks or fails to act. The shifter lever has a strong spring attached to it for throwing it when released by the failure of the squaring band. The said spring is held distended, ready for action, by the shifter lever aliding cam rod when the band fails, and throws the belt shifter.

IMPROVED WIND POWER.
Timothy C. Guthery, Freedom, Ind.-This invention relates to an and consists in mounting the wheel upon a shaft having its bearings in a rotating bar, to whose upper end a vane is rigidly attached. The object is to render the device simpler and less expensive. improved automatic waste pipe closing attachment. F. Philip Bourne, Brooklyn, N. Y.-The object of this invention is to furnish an improved attachment for waste pipes, so con-
structed as to prevent the escape of gases, odors, etc.; and it consists in the combination of a valve chamber or box, bottom plate, chambered to plate, pipes, pivoted valve, pivoted valve plate, and weight with each other, so arranged as, when the waste water is admitted into the pipe in sufficient quantity to overbalance the downward pressure of the weight, the valve will be lowered into an inclined position, allowing the waste water to flow into the pipe. As soon as so much of the water has run out that the valve will close. The valve will al ways have a small quantity of water above it, and will thus effectually prevent the escapeof any gas or odor from the waste pipe.

IMPROVED ANTI-FRICTION BEARING
Cevedra B. Sheldon, New York city-Good result Cevedra B. Sheldon, New York city.-Good results have lately been obtained with linings for journal boxes, composed of paper
and cloth combined with plumbago. Mr. Sheldon's invention proceeds a step further, and obviates the objection of destructibility, which applies to the fragile materials last named above. Plumbago
is made into a plastic mass with a suitable cement, and by heavy is made into a plastic mass with a suitable cement, and by heavy
pressure is forced into the interstices of wire cloth or perforated pressure is f
metal sheets.
IMPROVED TWEER.
Charles M. Morgan, Hesper, Iowa.-The manner of controlling the blast is by raising or lowering a cup, thereby increasing or diminishing the opening for admitting the wind to the fire. Ano-
ther purpose of the cup is that, by raising or lowering, it loosens the cinders that may have choked up the wind passage to the fire, and causes all fine particles to fall into the chamber below, thereby and causes all fine particles to fall into the chamber below, thereby
insuring a clear fire free from dirt. By operating a lever, the
valve in the base plate can be moved awa from its seat to allow valve in the base plate can be moved away from its seat, to allow
any dust or cinders that may be in the wind chamber to drop out ; any dust or cinders that may be in the wind chamber to drop out ;
and by leaving said valve open when the blast is shut off, a suffi and by leaving said valve open when the blast is shut off, a suffi
cient quantity of air will pass up to keep the fire alive for a long cient
time.
improved machine for pointing wire Henry A. Willams, West Medway, Mass-This invention consists of progressive feeding and turning mechanism, in combination with rolls having tapered grooves, for tapering and pointing wires
to make picker teeth, hackle pins, printers' bodkins, taper dowel pins, and the like, the said feed mechanism being so that only a small portion of the wire is at first presented to the rolls. The
wire is advanced a little more at each operation, so that, as the size wire is advanced a little more at each operation, so that, as the size
is reduced, the wire feeds into the smaller portion of the grooves, and thus can be reduced to any required size in one groove. This plan saves the necessity of a series of grooves for doing the same

IMPROVED EMERY WHEEL.
George H. Peabody, Brooklyn, N. Y.-This wheel is covered with an emery composition formed of powdered rosin, white lead, beach clay, glue, emery, and water, which is applied by tamping it to the
surface of the wheel by numerous blows with a small hammer.
improved grain separator.
Michael Laufenburg, San Francisco, Cal., assignor to Treadwell \& Co., same place.-A fan blower throws a blast between two sepa-
rate belts. The upper half of the carrier passes over and under guide rolls at different elevations, so that the straw is shaken repeatedly on the open work belt and the remaining grain caused to fall on a subjacent chute. From this chute the grain is dropped in front of another fan that detaches any dust, and thence into a
shating shoe. By this organization of mechanism the straw undershaking shoe. By this organization of mechanism the straw underfrom the head can well be carried off to the stack.

IMPROVED TREADLE.
Henry Reese, Baltimore, Md.-The object of this invention is to lessen the fatigue of operating sewing machines and other devices run by treadle power, by means of a peculiar construction of without bending the ancles, and enables the operator to run the machine with a very light expenditure of muscular power. This result is accomplished by a peculiar construction of two independent treadles, hinged or pivoted upon opposite sides of the fulcrum springs, and arranged adjustably for either foot foremost.
improved railway signal.
Jacob D. Hughson, Prairie City, Ill.-This invention relates to a signal apparatus in which springs, or other analogous means of clappers or hammers are so arranged and connected with other parts that they counterbalance each other, to a certain extent, and the rebound of either aids in producing the striking movement of
the other : also whereby the signal is always repeated and the the other: also whereby the signal is always repeated and the
sound thus made practically continuous so long as a train is passing.
improved baling press
Christopher C. Campbell, East Chatham, N. Y., and Henry W. King and Allan C. Smith, Caanan, N. Y.-This invention relates to which the operations of packing the hay into the box and tying it into bales in the baling chamber are performed at the same time; and both followers are detachable, each being taken out successively at the end of the baling chamber and inserted successively in the packing box. The invention consists in the devices for packing the hay or other material in the packing box, which devices are also made to automatically withdraw the follower from the baling

## NEW AGRICULTURAL INVENTIONS.

CUTTER bAR FOR REAPERS AND MOWERS. Thomas Henderson, Black Horse, Md.-The object of this invention is to provide an improved means of attaching the knives of a may be more conveniently and safely handled and more readily sharpened. It consists in attaching each alternate knife to a sepato form a continuous saw-shaped or serrated cutting edge.

IMPROVED GRATED ENTRANCE TO BEEHIVES. John S. Harbison, San Diego, Cal., assignor to himself and An-
Jrew Harbison, Newcastle, Pa.-This invention consists of positive drew Harbison, Newcastle, Pa.-This invention consists of positive
gaged passages, of sufficient thickness to permit the rounding of the corners, thereby enabling the bees to pass safely with their loads of pollen, while at the same time gaging the passages to the size of the worker bees. The object is to restrain either the queen or drones from leaving their respective apartments, either in the act of swarming or otherwise.

IMPROVED ROAD SCRAPER
William H. Bowman, London, O.-A revolving scraper is pivoted to a handle frame, which has an independently swinging front bail that breaks, by a curved end at one side only, the connection of scraper and handles. This is done by pressing on a sliding spring rod and releasing the retaining latches of the scraper. The catches
are jointly operated by their fulcrumed connecting lever rods, and lock into a notched casting at each corner of the scraper. The face plates of the handles are recessed to receive the sliding rods which plates of the handles are res
operate the lower catches.
improved milk and cheese pan.
Henry W. Horton, Binghamton, N. Y.-This pan is seated in another receptacle, into which steam is admitted for heating or water
for cooling. The novel features are an overflow pipe having a detachable upper portion, to allow access to a series of inlets, through any one of which the water can be made to escape by plugging the passages below. The end pieces of the supporting frames are made be put in to make them of any length required for pans of any width.

IMPROVED TObACCO SUCKER GERM DESTROYER. Joseph H. Knaus and Jobn R. Harford, New Franklin, Mo.-In using the instrument, the fork of a bar is placed against the to
bacco stalk, directly over the sucker germ, and is pressed against said stalk with sufficient force to force the forked bar upward and cause a cutter to project against said germ. A cross bar is then drawn upward with the fingers, which rotates the rod and cutter and cuts out and destroys the germ, so that it will not grow again.

IMPROVED HAY RACK.
Joseph Hall, Riverside, Neb.-This invention consists of improve ments in parts of the hay rack for which a patent was granted to he same inventor, May 1, 1875: said improvements being hook is to render the apparatus more substantial.

IMPROVED CHEESE TURNER.
Cbarles Barlow, Cookshire, Canada.-This invention allows the shelves; and the general arrangement is such that each shelf may be readily brought into such position that the cheeses upon it may be conveniently reached.

IMPROVED GRAIN BAG.
Constantin Lazarevitch, Brooklyn, N. Y.-In this improved grain bag, the necessity of sewing up the mouth of the grain bag is ob bated. A funnel-shaped part is formed above the mouth of the ide of the funnel The funnel is reversed and forced into the grain closing thereby the bag securely.

## NEW TEXTILE MACHINERY.

IMPROVED FELTING MACHINE.
Jeremiah J. O'Sullivan, Brooklyn, N. Y.-By this invention the nventor claims to dispense with putting in layers, breaking down, stopping off, hardening off, tip-hardening, and all other handling
usual in the old process of hat-hardening. The process is as follows: usual in the old process of hat-hardening. The process is as follows First, having raised the upper cone from the perforated cone, the
hat body is placed over the latter. The upper cone being set in po sition, steam is admitted to the perforated cone. This heats and moistens the hat body; and while this is going on, the upper cone is given a rapid reciprocating motion. The cones, being perfectly true, will cause the whole hat to be finished with an evenness here ofore unable to be obtained

## NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

## IMPROVED VEHICLE TOP PROP BLOCK

Andrew Butterfield, Huntsville, Ala., assignor to himself and I 1. McKibbin, of same place.-This inventor proposes a spring extension of the block up along the bow, and a cushion on the end for
the bow to rest on, whereby the spring extension takes the strain the bow to rest on, whereby the spring extension takes the strain
off the bows when the top is down, and prevents them from springoff the bows when the top is down, and prevents them from spring-
ing and breaking. The top is also preserved, and has an easy and ing and breaking. The to
bracket band for vehicle wheels.
John G. Lefler, Philadelphia, Pa.-The object of this invention is to provide a ready means for repairing the hubs of vehicle wheels invention may also be applied to advantage in new wheels for additional strength; and it consistsin a bracket band, or a band which is made to encompass the hub, with bracket extension for each spoke provided with a screw eye or bolt hole, so that when the
spoke is inserted in its socket and fastened by a bolt or screw to the spoke is inserted in its socket and fastened by a bolt or screw to the
bracket extension, it is securely held to the hub against all shrinkbracket extension, it is
age, wear, and rattling.

## NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.

IMPROVED BAGGAGE CHECK.
John F. Wheeler and Henry A. De Haven, San Quentin, Cal.-In this improved baggage check a duplicate is taken off from and applied in an instant to the main check, and is carried about by the
checker. The slotted main check is attached, by a belt and tag, to hecker. The slotted main check is attached, by a belt and tag, to the trunk. A spring around the eye of the slot retains the tag, and
serves also to lock the duplicate check that slides, by a projecting tud and fastening knob, in the slot of the main check.
improved locomotive head light.
William P. Mills, Frank Bell, and James Carey, Jackson, Mich.the case of the ordinary head light, together with contrivances for setting in different glasses for train sig
and thus, by making the specially used on tyow for that purpose terns, save the cost and attendance of them. The inventor claims that the head light affords greater certainty, because it is less liable to go out; and if it does, it is where it will be noticed at once by the are not always in view, and at best they are more uncertain as to burning than the head lights are.

IMPROVED CAN-SEALING DEVICE.
Richard Wells, Baltimore, Md.-This invention relates to certain ir is first exhausted by mechanical means, and the can which the metically sealed. It consists in a plug of metal or other suitable material, screw-threaded so as to be securely and permanently located in the cork stopper or cover of the can. The said plug is hol-
low, and is also screw-threaded upon its inner surface, into which low, and is also screw-threaded upon its inner surface, into which
an interior plug carrying an elastic stopper is secured. This interior plug is provided with side grooves for the escape of the air and has a squared recess in its top to receive the end of a wrench or turning shaft, which passes through a detachable chamber having communication with the exhausting apparatus.

IMPROVED GUN WIPER.
Evander M. Gregg, Mars Bluff, Ky.-The invention relates to means for swabbing out a gun barrel so as to conveniently liberate the adhering matter on the inside, and consists in a piece of metal
having at one end a socket, into which is screwed a bolt, between having at one end a socket, into which is screwed a bolt, between
whose head and a flagge are arranged a series of rubber disks with spaces and washers between them. The attachment has also at the upper end a socket in which is secured the small end of the ramrod. ference, by merely screwing up the bolt, while, by removing the latter, the disks and washers may both be changed.

IMPROVED LAMP EXTINGUISHER
Charles J. Knapp, 48 Beekman street, New York city.-This is an ngeniousand practical extinguisher for kerosene lamps, claimed
o obviate the dangers that attend blowing out either up or down through the chimney. It is applicable to any of the burners now made, and appears to be an improvement of merit. Standards are
applied to the narrow sides of the wick tube, and provided at the upper ends with pivoted caps that are operated to close over the
wick tube, or are opened by a forked and weighted lever with tonnecting links. The caps, when closed above the wick tube, excnguish the flame.

Robert C. Breck, Bridoved bird Cage.
made in the cage to receive the food and water vessels. ood or water is to be replenished, the outer door of the compart ments is raised until caught and held by a catch. This leaves the nner door closed, and the outer side of the compartment open, so hat the food or water can be put in or taken out, or the compart ment cleaned, without any danger of the bird getting out. Trian gular plates are pivoted at their angles to the bars of the cage at
the upper and lower ends of an opening. The sides of the plates, djacent to the pivoted angles, are connected by wires, and to the lower plate are attached pins to receive fruit or other articles fo the bird to eat. This device may be turned out so that the pins
will be without the cage, when fruit maybe placed upon them; and will be without the cage, when fruit may be placed upon them; an when the device is turned inward, the pins will be within the cage, so that the
the perch.
improved spring balance for extension chandeliers. Lyman T. Lawton, West Meriden, Conn., assignor to himself, P the bottom of the case of a spring drum, in combination with notches in the drum, and having a cord depending from it, all so contrived that the stop will be caused to engage the drum by it
spring, to hold it so as to prevent a heavy chandelier from falling o spring, to hold it so as to prevent a heavy chandelier from falling o by the cord, to allow of adjusting the chandelier.

IMPROVED BROOM-SEWING MACHINE.
Henry Behren, Columbus, Ohio.-In this machine the jaws may be readily thrown into position for sewing the different seams, an blesome changing of the pins of different lengths that have to b hanged after each seam. To this end jaws are provided with piv ted pawls that lock into racks and notched plates at the sides of he machine.

IMPROVED GALLEY SUPYORTER
William S. B. King, Brooklyn, E. D., N. Y.-This is an improved device for supporting a galley upon a compositor's case while correcting, so that access to all the type boxes is always free. An illus-
trated description of the invention will be found on page 402, volume XXXIII.

IMPROVED STUD AND BUTTON.
John B. Bennett and Walter Bennett, Halifax, N. S.-This stud has a head having a recess in its under side; a stem, provided with has a head having a recess in its under side; a stem, provided with having a horizontal flange on its upper end, which enters the recess
in the button head. The flange and tube are slotted for the recepin the button head. The flange and tube are slotted for the recep
tion of the pin on the stem, which serves to lock the two parts to tion of ther
gether.

IMPROVED OIL-bURNING STOVE
Edwin G. Adams, Cohoes, N. Y.-This stove includes devices where it is burned. The dampers may be adjusted to leave any de sired amount of fire surface.

IMPROVED CAROUSAL OR ROUNDABOUT.
Robert Steel, Pbiladelphia, Pa.-This is an improved device in-
tended to take the place of the horse carousals or roundabouts now tended to take the place of the horse carousals or roundabouts now in use in parks and other places of amusement for children to ride
upon. It consists in the combination of a rigged vessel with a reupon. It consists in the combination of a rigged vessel with a re-
volving wheel and its driving mechanism, so that it travels over a cloth painted to represent waves.

IMPROVED HEAT INDICATOR FOR STOVES
Alfred J. Jourde, St. Louis, Mo.-This invention relates to a therof the same, so as to admit the proper regulation of the heat, pro duce a saving of fuel, and indicate also the proper heat for cooking and baking. The instrument is screwed, by a threaded tube of the graduated plate, back of the mercury, into a hole of the stove, and
retained by projecting seats at suitable distance from the same

## IMPROVED COMB

John T. O'Donoghue, New York city.-This is a comb, of metal or any suitable substance, having a hollow head, in which a heating iron of the handle is placed for heating the comb and keeping it warm while using it. By the use of a heated comb, the heat, it is
claimed, draws the sap and oil from the scalpinto the hair, and thus restores color, vitality, and vigor.
IMPROVED TRUNK.

William J. Large, Brooklyn, N. Y.-This is a new arrargement o
William J. Large, Brooklyn, N. Y. may be conveniently turned up to allow of access to the lower one may be conveniently turned up to allow of access to the lowe
New devices are also provided for holding the trays in place.

> IMPROVED ICE CREAM FREEZER. Sylvain M. Gosson, Whistler, Ala.--This ice cream freezer will
enable ice cream of any desired number of different fiavors to be kept distinct and separate while being frozen. It combines several
novelties in mechanical construction, the principal of which is a ring can divided into compartments, in which buckets holding the ring can divided into compartme
material to be frozen are placed.
mANUFACTURE OF ANTIQUE COLORED GLASS.
James Baker, New York city.-By this method of turning or spinning the fused glass of any color or tint into disk or oval shape
concentric streaks are formed around the bull's eye at the issuing orifice of the rod, while at the same time different shades are formed by the slightly diminishing thickness of the glass disk from the center toward the circumference. This admits of bringing a certain
shading into the glass pieces employed. The peculiar concentric shading into the glass pieces employed. The peculiar concentri
structure of the glass disk produces a brilliant structure of the glass disk produces a brilliant sparkle and semi-
translucent effect, which approaches the warm and effective coloring of antique glass, and furnishes thereby colored glass of superior quality for church windows and other ornamental purposes.

IMPROVED POCKET BOOK FASTENERS.
Daniel M. Read, New York city.-This inventor has patented two ingenious devices for securing the flaps of pocket books. The first teeth formed on a slotted base plate, and a catch pin engaging with the ratchet teeth. The book may by this be drawn snugly together
without withdrawing the catch from the lock; and the outer surwithout withdrawing the catch from the lock; and the outer sur-
face of the lock appears entirely smooth, and without any projectface of the lock appears entirely smooth, and without any project ing knob or handle. The second device consists essentially in the which is extended in rear of its pivot, so that it can be operated by the tbumb or finger to release the catch on the flap from the fast ening on the body of the pocket book. With this construction, the fastener may be unfastened with gloved hands without inconven ience, and without injuring the gloves.

IMPR OVED MINERS' LAMP
James C. Marshall, Girardville, Pa.-This invention consists of a spring, in combination with the hook by which the lamp is hooke hook, and thus sustains the lamp when the miner is at work

IMPROVED SYRINGE.
Charles E. Koechling, New York city.-This syringe is provided and fitted for insertion in a bottle, so that it may be directly filled from the latter.

## Shuturss and tetyoual.

## The Charge for Insertion under this head is One Dol-

 lar a Line. If the Notices exceed Four LinDollar and a Half per Line will be charged. "Wrinkles and Recipes" is the best practical
Handbook for Mechantcs and Engineers. Hundreds of valuable trade suggestions, prepared expressly by cele-
brated experts and by correspondents of the "Sclentific American." 250 pages. Elegantly bound and Illus-
trated. A splendid Christmas gift for workmen and
apprentices. Mailed. post paia, for $\$ 1.50$. Address H . apprentices. Mailed. post paid, for \$1.50. Addr
N. Munn.Pubisher. P $\quad$ O. Box 772 . New York city. To Manufacturers-A first class Electroplater,
having long experience in coloring all kinds of metals, elther by electroplating or dipping, wishes to change his
position. Address A. Wolf, 429 Callowhill St., Phila. Mach'y Depots, Mech. Eng'rs, Millwrights, New
Manuf'g Enterprises-Send for Catalogue of best line One 12 in . Mill Saw File of our manufacture fled
70 Gang Saws at McGraw \& Co.'s Saw Mill (the largest in America), Bay City, Michigan. Passaic File Works, Paterson, New Jersey.
An Interest in Sewer Trap, described on page
118 of this paper, will be sold to a Capitalist or good ManGlass, True Blown Cylinders. T. De Glass, True Blown
milk St., Boston, Mass
Correspond with the Allen Fire Supply Co.,Pro
R.I., for the manufacture of hardware specialties. For Sale, to Cloce an Estate-A Valuable Patent
Evaporatling Pan for Parior Stoves. For particulars, apply to Box 52, Iroy, N.
A Situation as Engineer wanted by an experi-
enced man who can glve good references; is so anxious o get a position that he is willing to go as fireman,sooner
than be idle. Address Phillp Duggan, 73 West St.,N.Y. A Party offers a share of a valuable invention to
one who will procure a Patent for the same. For particuars, adaress
L. Duvinage, 1745 N . 11th St., Philadelphia, Pa
act as Agent, erect Mıchinery at the Centennial Exhilition, and make drawings.
An intelligent practical Machinist desires em-
ployment in any capactity. Address Box 88, Strouds-
burg, Monroe Co., Pa.
For Sale-Queen's Educational Microscope, Po-
lariscope and CameraE B. Kiersted, Hancock, N. Y.
For Sale-A good manufacturing business, se-
cured by Patent. Address H. R. Van Eps, Peoria, Ill. Wanted-A Partner in a long established and
profitable Mach'ne Business, with from $\$ 5,000$ to $\$ 8,000$, to develope one of the most promising patents ever
duced. Address Lock Box 1004, New Haven, Conn. For Sale-Two Brick Machines, "Sargent" Pat-
ent-in use one year. Apply 27 So. Charles St., Balt..Md. ent-ln use one year. Apply 4 so. Charles St., Batc..M.
Hangers. 5 to 8 cts. per or clamp Pulleys, best s.E. S. Carth .
Han, Worcester.Ms. Leather and Rubber Belting, Packing and Hose.
Greene, Tweed \& Co., 18 Park Place, New York. Hand Fire Engines, Lift and Force Pumps for fire
and all other purposes. Address Rumsey \& Co., Seneca and all other purposes,
Falls, N. Y., U. S. A.
Roth's Saw File Guide, illustrated in this paper
Jan. ., 1876, is manufactured by E. Roth \& Bro, New
Oxford, Pa. Ove, as sample, \&2. Agents wanted. Oxford, Pa. Ove, as sample, \&2. Agents wanted.
Wanted-A Bone Crusher, suitable for crushing
bones size of nut coal. A stamp mill preferred. P. O. Box 3369, Boston.
$1,2,1, \& 2$ Horse Engines, $\$ 30,60, \& \$ 100$; Boilers
for same, $875 \& \$ 100$. T. B.Jeffery, 253 Canal St, Chicago. Abbe Bolt Headers, the best-Prices reduced ;
2 sizes made. Palmer Power spring Hammers. 10 sizes. See machines, or write for information before buying.
S. . . Forrasth \& Co., Manchester. . . H.
Steel Castings, from one b. to to the thend lbs. Invaluable where great strength and durability are re-
quired. Send for CIrcular. Pittsburgh Steel Casting quired. Send for Co
Use Yocom's Split-Pulleys on all Sbafting, same
appearance, strength and price as sinished whole Puleys. Shaftung Works, Drin
Second St., Philade!phia, Pa.
Blake's Belt Studs are the best and cheapest fas-
tening for Leather or Rubber Belts. Save ten times their cost. Greene, Tweed \& Co., 18 Park Place, N.Y. Fine Castings and Machinery, 96 John St., N. Y. Hotchkiss Air Spring Forge Hammer, west in the
market. Prices low. D. Fribie \& Co , New Eaven, Ct. Water, Gas and Steam Goods-Send eight stamps
or Catalogue, contaning over 400 illustrations, to Balley, Farrell \& Co. Prttsburgh, Pa.
For best Presses, Dies, and Fruit Can Tools, Bliss For best Presses, Dies, and Fuys, Brooklyn, N. Y.
\& Williams, cor. of Plymouth and Jay
For Solid Wrought-iron Beams, etc., see adver-
tisement. Address Union Iron Mills, Pittsburgh, Pa., tisement. Address Union Iron Mills, Pittsburgh, Pa.,
or lithograph \&c
Hotchkiss \& Ball, Meriden, Conn., Foundrymen Hotchkiss \& Ball, Meriden, Conn., Foundrymen order. Job work solietied.
Peck's Patent Drop Press. Still the best in use
Address M110 Peck, New Haven, Conn. All Fruit-can Tools,Ferracute W'ks, Bridgeton,N.J. American Metaline Co., 61 Warren St., N.Y. City. For Solid Emery Wheels and Machinery, send to
the Union Stone Co., Boston, Mass., for circular. Hydraulic Presses and Jacks, new and second
hand. Lathes and Machinery for Polishing and Buffing Metals. E. Lyon, 470 Grand Street, New York.
Spinning Ring of a Superior Quality-Whitins-
ville Spinning Ring Co., Whitinsville, Mass. For best Bolt Cutter, at greatly reduced prices,
address H. B. Brown \& Co., New Haven Conn. Diamond Tools-J. Dickinson, 64 Nassau St., N.Y. Temples and Oilcans. Draper, Hopedale, Mass.

Matice dinuries
A. B. and others, who ask as to books on the locomotive engine, should read Forney's find formulæ on the strength of boilers on p. 186-
vol $32 .-$ J. C. W. will find full instructions for pol, ishing lenses on p. 363, vol. 31. Consult Prechtl's
" Dioptrik," if you canread German.-J. H. R "Dioptrik, if you canread German.-J. H. R.
should use the Léclanché battery. See p. 362 , vol.
31.-P. H. G. will find directions for polishing shirt bosoms on p. 203 , vol. 31.-H. H. T. will find partir
on pp.151, 241, vol. 30.-E. R. J. will find a descrip
tion of the method of preparing bone charcoal on tion of the method of preparing bone charcoal on
p. 5 , vol. 28.-J. L. H. will find a recipe for cement for glass and brass on p. 117, vol. 32.-F. B. S. will find a deseription of an electric engine on p. 241 ,
vol. 33.-A. K. will find full directions for mounting maps, etc., on p. 91, vol. 31.-R. W. will find that painting on zinc is deseribed on p. 116, Science
Record for 1874.-W. N. C. will find directions for Record for $1874 .-$ W. N. C. $\begin{aligned} & \text { will } \\ & \text { bind directions for } \\ & \text { binel work on p. } \\ & \text { tind }\end{aligned}$
tind vol. 31.-J. C. R. will find the dimensions of the Great Eastern steamship on p. 346, vol. 31. .-J. C.
of Moscow, Russia, will find a description of wood-splitting machine on p. 79, vol. 28 .
(1) S. L. S. asks: Please to inform me how
I can dissolve aniline green, or how to prepare it I can dissolve anilinegreen, or how to prepare it
for coloring purposes. A. We are acquainted with two varieties of this color, namely, aldehyde green and iodine green. The former 18 soluble in
parts of sulphuric acid, and from 50 to 70 part of alcohol. The latter dissolves readily in equal parts of alcohol and water.
(2) W. M. J. asks: 1. Why would it not answer as well to place the coils of a magnet I $_{\text {o }}$ of
an inch apart instead of putting them the thickan inch apart instead of putting them the thick
ness of a fine silk thread apart?
What would be the result provided the same length of wire be
used ? A. It would not answer so well, because lised? A. It would not answer so well, because
the same number of convolutions could not be contained in the space occupied by the wire when the latter 18 covered with a thin layer of silk only.
. What is the theory of a current of electricit 2. What is the theory of a current of electricity,
passing around a piece of soft iron, magnetizing the passing around a piece of doft iron,magnetizing the
same? A. Ampere's theory assumes that each in dividual molecule of $a$ magnetic substance is tra versed by a closed electric current. It is furthe assumed that these molecular currents are free to
move about their center of gravity. The coercive force, however, tends to keep them in any position
in which they may happen to be. When a current of electricity is passed around the substance, its tendency is to place all of the molecular currents
in a parallel direction; by this means the action of in a paraliel direction; by this means the action o
the latter on external matter becomes apparent. the latter on external matter becomes apparent.
3. Is the magnetic influence derived from the passage of a current of electricity? A. Yes. 4 . Would it not do as well, if practicable, to replace electricity with heat? A. Yes. It is not practica-
ble, however, until the heat is first transformed nto electricity
(3) J. R. C. asks: If the two disks of an achromatic object glass are $5 \frac{3}{1}$ inches in diameter, the bi-convex and the contact side of fint glass be-
ing ground to 31 inches radius, what should be the curvature of the posterior side of the flint glass? If the disks be $41 / 4$ inches in diameter, and the three curves (as above) are ground to 24 inches radius, what should be the posterior or correction
curve? The lenses are of French glass. A. Assuming the glass to be of medium quality, in the frrst instance, the posterior curve should be con-
cave, of 146 inches radius. The latter should also be concave, of 113 inches radius.
(4) J. E asks: How can I make glycerin soap? A. It is made by incorporating, with any
mild toilet soap,
 of a red or rose color with a little tincture of or chil or of dragon's blood, or orange yellow with a
little annatto. It is variously scented ; but oil of bergamot or rose geranium (ginger grass) support ed with a little oil of cassia, or oil of cassia supported withe essentume. The greater portion of the
the favorite slycerin
(5) J. F. P. says : I propose to build a fruit house with iee house overhead. Ipropose a triple brick wall, with two air spaces of two inches each,
with cut-off at every two feet in hight. Would it with cut-off at every two feet in hight. Would it
be bettec to fill one or both spaces with non-conducting material, like dead air
suffice.
(6) J. O. P. asks: How can I make vinegar in 10 hours, from pure cider? A. The best ferment is vinegar. An old cask in which thegar
has been kept is the best to ferment in. Other fer ments are used, such as bread soaked in yeast,sour
dough, dough of wheat, or rye bread soaked in dough, dough of wheat, or rye bread soaked in
cream of tartar and vinegar. All these are used cream of tartar and vinerar. All these are used
in small quantities, a few ozs. to the barrel. Vinegar made with them is more apt to spoil. The
more ferment there is present, the quicker will be more ferment there is present, the quicker will be
the process. The cider is put into the cask , which is best painted black outside to absorb the sun's rays when the weather is cool; the bung is left out, the bung hole is oovered with a piece of slate,
and in bout fur weks the rectification is comand in about four weeks the rectification is com-
plete. The lower the temperature is, the slower plete. The lower
will be the change
(7) G. J. asks: In what position is the compass placed on board iron steamers, soas not to be
affected by the metal of which the ship is con affected by the metal of which the ship is con-
structed? A. It is ismounted on an elevated standard, sufficiently high to be out of the sphere of the ship's attraction.
(8) J. C. R. asks: Where is native sulphar found, outside of Sicily? A. The great de
positories of sulphur are either beds of gypsum positories of sulphur are either beds of gypsum
and the associate rocks, or the regions of active or extinct volcanoes. In the valleys of Noto and Mozzaro, in Sicily, at Couil, near Cadiz in Spain,
at Bexin Switzerland, at Cracow in Poland, it ocat Bex in Switzerland, at Cracow in Poland, it oc-
curs inthe former situation. Near Bologna. Italy, curs in the former situation. Near Bolognat,
it is found in fine crystals, imbedded in bitumen. Sicily and the neighboring volcanic isles, Solifa-
tara near Naples, and the volcanoes of the Pacific ocean, etc., are localities of the latter kind. It is also deposited from the hot springs of Iceland; and in Savoy, Switzerland, Hanover, and other coun-
tries, it is met with in certain metallic veins. Near tries, it is met with in certain metallic veins. Near Cracow and in Upper Egypt there are large depos
its. A fiberous variety is found near Siena inTus its. A fiberous variety is iound near sienna,inT
cany, and is abundant in the Chilian Andes.
(9) G. M. says: I wish to know something of the nature and properties of phosphorus.
Consult some elementary work on chemistry. 1. Does lodestone possess the same properties, 1. Do respect, as an artificial magnet? A. . Yes.
2. Which is the most powerful? Artificial magnets are much the more powerful. 3. Where odestone found ? A. Lodestone occurs in large
cuantities in the northern parts of New Yort quantities in the northern parts of New York
State. 4. In a horseshoe magnet, made of a baro of steel 8 inches in length, how far apart should the ends be to secure the greatest power? A. About /2 inch apart.
(10) W. T. G. asks : 1 . What are the quali
(ications necessary to becomea midship cations necessary to becomea midshipman in th
United States navy? A.A fair English education ood physical development, and age between 1 nd 18 years. 2. Who would be the eroper person o apply to for a position in the lake squadron?
a. There is no lake squadron. To become a midshipman requires recommendation to the Secre tary of the Navy by the member of Congress o your district. 3. Which offers the best chance fo or the merchant marine? A. In the navy, you ar sure to be advanced if you live long enough. In the merchant service, the case is the same as in
any private pursuit; individual merit and ability any prize
tell.
(11) S. H. L. says: I have an ornamental pieze of white ivory, in the shape of a cylinder Which has lately cracked. Do you know of any
plastic material with which I could fill the erack o conceal the defect, and not in any way atfect he ivory ? A. Place a small quantity of pure gel
tin in a strong solution of alumina tirely penetrated by thealumina, remove from the solution, and use immediately. When dry, it may e readily polished.
(12) J. R. says: I am interested in a quartz mine, which assays from $\$ 40$ to $\$ 80$ per tun of gold
but the sulphuret of iron is so abundant that the quartz mill men claim that they cannot amalga mate the gold. Can you inform me of some chea nethod of destroying the sulphuret of iron? Pulverize the ore, and roast it at a high temper
ure in a current of air. This will expel the sul ohur as sulphurous acid gas, leaving the iron be ind as an oxide.
(13) O. C. says: You say that the earth rekeeps up from the fact that there is no resistance As the moon draws after it a great tidal wave, ex tending nearly from pole to pole, the land must feel this draft; is not this an enormous resistances,
and would it not of itself bring the earth and moon to a standstill, if there were not some great nd perpetual force keeping them in motion? $\mathbf{\Delta}$. to the moon exerts a retarding influence on the rotation of the earth, but that, at the present pe--
riod of its existence, the retardation is exactly riod of its existence, the retardation is exactly
kounterbalanced by the acceleration due to its contraction in size by cooling. He holds that there so far that a to more contraction will take proceede that then the retardation by the moon's action will commence, and go on until, in the course of ages, the earth will always turn the same side to
the moon. He holds also that the moon has gone through this process.
(14) J.C. R. asks: 1. Are there any sulphur this country near the sulphur springs of New York Virginia, etc., sparingly,in many coal deposits and elsewhere, where sulphide of iron is undergoing
decomposition,and in microscopic crystals at some decomposition,and in microscopic crystals at some
of the gold mines of Virginia and North Carolina; of the gold mines of Virginia and North Carolina;
as a powder and in crystals in the western lead regions:in cavitiesin the limestone,in minute crystals on cleavage surfaces of galena ; and the beds of California a aford large quantities of sulphur for
commerce. 2. Excepting for $\mathrm{SO}_{3}$, gunpowder, and commerce. 2. Excepting for $\mathrm{SO}_{3}$, gunpowder, and friction matches, is there any considerable use or
demand for sulphur ? A. Yes, it is used in large quantities for sulphurizing hops and vines; as a preventive against some diseaseg the the this purpose in France, Spain, and Italy amounts to about 45,000 tuns. It is further employed in the production of sulphites and hydrosulphites, sul-
phide of carbon, cinnabar, mosaic gold or bisulphide of carbon, cinnabar, mosaic gold or bisul-
phide of tin and other metallic sulphurets, ultraphide of tin and other metallic sulphurets, ultra
marine, various cements, and for vulcanizing and marine, various cements, and for vercanizing and
ebonizing india rubber and gutta percha.
(15) O. C. says: Suppose the continents led eastand west, and the oceans extended around
the globe in the same direction, with no land to the globe in the same direction, with no and to
check the tidal wave, what would be the result? Would not the tidal motion of the sea constantly ordinary hight, and carrying everything before it? A. Undoubtedly some straits have been made, or at least their formation largely assisted, by the
tidal waves. If there were no land to check the tidal waves. If there were no land to check the
tidal wave, it would go round from east to west, and not be deviated in variousdirect might rush the case. In some narrow straits it might rush, as carry everything before it, the hight of the tides being due to the balanced attractions of earth, sun, and moon.
How far are the seven stars of the Pleiades supposed to be from each other? A. The mutual istance of the stars is on an average equal to their
distance from us; here are, however, spots in the heavens where stars are fewer,and where this distance is greater; and inversely, there are some star groups where the distance is much smaller ; such a group is the Pleiades, their material distance va-
rying from one fftieth to a five hundredth part of rying from one fiftieth to a five hundredth part of
the distances from us. The telescope reveals clusthe distances from us. The telescope reveals clus-
ters where the stars are still closer together, hunters where the stars are still closer together, hun-
dreds of them throwing a glow around like that dreds of them
of a furnace.
(16) J. J. asks: Do you know of any means Whereby the law of gravitation can be suspende
A. This la w is so universal and inherent in er that there is absolutely no means of the kind. (17) W. H. says: We have a reservoir on a hill which we wish to make use of for fire pur-
poses in our mill, situated at the foot. It would be costly and inconvenient to tunnel through the side of the hill in order to lay pipe from the bottom of the reservoir to the mill, the top of which is 60 siphon be used with advantage and certainty, so as togive us command of all the water in the re sunk in the bank a few feet below the level of the water surface. If a siphon be practicable, how deep below the surface ought it be laid? The re-
dervoir is 20 feet deep. A. The reservoir being 2 servoir is 20 feet deep. A. The reservoir being 20
feet deep, and the highest part of the bend being afew feet below the surface of the water in the reservoir, there can be no doubt of a siphon's not to be more tan 30 feet lorg, the atmosphere counterbalances only from 32 to 36 feet of a column of water; but in this case your shortest leg will be not more than, say,18feet. The pipe should be so laid as to prevent freezing; for
this purpose four feet below the surface will be this purpose four feet below the surface wilb
deep enough; it should be also sunk in the bank down the side of the reservoir to guard against he same difficulty in case of low water. Take of the hill to he bottom boring through the . In boring throug the eide of the hill, there would be danger of leak:
age to your reservoir, through which you migl: age to your reservoir,
lose all of the water.
(18) C.G. W.asks: Is there any chemica hat will assista a diamond in drilling hardened tine or benzole. The latter is the better of the
(19) R. H. B. says: I have a tin roof put in wind it rumbles a good deal. Is that an ill omen A. Tin plates for roofing are sometimes put together in the shop in rolls, taken to the building,
and laid upon the roof, extending from the ridg and laid upon the roof, extending from the ridge
to the eaves, theedges of the rolls are brought to gether, secured to the roof by nailing a cleat of tin between them, and the two edges and cleatac
 ock. By this style of rooting, the tin has quite limited nailing to the roof hoards; and should the edges become loose at any place to admit the en
trance of the wind, it could very easily be stripped off by that means. This danger, provided th rolls are wide, more than compensates for any ad sess in respect to its yielain The usual mode of laying the tin, plate by plate upon theroof, where every plate is securely nailed,
has generally we think, met every reasonable as generally, we think, met every reasonable
expectation in regard to durability, and is to be b prefred to the fomer metho.
(20) S. L. T. asks: I am about building a 36 inch buzz saw. There are two engines 36 inch buzz saw. There are two engines in
view; one has a cylinder $5 \times 10$ inches with a 30 inch balance wheel, the other has a cylinder $6 \times 8$
inches with an 8 inch balance wheel. Which in inches with an 88 inch balance wheel. Which in
your opinion is the best for me? A. The $6 \times 8$ enyour
gine.
(21) W. O. P.asks: Is it practicable to melt cast iron on an ordinary blacksmitb's forge, in
sufficient quantity to make a casting of 15 or 20 bs. weight? A. No.
(22) L. L. H. asks: The wild cane growing throughout many parts of our country can be
utilized for making pipesfor convesing water and other liquids. Some of them attain a diameter other liquids. Some of them attain a diamete
of several inches. With an iron rod heated to redness, the joints may be entirely cleaned out; holes holes, they can be united in any length. By viceable for years. Is there a way by which thoy may be curved or bent (and remain so) so as to
suit a change of direction ? A. Try steaming suit a change of direction ? A.
them, as is done for wood bending.
(23) J. A. G., of Manchester, England,asks Can bright steel goods be bardened and tempered
without affecting the polish on them ? (24) O. F. says: 1 . We have a 10 by 16 inches single valve engine, of which the valve is
1014 inches long and $51 /$ inches wide, with a recess in it for steam exhaust 9 inches long by $25 / 8$ inches wide. The entire width of valve seat is and the widthes ports is $43 / 4$ inches, and between inside edges, $23 / 4$ inches, the ports being consequently each 1 inch Wiae. The exhaust port is $1 \%$ inches wide, and $21 /$ inches, the eceentric being set so as to begin Thefeed pipe is $21 /$ inches and the exhaust pipe 3 tions diameter. The engine tons per minute. Are the ports, valves, and other portions rightly proportioned? A. The cy-
linder exhaust port is a little too narrow, and the valve travels too little. 2. The piston does not
come to within an inch of the cylinder heads. come to within an inch of the cylinder heads. Can anything be done to economize steam and
improve the working capacity of the engine? There is too much clearance at the ends of the the piston head wich increase the thich 3. Thethe piston head or the cylinder reads. 3. The
present boiler is 10 feet long and 3 feet in dia $m$ ter, with 26 three inch tubes, supplemented by heater. How much boiler room would be r
quired to run the engine at 200 revolutions pe quired to run the engine at 200 revolutions pe
minute, and maintain 60 lbs. pressure in boilea A. Your boiler pressure, if increased by nearly on third, will maintain 200 revolutions.
(25) C. G. asks: What is the proper way of
packing the stufing box around a steam engine packing the stuffing box around a steam engine
piston rod? pared packing, and a small packing tool.
126) Y. L. a.sks: 1 . When my engine is running very light, I fiad that, before it is necessary
to replenish the furnace with fuel, it is of far burnt down that part of the fuel falls through the grates, and is thus lost. What should be done to
prevent this? A. To prevent the waste of fuel referred to, puta damper to the ash pit and in the chimney. 2. Is it right, in such a case, to open the flue doors? A. Sudden drafts of cold air are in-
jurious to the boiler. 3. Do you not think that jurious to the boiler
regulate the draft with? A. Yes, or over the
and mouth of the ash pit. 4. Isitinjurious to a boiler to open the fire doors in case of too much steam? A. Yes, slightly. 5. How are leaky engine cocks, such as cylinder and blow-off cocks, ground? A. The unground shoulder should be eased off with a file,and the plug ground as directed in "Wrinkles
and Recipes." 6. Are hand force pumps ever used for cleaning boilers? A. Yes,but a boiler cannot be thoroughly cleaned by a force pump. 7.Doesit in jure a boiler to blow it out, and immediately wash tout by means of a pump with cold or luke-warm by a mud drum laid under them, into which th feed water is also forced, should the which the pipes be large? A. Yes, the larger the better.
(27) J. E. W. says: I wish to build a foo size should the drive pulle light work. Of what be, to get the fastest mction with the least power A. Make the treadle pulley about 30 inches, and the lathe pulley about 6 inches. 2. What should be the strok
nches.
(28) A. M. H. asks: What will be the dif erence in time between two clocks having pen dulums of the same length, one vibrating in an cun for 24 hours. Is there a rule for ares of any ana $10^{\circ}$, and the pendum is free, that is, if it ha no work to do, the difference in time for differen vibrations is so small that it need not be taken nto account. Itis advisable to have the vibration as small as possible; then the barometric
(29) F. D. and others ask as to the best pos method which obtains the desired mpeed on the The with the least number of gears, shafts, beesaw, or pulleys, is always the best. Always get th peed as direct from the driver as possible. Ever additional piece entails a loss of power in the ex
30) B. P. F. asks: 1. Can you give me the imensions for a drying house for lumber? A The size of your house should conform to the dimensions and quantity of the lumber you propos might answer in the aby feet and 15 feet hig uirements. 2 . At what point or points shoul he steam be allowed to enter and escape? The steam should circulate through a coil of ch iron pipe to the extent of, say, one superficial foot of heating surface to every 50 cubic fee of air in the house. Place the pipe in stacks abju feetlong, one praded to discharge the drip wate rom the top to the bottom; let the pipe from the oiler connect at the top, and another pipe return the boiler from the bottom, of the stack; an his will keep up the circulation and return the drip water to the boiler. Provide ventilation a described in answer to G. J. P., No.43,in this issue, The lumber should dry in from four to six days.
(31) J. B. Jr. asks: What shall I put on ter painting the boards? A. Shellac varnish. (32) A. S. asks: 1 . Which is the best of the ories, putting the steam pipes round the room elow, the windows, or pipes round the room ceiling? A. Below the windows. 2. Would it tak from the ceiling the with the the dows? A. Yes. 3. Which of these ways would be most liable to cause fire? A. Over the win
dows. 4. Would 2 six inch cast iron pipes heat room with less steam than 6 one inch wrought iro ion, 1 P surface in your pipes for every 70 cubic of heating contained in your room; the one inch wrought ter at the highest point and return at the lowest, and set tween those points, that the pipes may not be
(33) S. A. T. says: We have a paper mill built on a light bottom of quicksand, and within 200 feet of a hill or bluff 100 feet high. In the nill are two large tubular boilers for generating steam using an iron stack or chimney, which is very ex chimney is out of the question on account of our sandy foundation. It occurred to us to dig a trench or ditch of suitable size from the boilers to the top of the bluff, and there build a brick chimney of proper hight, the whole to act as chimney to ou and would dampness of arth fect it? that way, nd ined with brick. In starting the fires, it might be the vertical portion.
(34) T. A. W. asks: Is there any means of once damaged? A. Yes; reburning it.
(35) J. L. C. says: I wish to build a cistern built nearly all above pround. My experience that the ordinary square walled cisterns, if bove ground, are not to be depended on, and gen-
erally leak. It is not convenient for me to build a und cistern, and I have planned one, shown in the diagram, which I think will be very strong and will suit my case exactly. It is constructed on the

er strengthens rather than weakens the walls, buttresses, are made to bear the strain. T'his be ing so, I can save material and make the cistern walls 9 inches instead of 14 inches thick. Please give me your opinion. A. The principle is a cor-
rect one. A good foundation would be required or the whole of it, to prevent settling, which ould cause cracks. Greater strength could be one buttress to the opposite one; these could be made of iron pipe covered with tar, and secured y means of nuts over plate washers.
(36) E. C. H. says: 1. I have some photo sraphic lenses, double convex, of good quality: one
214 inches in diameterand of 8 inches focus; the is $21 / 4 \mathrm{inches}$ in diameter and of 8 inches focus; the
ther is 1 inch in diameter and of 5 inchesfocus.Can I construct a telescope with them, by he addition of other glasses, if necessary? A. You canno construct a telescope with lenses intended for pho of an object lens of very long focus, say from 20 040 inches, and an eye piece, which is one smal ns or is compounded of two or more small lense of very short focus, say 1 inch or less. 2. How require? A. We refer vou to the firstnumberof the Scientific American Supplement, where nd illustrated. 3. Can a magic lantern be made ith these lenses, and how should I arrange them AY Y u can make a magic lantern with them; pho tographic lenses are excellent for that purpose between the picture to be enlarged and the light These bullseye lenses must be some 3 or 5 inches in diameter, and have a focus of about 6 inches.
(37) F.E.D. B. asts : How many chair rockhour with a band saw? We have a man here wh ayshe can saw 400 in an hour. Isit possible? A.Tbe man claims that he cansaw $62 / 3$ pieces per second. he a verage length of a rocker is 2 feet, to be saw on both edges, equal to having $131 / 3$ feet (lineal)per teach cut; and in most cuts, the concave part of ne and the convex of theother would be part of ame cut. This renderssuch a feat possible, an it seems no more difficult than for one circula aw to cut 9 boards 24 inches in width, 1 inch hick, and 16 feet long in one minute. This I hav seen done. At this rate of sawing the incredible in 10 hours.-J. E. E., of Pa
(38) W. H. s.ys: We want to convey abou here any way of making cotton rope imperviou to the weather, so as to make it serve the abov
(39) I. A. M. says: 1. Of what diamete hould a circular saw be for general use, more pa icularly on oak logs? A. From 50 to 60 inche How many horse power would be necessary to wers, however, depend in each case on the averprformed. As a rule, each horse power, well applied, will saw one thousand feet of lumber with circular saw; this varies slightly with the hardit is easier to make 30,000 feet of lumber with 30 horse power than 5,000 with 5 horse power, partl owing to the greater proportionate amount ous causes.-J. E. E., of Pa.
(40) J. E. J. says: 1. Would an achromati pyglass of 50 power be of any use for astronom ical purposes? Would it show the globular form rings? A. Yes, if it is a good one. 2. How fa could a man te seen with such a glass o
bright day? A. Fifteen or twenty miles.
Would it besafe for a person never having see course of chemical experiments to attempt out the aid of an instructor? A. Yes, in most cases, if done with proper care.
(41) C. L. asks: In building a telescope, the of which is 5 inches in diameter, ho is 72 inches. How many, and of what objeces, glas
inoula the remaining lenses be? A. The object glas hould be made of two lenses placed in contact che outside lens is a double convex; the oute 16 inches. The inside lens is $\mathfrak{a}$ concavo-convex flint with the concave side fitting the crown, also of 18
inches raius, and theexterior curve of $78 \cdot 4$ inches radius. The eye piece may be made of two plano-
convex lenses, of equal focal lengths, with their
convex sides toward each other. Their distance apart should be two thirds the focal length of either. Thelens toward the objective should be $3 / 4$ nch, the other $1 / 2$ inch in diameter.
(42) J. T. H. says: I have been troubled or three months with heating of a sawmill mandrel, ald would like to know the cause. A. See
article in Scientific American Supplement, No. on the heating of journals.
(43) G. J. P. asks: We have 2 drying
houses, $18 \times 32$ feet, with 6 lines of 4 inch cast iron ipe 25 feet long. One party says that ventilation is required, so he has cut 3 holes 18 inches square in the roof, and put a square box pipe up through quare; but he does not think in the end 2 fee buildings tight. I tell him he ought, in order to keep his houses warm, to keep them as tight as pos-
sible. Which is right? A. There should be some ventilation, and it had better be under control Provide a box shaft about 16 inches square, at one
end of the building, extending from near the end of the building, extending from near the
floor to 2 feet above the roof, covered at top and
with openings on the sides above the roof; at the other end of building, provide a like shaft, but buildng near the floor; in each shaftplace a board alve or damper working on centers, and by means these you can have as muci or as as
(44) F. J. F. says: In reply to a correspon 18 feet wide and $31 / 2$ feet deep, sou told him to usc 2 engines of 7 inches bore by 12 inches stroke If he puts 2 such engines in the boat, he might a well have no boat at all. I had a boat of 14 feet beam by 60 feet long; and 1 used 2 high pressure ngines of 7 inches bore and 24 inches stroke, and she would make up stream was $21 / 2$ or 3 miles pe ased upon examples of sucesoful practice ourse the model of the boat may affect the powe equired to a very great extent, as well as mall a boiler, a wasteful engine, or the like (45) E. H. R. says, in reply to A. E. R.'s query as to closing the drip cocks of steam heat-
ers: If the air is out of the pipes, in either case ers: If the air is out of the pipes, in either case
the heat will be just the same whether the water ne heat will be just the same whether the water
only is run through the drip cocks or whether am goes with the water. The p the back pressure valve is all right
(46) H. L. P. says: In reply to N. W., who the earth, you replied that "it persisted in it ootion by the absence of resisting obstructions. Is not the air which presses on the surface an obruction? A.The air which surrounds the earth is no more obstruction to its motion than is the waer in the ocean, as both belong to the earth and arth is 8,000 miles, and the hight of the dense at osphere only a few miles, while at the hight o 30 or 40 miles scarcely a trace is left. The earth moves with the atmosphere through the practicalempty space
(47) W. P. H. says, in answer to J. D. H.,
ho asks how to thicken his stove patterns, so a ho asks how to thicken his stove patterns, so as
o take a heavier set of castings from them : Prepare the mold as usual, and then insert something ill separate them sufficiently for the additiona thickness desired. The cavity is small, and ca usually be filled by sprinkling sand on the face o the flask when open. An ingenious man can also (48) W. S. D. says, in reply to the question ow to construct a perfect square, with divider r compasses only, without the aid of scale, pen ment, on a given base ora line drawn of between tw

with a radius=A B, describe the arc C ; then with B as a center, describe the are
C; with C as a center, describe the are, A D B then again, with C as a center and a radius=A
(1/2 A B,measured on the arc) describe the ares at and $F$; then will the points, $A, B, E, F$, form
(49) E. H. R. says, in reply to H. F. K,
query as to boiler capacity for a steam heater Provide one fifth as much boiler surface 'in square pipes, and you will heat your building with econ-
(50) M. R. C. says, in roply to I. O. A., who arises from partial paralysis of the retina or ner vous coat of the eye, caused by bright white ligh rom the lamp obviated by decomposing the rays porcelain is very good, or thin tissue paper (white traw-colored, or such), hung between the light will do. If the pors to shade the white wood, quire a concave glass to suit the sight. If he be long-sighted from advancing years, weak lenses
may be required. If the glasses are suitable for
the sight, and the fatigue continue, rest should be
enjoined. Strengthen the general health; sea bathing or bathing with sea salt and water is (51)
(51) S. says, in reply to A.'s query as to how to get a good color on casehardened goods :
Use leather scraps for the purpose. The leather sculd be charred sufficiently to pulverize easily, and then be pounded, not too hne, say about the his in peas. The artues sith beas, mbed heated red hot for from 1 to 6 or more hours, as theated to be hardened to a greater or less deptb, and then aumped into cold water and dried off before they
(52) M. R. C. S. says, in reply to J. H. I. The splitting of the nails may be due to dry heat, as of a stove during cold weather. Keep the nails ten with a little glycerin or almond oil to which little liquor potassce has been added. The nails be coming concave is not, I believe, due to debility always, as I have seen it in one case where the person was well nourished.
(53) A. W. C. says, in reply to R. I. S., who asks how to settle rain water: The best plan that has as yet been found in Canada is to put about 2 ty barrel cistern of ba 2 ozs. borax into a twenhours the water will be purified, and comparatively waste water may thus be made fit for cooking purposes. This mixture has the same effect cles to the bottom of the receptacle.
(54) A. W. C. says, in answer to T. B, who asksas to using potatoes for manu facturing puran article of diet by the naval and mercantile marine of Great Britain; and they were the staple diet of the explorers of the northwest passage under McClintock
Minerals, etc.--Specimens have been reeived from the following correspondents, end xamined, with the results stated
Dr. T.-It contains 85 per cent lead and a trace silver, but nogola. 1 is mud shale, ay.-R. T. W.-No. 1 is mud shale

## COMMUNICATIONS RECEIVED <br> The Editor of the SCIENTIFIC American acriginal papers and contributions upon the follow-

 OnOn Drawbridges. By C. V. W.
On the Tails of Comets By E. B.
On a New Wash Bottle. By W. K.
On a New Motor. By T. H.
On a New Motor. By T. H.
On a Double Channel Theory. By w. т. c.
On a Boiler Explosion. By G. H. K. On Working Men the On a Meteor. By E. S. On Børed Wells. By R. A. R.
On Cleansing Water Mains. By f. O. A. On Penguins. By W. E. D.
H. Dinquires and answers from the following:


## HINTS TO CORRESPONDENTS

Correspondents whose inquiries fail to appear nay conclude that, for good reasons, the Edito declines them. The address of the writer should always be given.
Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be
published here. All such questions, when initial only are given, are thrown into the waste basket it would fill half of our paper to print them all but we generallytakepleasurein answering briefly mail, if the writer's address is given.
Hundreds of inquiries analogous to the followin esent: "Who sells miniature locomotive en gines? Who makes the best steam pumps? Wh sells mica lamp chimneys? Who makes pape
barrels? Who sells millstones? Whose is the best lue? Why do not makers of electic telegrap pparatus advertise in the SCIENTIFIC A MERICAN dil such personal inquiries are printec, as will be ob erved. in the columo of "Business and Personal, Which is specially set apart for that purpose, sub-
lect to the charge mentioned at the head of that olumn. Almost any desired information car in his way be expeditiously obtained.

## [OFFICIAL.]

INDEX OF INVENTIONS
Letters Patent of the United States were Granted in the Week Ending January 18, 1876,
AND EACH BEARING THA'T DATE.


Bed clothes holder, L. s. Weed. Bed, spring, H. W. Ladd.
Bee hive, W. L. Hamilton Bobbins, winding conical, G. Campbell Boiler tube stopper, P. Walker........... Boiler tube and flue, C. S. Dean........
Bolts, manufacture of, W. J. Lewis... Boot-burnishing machine Boot peg, C. M. Higgins Bottles, forming chokes in, H. Miller. Brick machine, J. K. Caldwell........ Bricks, etc., making, Walsh and Taylor Brush, Hellioig and Eke uckle, lever, s. Wales Buckle, trace, w. Challenger
Bullets, machine for casting, C. S. Meeker Burner, vapor, H. Wellington Butter package, A. J. Dibble Button, A. Young.............. ar axle lubricator, C. D. Car coupling tool, H. Sullings.. Car, refrigerator, A. W.. Zimmerma Car wheel, chilled. W. W. Lobdell Carpurets, scr, air and gas, Porter and Grimes (r) Carriage axle, J. C. Jenkins artridge, L. W. Broadwell Cartridge cases, making, J. V. Meigs....... Cartridge shot, A. B. and R. A. Kay. Center board, W. Austin ....
Chair, nursery, L. P. Lawrence .............
Chair, oscillating, Guildersleeve and Grimm
Chairs, foot rest for, J. H. Travis (r)
heese cutter, C. McGill
Chuck, planer, W. Esty.
hurn, E. F. Beard....
Churn and butter worker, E. W. Kitchen
Cigar machine, Nittinger and Theobal
Cigarette former, H. D. Bacot.........
Circuses, etc., seat for, J. E. Kelley
Clock-winding device, J. N. Rice.........
Clothes pin, D. M. and A. G. Cummings.
Coffee pot, L. C. Lomer
Corset attachment, J. D. Banfield................ Cultivator teeth, J. C. Bannigan
Curry comb, F. M. Shepard....
Desk and seat, school, Kline
Desk, offlce, W. S. Wooten.-
Distilled spirits, purifying. S. Swe
Door and gate spring, L. Gallaher.
Drilling, bit for rock, J. B. War
Elevator, water, Jones and Holm
Emery grinding wheel, S. G. Morrison
Engine air heater, B. T. Babbitt....
Engraving machine.J. C. Guerr
Exhaust mechanism, J. D.
Explosive compound, C
Fare box, C. H. Goebel
aucet, Hornbostel and Carroll
ellie, , machinefor saw
Fence post, L. Lightfoot
Fences, forming barbs on wire, Hill and Jayne.
Fifth wheel, F. A. Hollenbeck
Fire arm, revolving, Boardman and Peave
Yre arm cartridge extractor, J. W. Keen
Flax and hemp sor stock, steaming, R. Dalle
Fruit dryer, w. R. Davi
Fruit dryer, G. A. Deitz
Fruit Jar, J. Young.........
Frutt jar clamp, т. Hipwell

Furnace, hot air, J. B. Pierce
Furnace ore, H. G. Livermore
Furnace, glass tempering, F. B. De La Bastie
Furniture, school, E. G. Dur
Gage, siding, W. E. Babcock
Gas, manufacture of, G. Olne

Gimlet, B. F. Bee
Goblet molds, glass, J. H. Hobbs (r).......... 6,860 Guano distributor, R.
Gun sight, McFarland and Hadle
Hair restorative, A. R. Kiny on... ...... Harness, elastic tug link for, A. J. Pete Harness rosette, G. A. Keene...... Harvester, W.F. Cochrane
Harvester cutter, F. H. Wolkenhauer Heater, steam, G. W. Blake.
Chapman

Hog ring blank, E. N. Wing.
Hooks, snap, G. M. Hubbard
Hooks, snap, G. M. Hubbard
Hook, snap, W. E. Sparks...
Hook, snap, E. J. Steele....
Horse power for hoisting. P. K. Dederick
Horses' feet, frog pad for, A. F. Olds....
Horseshoes, E. L. Tevis........................
Horseshoe calking vise, Kimball \& Train
Hose coupling, A. I. Morse....
Househola utensil, J. Pfeifer.
Ice cream freezers, dasher for,
Indicator, speed, W. W. Wythe.
Jack, lifting, S. M
Lattel for bottles, J. ....
Lamp, Hadifield \& Clark.......
Lamp and gate, signal, W. E. Prall
Lamp shade supporter, E. Stevens.
Lamps, etc., filling liquids in, $W$. sedgwick Lantern slide, magic,

| 172,358 |
| :---: |
| 172,327 |

 Plow, gang, E. C. Eaton Pneumatic railroad signals, W. E. Prall....................433, Pneumatic signal, w. E. Prall.............172,491, 12,
Polishing wheel.C N. Bac
Power, spring, Frainer
Press, wine and cider, C. Müller
Printers' use. lock-up for, A. She
Printing block, color, J. Perkins
Puddler, revolving. G. H. Seller
Pump piston, L. D. Hovey
Pump, rotary, L. D. Gree
Pumps, bucket for chain, A. D. Crosbs
Railroad signal, etc. B. Woodruff...
Railroad chart protractor, A. Hill.
Railroad cutlery, E. L. Hutchinson...
Railroad ticket shears, etc.,R. McCul
Raker and loader, hay, G. Lambert.
Rawhide, treating, H.
Reaper reel, S. Hamilton.
Refrigerator, W. Spear..
Rolling hoop iron, roll for, B. Lauth
Roofing composition, c. в. Hutchin
Sack holder, G. H. . Sawyer
Saw gummer, J. Connor...
Saw gummer, J. W. Mixter.
Saw handle, crosscut, S. Boone..........
Scholar's companion, w. A. Harwood
Scholar's companion, w. A. Harwood..............
Screw, wood, T. . Sloan...................
Screws, making wood, T. J. Sloan.......72,349,
Semolino, purifying, H. Seck.. .......
Sewer trap, ventilated, J. T. Campbel
Sewer trap, ventilated, J. T. Campbe
Sewing machine, B. Frese.
Sewing machine, Young and Bar Sewing machine for knitted fabrics, W. Sewing machine tension, C. F. Ritchel...........
Sewing machine dress protector, R. \& G. Blake Sewing machine dress
Shackles, J. C. Palmer.
Shawl strap, F. Turne
Shoe, J. Knowiton....
Shot case, Hill \& Taylo
Shot case, Hill \& Taylor.
Sifter, ash, E. Herzberger.... Cumm
Signai box, electric, E. J. Frenc
Sledges, making, L. Chapman
Spark arrester, R. P. Faries.
Spear, eel, S. P. Hedges
Spindle sheath and cop tube, G. H. Simmons
Spinning frame traveler, F. J. Dutcher......
spinning machine spindle, D. H. Rice
Spoke socket, J. B. Goldsmit
Sprinkler, J. C. Melcher....
Steerer and propeller, J. H. Allyn.........
Stereotype plates, planing, J. W. Kellber
St Steinbeck Stove, G. Newcomer
Stove water heater, J. H. Mitchell
Stove, self-closing door, N. A. Boynton,
Straw cutter, L. Cossitt............
Street sweeping machine, T. MacNeil
Stump extractor, J. Platten.:
Suspenders, w. P. Vrooman.
Table, ironing, J. L. Young M. Ro
Table, sloning, J. L. Young...........
Table slide, extension, H. R. French Tables, slides for extension, H. R. Frenc Telegraph, automatic, T. A. Edison....
Telegraph wires, insulating, W. . . Prall Telegraph wires, Telegraphy, automatic, Foote \& Randall. Thill coupling, w. H. Trissle Thrashing band cutter and feeder. Gearhart et Tobacco pipe, B. Lorillard.. Tool, D. W. Norris...
Trap, fly,O. M. Pond.
Tubes, welding ends of, A. $L$.......e
Umbrella runner, H.S. Fros
Umbrella sticks, joint for, Briggs \& Clarkson...
Urinal, W. L. Hepineuze.
Valve stop, M. Willard...
Vehicle axle, J. C. Spooner
vehicle hub, , . H. Guard......
ventilating vessels, E. C. Soule
Wagon, dumping, J. Kramer.
Wardrobe, folding, H. Smith


HOISTRTNG RIBLE BNTGE AMATEUR WORKERS Rareand Fancy Wools Beautiful Designs.
 GEO. W. READ \& CO., How to Learn of of thenenologs," (Inoortorora-
of Phrenology',
ted by the State
will instruct a Ming suly 6, 1876, to accommodate Teachers, students,



WHIPPLE'S
Patent Door Knob.








H. W. JOHNS, 87 Maiden Lane, N. Y.


Love vox, son © coor
ELECTROTYPERS and STEREOTYFRS,




Science Record is a splendid book of 600 nually, about the 15th-
of January. Illustraof January. Illustravings. Price $\$ 2.50$.
THE
Volume for
frent THE Volume for 1876
will be published about
January 15 th. Its con-.
tents Will embrace the
most
minteresting Facts and Discoveries in the
various Arts and shi
ances that hate trans-
pired during the prece-
ding year, exhibiting in
one view the General
ond





Every person who destres to be well informed conncorn-
ng true Progress of the Arts and Sciences should hare


 All the preceding volumes of SCIENCE RECORD
may be had separately at $\$ 2.50$ each, or $\$ 10$ for the five volumes, 1872, 1873, 1874 , 1875, and 1876 .
munn \& CO., Publishers,
37 Park, Row,
New York city

Baird＇s scientific Book Catalognes JUST READY－－－NEW EDITIONS． Catalogue of Practical and Scientific Books，pub－ lished by H．C．Baird \＆Co． 96 pages， 8 Bo． Catalogue of a Choice Collection of
Scientific，and Economic Books．4to．
List of Bon List of Books on Steam and the Steam Engine，
Mechanics，Machinery，and Engineering．4to．
List of Important Books on Metallurgy，Metals，
Strength of Materials，Chemical Analysis，Assaying， etc．4to． List of Books on Dyeing，Ca
and Woolen Manufacture． 4 t
List of Books and Pamphlets on the Currency jects． 4 to．
greatis，Any or all of the abo mail，free of postage，on an application． EnE We are now recelving the most tmoorthnt new are prepared to furrish all American and foreign scien－
ffic books which are to be had，as well as information re．
ald tific books which are
garding all sicintiftc
soever puolished．

HENRY CAREY BAIRD \＆CO．，

co
Tornado Windmill Co．， $442 \begin{aligned} & \text { A WEEK－AAEnts wanted every where．Bu－} \\ & \text { siness permanent and first－class．} \\ & \text { particulars，address }\end{aligned}$


Contains deecriptive GARDEN CALLENDERR， 1896 and Grass Seeds Plants，Bulbs，Noveltites，and every
GARDEN REQUISITE，Beautifully illustrated．Send

HOOREA즌 teed strength and purity at the lowest mark et rate．
CHAS．PFIZEK © CO．， 81 Manden Lane，N．. A WANT．SUPPLIED．




Best Mill Spindles and Steps， MILL GEARING，
Shafting，Pulleys \＆Hangers．
Address
т．B．WOOD \＆Co．，
A．GOOD HEATEER FOR THE GOthic Furnace I bought of you works to entlre satisfaction．

An deutfode Erfinder．
Diefe grose und thätige ©lafie unfrer $\mathfrak{B e}$ bolferung madjen wir bejonbers baraut aufmerffam，סấ unire firma burd）ihre $\mathfrak{B e r}$ bindung mit $\mathfrak{B z c}$ bgington und ben europäifden ఏauptfïbten，bejondere Borthoile zur Exlan gung bon ine und auständifden Patenten bietet．
Seder Erfinber，gleidgbiel weldjer Mationali． tät angehỏrig，ift durd bie liberalen ßatentge feze Der Bereinigten Staaten zum ßatentjdut für ほrfindungen beredtigt． $\mathfrak{u n i r e} \mathfrak{F i r m a}$ ifl bereit，geftuitzt auf 26jährige exfahrung，Dentidje Erfinber jeber Seit zu beratben und zu mäßigen Breijen rajd und piinftliø ßatente zu erlangen． Die Deutidue Section ift in ben Sounden fäbiger beutider Sngenieure，weide in ber Dffice perjönlidg mit Erfindern berfehrey werden．
Der ，Scientifc American＂wird in feined Spalten bie bedentenderen Erfindungen be iprefien
©orrefponbenz erbeten und prompt bean soortet．Bamphlete in deatider Sprade we ben auf $\mathfrak{B e r l a n g e n}$ franco zugefandt．

## Y Morefite

马aunu \＆coo．
cientific American＂Patent Agentu 88 Saxt Mow．

## CLARK \＆COMPANY＇S

 PATENT SELF－COILING，REVOLVING STEEL SHUTTERS






BRADFORD MILLCO：
Fronch facrivisis of



Planing \＆Matching，

Planing，and Matching

O IT S＇Maftiy hoisting

## 

 OPIUN／No．$\mathrm{T}_{\text {HE CENTENNAL INTERNATIONAL EX }}^{\mathrm{HE}}$








## PUNCHING


 Gandiner＇s Pat Cenwing \＆Spuaxing Attadment


R．之．STATE \＆CO．，Springfield，Ohio
Compressed air motive power．－For


CELEBRATED FOOT LATHES








## 



 a Specialty
The Myers Portable Envine， 5.5 ， 6 ，s．s．p．Some



$\mathbf{W}^{\mathrm{ITHEREF}}$ ，RUGG \＆RICHARDSON，Man




PATENT SCROLL SAWS．
 CT BATS－THEIR CONSTRUCTION AND
 EAGLE FOOT LATHES，





DO YOU Male or female，Send your ad

 Birelow Rinine The Cheapest and Best Portable
Engine offered to the Public．
Price Price of stationary E ．．．． 800 4 He wilmount Bollers．Eng

 H．R．Bigelow \＆Co

## FOREIGN ${ }_{A N D}$ PATENTS

THE CENTENNIAL．

## There is no doubt that our Centennial Expo

 tion will attract to our shores multicudes of repre they will take home with them many of our best improvements to introduce into their own manu－ factures．An unusual opportunity will be offered for sell－ ing to these people such foreign patents as hav respective countries from which these visitors respec
At the reduced prices for which patents are ob－ tained abroad，our people will lose a chance not likely to occur again，if they do not avail them－ tions in foreign countries at once，so as to hav their patents ready to negotiate the coming sum
For cost of patents in the different countries and
mer． the conditions on which they are granted，send for pamphlet containing full information．
Address
MUNN $\&$ CO．，
－ 37 Park Row，New $\mathbf{Y}$
branch Office，cor．F and th Sts．， Washington，D．C


\＄250
Moxtineidmate ided
 TRADE Noiseless in ooperation－Perfect
in wormansip





INDIA RUBBER For Inventors and the Trade，made into any pattern ar
short notite ory F ．H．HOLTON， 45 Gold St．，New York
Estabilished in 1860 ．
 Blowers
All Purposes The CHEAPEST and BEST now in us EXETER MACHINE WORKS，
Sole Makers， 140 Congress St．，

Machinery of lmproved Styler for making
SHINGLES，HEADING ANE
 PATENT DOUBLE ECCENTRIC CORNICE BRAKE． MACHINERY． IRON \＆WOOD WORKING MACHINERY Cold Rolled Shafting． HANGERR，PULLEYs，COUPLINGG，BELTING，
ac．Send for illus trated Catalogue and Price List．


## Machinists＇Tools，

Minu \＆Co＇s．Patent Oficess．

## clstablished 1846.

The Oldest Agency for Soliciting Patents in the United States．

TWENTY－NINE YEARS EXPERIENCE，
MORE PATENTS have been secured through this agency，at home and abroad，than through any other in
the world． They employ as their assistants a corps of the most ex draftsmen that can be found，many of whom have been se ected from the ranks of the Patent Office
SIXTY THOUSAND inventors have availed Semselves of Munn \＆Co．＇s services in examining their in entions，and procuring their patents．
MUNN \＆CO．，in connection with
MUN confer with inventors，prepare drawings，specitications．and assignments，attend to filing applications in the Patent Office paying the government fees，and watch each casestep by step while pending before the examiner．This is done
through their branch office，corner F and 7th streets，Wash Ington．They also prepare and file caveats，procure design patents，trademarks，and reissues，attend to rejected cases
（prepared by the inventor or other attorneys）procure （prepared by the inventor or other attorneys），procure copy－ rights，attend to interferences，give written oplnions on
matters of infringement，furnish copies of patents，and，in fact，attend to every branch of patent business both in this and in foreign countries．
A special notice is made in the Scientific American of all inventions patented through this Agency，with the name nd residence of the patentee．Patents are often sold，in notice．
Patents obtained in Canada，England，France，Belgium， Germany，Russia，Prussia，Spain，Portugal，the British Colonies，and all other countries where patents are
ranted at prices greatly reduced from former rates．Send for pamphlet pertaining specially to foreign patents which states the cost，time granted，and the requirement for each country

> Copies of Patents.

Persons desiring any patent issued from 1836 to Novem ber 26，1867，can be supplied with official copies at a rea sonable cost，the price depending upon the extent of draw ags and length of specifications．
Any patent issued since November 27，1867，at which
ume the Patent Office commenced printing the drawings me the Patent Office commenced printing the drawings may be had by remitting to this office ${ }^{* 1}$
sper A copy of the claims of any patent issued since 1886 will be furnished tor $\$ 1$ ．
When ordering copies，please to remit for the same as
above，and state name of patentee，title of invention，and date or patent．
A pamphlet containing the aws and full directions for
obtaining United States patents sent free A handsomely obtaining United States patents sent free．A handsonely
oound Reference Book，gilt edges，contains 140 pages and oound Reference Book，gilt edges，contains 140 pages and
many engravings and tables important to every patentee and mechanic，and is a usefulhandbook of reterence for ev－ rybody．Price 25 cents，mailed free．Adares

MUNN \＆CO．
Publishers SCIENTIFIC AMERICAN nch Office－Corner Fark Row，N．Y．
Branch Ofrice
Washington D C ．



Sely for Pamphlet and



## NTOTLICIDE



An Unprecedented Success. Thousands Already Sold.

## Wrinkles and Recipes

 thorities, the most valuable Handbook evEngineers and Mechanics of every class. Contalus the cream of the Practical Mechantsm Sertes by Joshua Rose, which has appeared during the past
year in the Scientific American-Useful new papers on mechanical operations by distingulseed experts-Hundreds of knotty points in Mechanics and Engineering No high mathematics or intricate formulx. Recipes of
all kinds for industrial processes, for cements, for makng simple instruments, etc. Hints for farmers and for
housekeepers. The whole is a collection of the very best practical hints and suggestions which, for several
years, have been sent to the ScIENTIFIC AMERICAN by its correspondents and contributors, together with an
tmmense variety of new material. pz Price 81.50, post paid.
pages. Large pocket-book size.
$\qquad$ $\begin{array}{ll}\text { year } \$ 4.20 . \\ \text { Address } \\ \text { P. } & \text { H. MUNN, Publisher, } \\ \text { 3\% Park Row, New }\end{array}$

## Cold ROLLED shafting

## 



FOR Charlie's PResent.


 College, 805 Broad way; and many other places. Bestdes
telegraphling, many beautiful experiments can be made,

 $\qquad$
R OGERS' TANNATE OF SODA BOILER Send for book on Botler Incrustation. In, Ind.


Water Mheds. More than four times an
many of Jas Leffect 1 Im-
proved Double Turbine




RICHARDSON, MERIAM \& CO.,



 THE UNION IRON MILLS, Pittsburgh, Pa--
The attention of Engineers and Archtects is called
to our improved Wrought-ron Beams and Girders (pat-



NEWSPAPER FILE.




The NILES ENGINE.

 Hamilton, Ohio. HARTFORD
STEAM BOILER
Inspection \& Insurance COMPANY.
 J. B. Pirizer, see's.


Niagara SteamPump Works Espablisirp 1886 . CHARLES B. HARDICK, 23 Adams Stree
BROOKLYN, N. Y. IRON PIANERS,






## Steel ${ }^{\text {Thr }}$ Tube Clioniteaner.





## THE <br> Soinvince

For 1876.
The Most Popular Scientific Paper in the World.

## Thirty-Fisst Year.

Only $\$ 3.20$ a year including Postage.
THE SCIENTIFIC AMERIC AN, now in its 3 3st. year, enjoys the widest circulation of any weekly yearspaper of the kind in the world. A new volume commenceet January 1, 18786. Published week-
ly. Now is the time to subscribe and to form clubs.
The Contents of the scientific american embrace the latest and most interesting informa-
tion pertaining to the Industrial Mechanical tion pertaining to the Industrial, Mechanical, and
Scientific progress of the world; Deseriptions, with beautiful Engravings, of New Inventions, New Implements, New Processes, and Improved Industries of all kinds; Useful Notes, Recipes,
Suggestions and Advice, by Practical Writers, for Suggestions and Advice, by Practical Writers, for
Workingmen and Employers, in all the various workingmen and Employers, in all the various
arts.
EVERY NBER pages, elegantly prizted and illustrated with many engravings. The year's issue contains 832 large
pages, equal to four thousand book pages, at a cost, pages, equal to four thousand book pages, at a cost,
including postage, of only $\$ 3.20$ a year to the subscriber.
Engineers, Mechanics, Telegraphers, Inventors, Manufacturers, Chemists, Photographers, Physiof all Professions, will find the SCIENTIFIC AMERICAN most useful and valuable. Its pages teem with interesting subjects for thought, study, and conversation, and are an unfailing source of new and instructive information. As an Instructor and Educator, the SCIENTIFIC AMERICAN as no equal. It is promotive of knowledge and It should have a prominent place in every Household, Reading-Room, and Library.
Specimen copies sent, prepaid, on receipt of
TERMS OF SUBSCRIPTIONS.---POSTAGE One copy Scientiffc American, one year.... $\$ 3.20$ ne Scientific Amian thre months 1.00 One copy Scientific American and one Scientific American Supplement, both
for one year, post-paid................ 7
and one copy Science Record........... 5.20 We make a liberal discount and give advan tageous premiums to those who form Clubs or
procure Subscriptions. A beautifully illuminated
Mill FurnishingWorks
 THE B ES T INJECTOR Over 15 fribinhans patert.




REYNOLDS \& CO.,


## Portiand Cement

## NPortant for All corpora atons and





 Todd \& Rafferty MachineCo.





 6.-Agriculture, Eotany, and Horticul ture.-New and Useful Information in all branches Shrurs, and Fiowers, N Nw, Useful, and Interest Ing Facts in relation to Cultivation, Propagation-
with The Latest Information concerning Bullding Mate ryas,
ty of Miscellaneous Informations, pertanning to Ru
ral and Housee 8.-Materia Medica, Therapeutics Hygiene.-Exhibiting the progress of Medical
Sclence in varlous branches; New Medicinal pre-
Latest Investigations, Discoveries, and most Inter
esting Information in this department of Science
10 \& 11.-Meteorology, Terrestria Ing Atmospheric and Terrestrial Phenomena, Tra-
vels, Explorations and Discoveries, etc.
12.-Geology and Mineralogy.-The Lates and most Interesting Geological Investigation
and Reports, and New Discoveries. 13.-Astronomy.-Recent Interesting Discover ies and Information, with Reports of Astronomica
Phenomena, Progress, New Instruments, etc. TERMS:-Scientific American Supple ment, One year, post-paid, 85.00 ; half year, $\$ 2.50$


Subscription List, also Prospectus and Rates, sent

MUNN \& CO .



$\$ 5$ a year by mail, post-paid. Send 10 cents for Specimen Copy. interesting themes and objects presented in the Great Centennial International Exposition of 1876, and also to meet the wants of that large class of readers who desire an increased supply of Scientific In formation, particularly of the
more Technical and Detailed character, we shall issue a special and Duticailed character, we shal ENTIFIC AMERICAN SUPPLEMENT, to be printed weekly during the Centennial year of
1876, and, perhaps, permanently thereafter. Each number will have sixteen large quarto pages, issued weekly, printed in the best style, uniform
with the SCIENTIFIC AMERICAN, but separately paged. The SCIENTIFIC AMERICAN SUPPLEMENT, International Exposition, will embrace a very wide range of contents, covering the most recent and valuable papers by eminent writers in ALL THE PRINCIPAL DEPARTMENTS OF SCIENCE AND
USEFUL KNOWLEDGE, to wit: 1.-Chemistry and
cing New Chemical Discoveries,
 2.-Mechanics and Engineering.-The latest and best papers upon Steam Engineering.
Railway Entinering Mining, and CIVII Engineer-
Ing, Mil Work, Textile Industry ang working drawinges.
and Electricity, Light, Heat, Sound. Latest Improvements in Telegraphy Telegraph
Engineerring Improvementsingalanic Bettories,
Electricic Engines, New end Useful anplications of
 - Archite

