

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.


## PATENT ONIVERSAL JOINTER.

Messrs. Bentel, Margedant \& Co., of Hamilton, Ohio, are the inventors and manufacturers of so many excellent machines, which, from time to time, have found prominent places in our columns, that, in adding another invention to the list, we think that no higher commendation will be necessary to secure for the device the careful attention of the reader, than to refer to it as the handiwork of the above mentioned firm. In wood-working machinery, there is an abundant field for the resources of the inventor; but judging from the frequency with which the frequency with which improvements in that class
of mechanism have, of late, of mechanism have, of late,
been brought to our notice been brought to our notice
it is evident that there is no lack of ability and geniu being devoted to the produc tion of not only new ma chines but useful and successful improvements on well known machines.
Amovg those who have done a great deal in this line of invention, the above mentioned manufacturers de serve to be placed foremost in rank. The device last produced by this firm is a planer, and is termed by the manufacturers the Univer sal Jointer. It will plane ou of wind, parallel or joint, pal joint, square, bevel, and make a perfect glue joint, also a rolling joint. It will square; it will raise and finish one or both sides of a panel at the same operation with $8 q u a r e$, bevel, scotia, cove, or ogee raise; it will gain and $\mathrm{r}^{10 w}$, making a square, bevel, ur round gain or groove from 4 inch up to or groove, from $\frac{1}{4}$ inch up to 8 inches wiae; it will make straight, bevel, and elliptical moldings, and rabbet any cut from $1 \frac{1}{6}$ to $1 \frac{1}{2}$ inches deep, and $3 \frac{1}{3}$ inches wide. It will cor ner, bevel, hand match, smooth, bead, flute, chamfer, round, nose, saw, bore, and rout ; and all of this work is done on the single machile by meraly changing heads, the labor of a moment
The heavv iron body of the tool is cast in one solid riece and, while occupying very little floor room, is a rigid support of the machine. The table of the machine. The table frame, althcugh heary, and also cast in one piece, can, ne vertheless, be easily brough to any required hight, raising both tables of the machine a once, keeping, if required, the given attitude of the ta bles. The latter are both ad justable. The table in front of the cutter head, which is raised and lowered indepen dently of the table in rear of the latter, or of the table frame, can be moved to or from the cutter head, and at any distance from the eame, raised or lowered, or other wise adjusted. The table, in brief, raises always towardis, and lowers from, the cutter head. Back of the two fron tables, there is a third table (also adjustable by means of a hand screw), which serves to rest long material upon when gaining, cross cutting, or sticking circular or elliptical molding. The same tabl serves as a rest for the ad justable fence or guide for planing square, or beveling, and for other purposes. The other side of this machine shown in Fig. 2, is provided with a boring and routing table, which can be raised and lowered by means of a hand screw. The different kinds of boring and routing can be done here, it being no matter whether the front side of the machine is being used or not at the time.

The machine is suitable for light and heavy work, and therefore will be useful for railway car builders, agriculsural carriage and wagon works, planing mills, house builders, sasb, door, and blind, furniture, and cabinet, factories.
Two sizes are being made, the one to plane 6 inches and the other 8 inches wide, aud are warranted and guaranteed in overy particular as to the capacity, quality, and finish of the work. If required, countershafts for the same can be fur nished. The pulley on the cylinder should make 3,800 revolutions per minute.


## PATENT UNIVERSAL JOIN'ER

The body of this very useful machine is so designed that the belt may be brought from below or from a different position on the side. This enables the tool to be placed in an upper story and the belt to be led up to it , thus economizing room, a point of considerable importance in many manufactories.
The device is covered by three patents, the latest dated


The London Telegraph relates the following account of the Czar's visit to Woolwich arsenal during his recent stay with the Queen: The party made their longest halt in the factory where the Nasmyth hammer, the largest in the world-fitted with top steam-is worked. Adding to the forty tuns dead falling weight of the hammer the fifty-one tuns given by a full pressure of steam above, a blow equivalent to a weight of ninety-one tuns can be given by it with as much contro as a child may exercise over a toy mallet. The Imperial party occupied a specially erected platform to witness he welding of the trunnion oil of a thirty ight tun gun. The Cesarewitch last year witnessed a similar process with the trunnion coil of a thirty-five tun gur. The massive door of the urnace was raised, and, in a fire terrible from the fierceness of its golden glow, stood the white hat coil-a cylinder weighing con-a cylinder weighiog twenty-three tuns and a balf. This trunnion coil consists of two thicknesses of bariron, coiled one upon the other, and the work of the steam hammer was to weld them into a homogeneous cylindrical mass. The powerful crane was stt in motion, and the swarthy smiths sprung to the beautifully adjusted machinery by which the firry mass was seized by giant tongs, swung glowing and biesing out of the fire, and placed under the hammer. Blasts of hot air rushed across towards the spectators, but the vast size of the building rendered eye protectors unnecessary. The coil, it is needless to an, was welded effectually; the very floor, although its foun. dations are on a rock, vibrating with the tremendous blows. The force, wielded by but a dozen men at the lever of the crane, was astounding; yet the hammer was subject to a steam power more formidable than itself. In their anxiety to see the next process, the visitors passed hurriedly. through the heavy turnery and sighting room, where they might have seen thick slabs of metal peeled off the partly built guns, as apples are peeled by a dessert knife. The party, without bestowing more than a passing glance at the great guns on the lathes, went into the opin air to witness the shrinking on of the breech coil of a thirty-five tun gun. Lying side by side, smiling in their new polish, lay a remarkable collection of guns ready for use. The largest cannon was the famous thirtyeight tun gun, the heaviest yet completed. The Wool. wich infants (thirty-five tuns) were an interesting family of four; of twenty five tun guns there were twenty-five, and twenty of eighteen tuns. After these frightful engines of deatruc tion, no one troubled himself much with the smaller cannon, whose name was legion.
Remedy for the Colo rado Роtato Bug.-Mre. Samuel Deforce, of Buei nessburgh, Belmont county Ohio, writes us that her po
can Patent Agency. For further particulars, address the ma nufacturers as above.

No two persons can actually see the same rainbow, a each receives the light from different drops of rain. above insect by a couple of guinea fowls, and*she thinks that these industrious and persevering bug pickers might be very advantageously employed wherever potatoes are grown.

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Contents:


## water as fuel.

Among the attractions at thc Colosseum in this city, where the wonderful views of London and Paris are exhibited, are certain practical demonstrations of scientific phenomena, conducted in the side rooms. Here we found a lecturer who has the merit of succeesfully illustrating his points with some of the most striking standard experiments of the
chemical lecture room, but the theories he propounds are not always consistent with the present state of scientific knowledge.
During one of his recent lectures, we heard him expound the idea that, at a future time, when all the wood and coal have given out, we shall use water as fuel, as it contains large amounts of the combustible hydrogen, and is every where present in unlimited quantities. Such an idea would have been pardoned forty or fifty years ago,'before the doctrine of the correlation of forces was established, before the na ture of heat was known, before the mechanical equivalent of heat was determined, and before we knew how to account for the heat of combustion; but it is untenable at the present day, when we know that the heat developed and diffused when the oceans were formed (by the combustion of almost all the hydrogen on our earth) must be given back to this hydrogen, in some form
nto the combustible gas.
In fact, the waters on the surface of our earth are nothing more nor less than the result of the burnt hydrogen, which gave out its heat at the time of its combustion. We know at present that this heat pre-existed in the gaseous hydrogen, stored up in its atoms or molecules. We have become con vinced that the atoms or molecules of a gas are not in fixed positions, but move in straight lines or elongated ellipses, hurrying to and fro, encountering their neighbors, rebounding and continuing their course in a new direction, according to the established laws of impact of elastic bodies. They do not move with exactly the same velocity, but their mean ve. locity is, for hydrogen gas at the temperature of $32^{\circ}$ Fah., about 6,100 feet per second, while it increases $12 \cdot 5$ feet for every degree of rise of the thermometer; so that at $522^{\circ}$ Fah. or 12,200 feet per second, at which temperature the gas must consequently, under the same volume,exert double the pressure, they will possess twice the velocity.
A pound of ice-cold hydrogen gas possesses, therefore, an internal energy as great as that of a pound ball moving 6,100 feet per second; and it is this energy which is taken from it when chasionged from itd gaseous state, to which, in the case of hence the result that, by the combustion of every pound of hence the result that, by the combustion of every pound of
hydrogen, an energy is developed of 62,030 units of heat hydrogen, an energy is developed of 62,030 units of heat,
equivalent to $47,888,400$ foot pounds, which means that it is equivalent to $47,888,400$ foot pounds, which means tha
sufficient to raise a weight of 23,944 tuns a foot high.

It is evident that this energy cannot be developed for the ecund time from the hydrogen in the water; but, on the contrary, it must be given back in case we wish to separate the two lements composing the water. One of the means
of effecting the separation is great heat. By passing steam of effecting the separation is great heat. By passing steam
through a white hot platinum tube, it is decomposed into its elements, while a part of the heat applied totally disappears, to be changed into the molecular motion of the gases. A second method is the electric current. When we pass a sufficiently powerful current from a voltaic battery through the water, the latter will be decomposed into its separate elements; while the electric energy, apparently disappearing, becomes in its turn transformed int) the molecular motion of the gases. The third method is found in the play of those energies which we call chemical affinities. In this case, the most simple illustration is the introduction of a piece of sodium amalgam under a bell jar containing water. The sodium oxydizes, and the energy developed by this oxidation is appropriated by the hydrogen, which thus finds the conditions under which it can assume again the hidden molecular motion necessary for its existence in the gaseous state.
It is evident from the above that it is as impossible to burn the hydrogen in the water, or in its vapor, as it is to burn the carbon in the lime rock or in the atmospheric carbonic acid. No fuel can be burnt up twice; and as the hydrogen contained in water has been once burned, and has thus loast its heat, any hope of obtaining heat out of it again, withoat first thtroducing heat, must be vain.

## THEI HORSE IN MARKET.

Modern life broadens in two ways: by the development of new customs and by the revival of old ones. Whenever the causes which led to the abandonment of the customs of former times seem insufficient or inoperative under present con ditions, there is a tendency to rëpstablish them, thus giving to our civilization a scope and variety never before enjoyed. Our range of food is specially wide and varied in consequence. All the world is laid under tribute to supply our tables, and we are learning to imitate or improve on every culinary process of every nation and every age.
One of the most important revivals of late years is the use of horse flesh, which for centuries has been under ecclesias. tical ban except a mong the aturdy people just now preparing to celebrate their first millenium.
Curiously it was through the people whose prejudice against horseflesh remains most intense that the revival began. During the siege of Copenhagen by the English, in 1807, the scarcity of provisions compelled the Danes to eat their horses; and the practical knowledge of the quality of the meat thus gained led them to continue its use after the original necessity had passed away. Possibly the example of their Icelandic allies may have had a good deal to do with the breaking down of Danish prejudice in the matter. In Iceland, the practice had survived from the first. The islanders were willing to have their souls saved by the Church, but they would not submit to any interference with their stomachs; so, rather than lose them, the "Church gave hem special permission to eat the "exe
hey have continued to do to this day
Timple of Denmark was Würtemburg, which legalized the sale of horseflesh in 1841. Bavaria followed in 1842, Baden in 1846, and Hanover, Bohemia, Saxony, Austria, and Belgium the year after. In 1853 the prejudices of Switzerland and Prussia were overcome, and two years later Norway and Sweden were added to the list of countries authorizing the sale of the long rejected food.
The struggle against religious prejudice was continued eleven years longer in France, though an impression preails that the revival is a Gallic eccentricity, rather than he result of Germanic good sense.
At one time the feeling against the use of this heretical diet must have been exceedingly intense in the land of good cooking, for it is on record that as late as 1629 a man was condemned to death and executed in France for the crime of eating horseflesh on a Saturday in Lent.
A hundred and fifty years later, the use of the abhorred flesh was publicly advocated by a French physician. Not many converts to the doctrine were made, however, until the retreat from Moscow. During that terrible march, when he alternative was starvation, the French soldiery ventured o eat their disabled horses, and discovered that horse flesh would not only sustain life, but was really savory and invit ing. Several of the surviving officers afterward endeavored to break down the prejudice against horseflesh, and advo-
cated its regular use in times of peace, but without much cated
effect.

More strenuous efforts were made by French savants after the surrounding countries had demonstrated the advantages of the change, and a grand hippophagic banquet was celebrated at the Grand Hotel in Paris early in 1865, In the meantime, the meat had begun to appear in the markets as beef, and the government was forced to authorize its sale under proper restrictions to prevent the exposure of uninspected cuts. The decree was published in 1866, and during the ensuing year upward of two thousand horses were slaugh. tered for the markets, after having been passed by a veteriinary sargeon; and not one of them, on inspection after killing, proved to be in an unhealthy condition. The sale and use of horse flesh has largely increased in Paris since then, and the practice is equally common in all the counries of Northern Europe, save Holland and Great Britain, much to the benefit of the people and the improvement of he stock of horses. In Russia the custom has always prevailed, the Greek Church never having meddled with the

The English, like ourselves, occupy an extremely absurd position in regard to the use of horse flesh. We both eat in large quantities, yet profess to consider it unfit for food.
It is true that, of the thousands who give the meal a place on their tables as an imported delicacy, very few are aware that it is horse flesh. Possibly the most of those who use it would reject it if they knew its real character; nevertheless the fact remains that horse flesh is largely eaten here and enjoyed, and the inference is legitimate that the flesh of American horses would be found just assavory and just as wholesome.
We call the article, which is kept for sale by every first class grocer, Bologna sausage: so called for the excellent reason that it is manufactured at-not the Italian city of he name-but at Boulogne.
Originally the basis of Bologna sausage was asses' flesh, more delicate meat than that of the horse, though not less obnoxious to common prejudice. Latterly, however, horse flesh has been its cbief component, not used secretly, but openly, since at the place of manufacture the sale and use of horse flesh is as legitimate as the sale and use of mutton or beef. For sausage making, indeed, the fiesh of the horse is a safer ingredient than any other meat. No other will bear so well to be eaten in a raw or partially cooked state, as it is free from the trichina which makes raw pork so dangerous, and the undeveloped tapeworma which infest both beef and mutton.
To a greater extent than here the abominated meat is aten in England, and under less favorable conditions; for in addition to the wholesome Bologna, large quantities of suspicious horse fleeh disappear-down the throats of deceived humanity, doubtless-every day in London and other English cities. The animals-broken down hacks and the like-are known to be killed, ostensibly for cats' and dogs' meat, but the amounts sold by the hawkers of that sort of stuff fall far short of the supply. The difference disappears as horseflesh, but reappears, there is reason to believe, as human food under other names. The Parisian caterers called it " bifsteck à la chevcl." It is altogether likely that the cockney caterers, less honestly, stop at beef, the resemblance of horse flesh to that much respected commodity being so close that, whether raw or cooked, it would require an expert to detect the cheat.

## HOW TOITREAT FRUIT TREES.

In considering the growth of organisms, the action of the alkalies is to be looked upon as scarcely less important than that of air and water. Lime is the great animal alkali, and potash the vegetable one; its old name of vegetable kali expressed that fact, and all the potash of commerce is well known to be derived from wood ashes. The importance of potash as a manure has been frequently overlooked by farmers, who rarely know the large amount of this material found in grass, grain crops, leaves, barnyard manure, roots, and fruits. How potash acts in plants, in conjunction with carbon and silex, to form woody fiber, starch, sugar, and oil, is yet unknown to chemical observers, but the fact of its action is beyond a doubt. Liebig long since pointed out that the chief cause of barrenness is the waste of potash carried off by rich crops, especially tobacco, with no replacement by proper manure. How many millions of pounds of potash have been sent to Europe from the forests of America, and in the grain, tobacco, and hemp! Luckily one alkali may bo replaced by another, and we have received a considerable quantity of soda from European seaweed and in the shape of salt. Latterly, nitrate of soda from natural deposits in South America is brought to us at a cheap price.
The point to which we now call attention is that our farmers and fruit growers have ignored, or rather been ignorant of, the importance of wood ashes as a vegetable stimulant and as the leading constituent of plants. Even coal ashes, now thrown away as useless, have been shown, both by experiment and analysis, to possess a fair share of alkaline value According to our observation, if the practice of putting a mixture of wood and coal ashes around the stems of fruit trees and vines, particularly early in the spring, were followed as a general rule, our crops of apples, grapes, peaches, etc., would be greatly benefitted in both quality and quantity, and the trees and vines would last longer. We will relate only one experiment. Some twenty-five vears ago, we treated an old hollow pippin apple tree as fol lows: The hollow, to the hight of eight feet, was filled and rammed with a compost of wood ashes, garden mold, and a little waste lime (carbonate). This filling was securely fastened in by boards. The next year, the crop of sound fruit was sixteen bushels from an old shell of a tree that had borne nothing of any account for some time. But the strangest part was what followed. For seventeen years after the filling, that old pippin tree continued to flourish and bear well.
Let us call attention to still another point of importance in fruit-raising. This is the bearing year for apples and fruit in general in New England; probably it is also in some other parts. Now when such years some, the farmers rejoice too much at their prosperity and abuse it, as nearly all people do the gifts of fortune. We should be temperate as to the quantity of our fruit as well as of our fruit juices. By proper trimming and plucking, the apple crop in bearing years may be reduced to but little more than half a crop as to number, but the improvement in size and price, and in the future effect, will more than balance the loss. Next February, March, or April, according to latitude, let the tree trimmerstimulate and nourish his trees and vines with a fair supply of ashes; and in nearly every case he will have a good orop of fruit in the non-bearing year.

## coffee grounds.

Not long ago, Punch figured that social bore, the chronic fault finder, in the guise of a complaining recruit. "Now then, Pat," says the sergeant testily, "what's the matter now?" "Sure, sor," the undeveloped hero replies, " they ch'ate me out of the thick of mechoffee, sor!"
At sight, no complaint could seem more destitute of grounds." To the average reader, none could be more absurdly ludicrous; for every one has learned by bitter experience what it is in the ordinary way not to be cheated of the " thick of the coffee."
Yet, without becoming the champion of cheap restaurants and boarding bouse madams, it is possible to argue seriously that Pat was the victim of a real wrong, that in losing the sabstance of the coffee berry he lost what would have been of actual service to him. The chemistry of the question is simple enough.

As commonly made, the infusion of coffee which we drink contains not more than twenty per cent of the substances which compose the berry. Of the remaining eighty parts, which we throw away as "grounds," about thirct-four are woody matter without nutritive value. The rest, or fortysix parts out of the hundred, contain in large proportions nitrogenous matters, fats and mineral salts, demonstrably useful for the nourishment of nerves, muscles and bones. In other words, by our mode of making coffee we lose more than half its available and valuable constituents. Considering the tuns of coffee imported every year, this wholesale wastefulness becomes a matter of considerable magnitude,
this of course only on the condition that the rejected matter this of course only on the condition that the rejected matter cin be used with pleasure and profit. That it can be so used is shown by the practice of the Turks, who make coffee as we do chocolate. ${ }^{\circ}$ The coffee, finely powdered, is drunk with the infusion. In this way all the stimulating qualities of the infusion are secured, with the full aroma and all the nutritious elements of the berry. It is perhaps needless to add that, for use in this way, the coffee must be reduced to an impalpable powder.
To those unaccustomed to oriental coffee, the limpid infusion may seem much to be preferred. As a stimulating drink, it is undoubtedly preferable; but the good qualities of coffee are not exhausted with the infusion; and as a mat$t \in r$ of economy, it may be worth while to sacrifice limpidity for nutrition. Besides, as one becomes accustomed to thick chocolate and learns to like it more than the clear infusion of the cocoa bean, so, it is claimed, the taste for café a $l$ 'Orientole may be acquired, with a corresponding improvement in the beverage.

## EVERYBODY'S CENTENNIAL.

If we did not have a fair degree of confidence in the ability of our people to carry through any great enterprize in a very short space of time, after their interest and enthusiasm in its behalf is once thoroughly aroused, we should feel serious doubts regarding the certainty of the success of the Centennial, in view of the apparent apathy which now exists concerning that undertaking. We believe, however,
that the present tendency, though it is perhaps to be deplored, is to procrastinate and to leave to the last few months the accomplishment of work which might be more leisurely if not more completely performed within the two years to come. While therefore the people as a nation should be urged to appreciate the necessity of early preparation for so important an event, it would appear advisable to encourage besides other plans, tending to what may be termed the individual celebration of the anniversary. In other words, while in no wise neglecting a national enterprise such as the proposed exposition, the commemoration of the day by separate States, cities, or towns, professions, trades, or individuals, by the erection of statues and monuments, or by the establishment of useful institutions, would we think, involve an idea which would meet with a universally favorable reception, and at the same time would evoke a more immediate and more direct interest in every class of the community. Such a scheme has already been suggested by Mr. W. S. Ward, of this city, and has encountered no small share of general approval. The plan is well calculated to excite a spirit of emulation and to arouse local attention. "It is proposed," says Mr. Ward, "that each class of artisans, artists, and students, and professors, scientists, and theologians, be requested to undertake the erection or endowment of some of service either in educating and amusing the living or honor ing the worthy and distinguished dead. Thus the artisans ing the worthy and distinguished dead. Thus the artisans
might, tbrough their various organizations and in different localities, erect reading rooms, night schools, etc. : there might be art museums, law, medical, and theolozical librariea, museums of natural history, zöological and botanical gardens, aquaria. etc."
It is hardly necessary to descant upon the advantages of the scheme, which is at once practical and feasible, and at the cially commend it to the classes to which the large majority of our readers belong. The mechanics, through their trade societies, might provide training schools for apprentices, establish centennial funds for the poor or unfortunate of their craft, and, in their various abodes, erect halls for meetings
or educational uses. As an instance of what the manufacturers might do, there is the proposed testing laboratory of the Stevens Institute,
an establishment which they would find of constant benefit. an establishment which they would find of constant benefit.
Let them endow that, and half a dozen similar ones throughout the country. The wealthy in the same calling might found scientific scholarships, erect colleges, or additions to those already in existence. There is the Cambridge Museum, Agassiz's great work, now with an incone inade
quate tor its support. The teachers' memorial subscription Plan, it is true, has met with a noble response; but cannot the cientists, and the manufacturers who depend upon the eachings of Science, endow the institution with a centennial gift sufficient to place it above all possibility of future want? And speaking of Agassiz, who out of the many scientific men in this great city will contribute toward erecting a statue of him in Central Park? Are there not enough teachers and
students of Science in the metropolis to raise the necessary sum by a very small subscription from each, and thus to provide a noble memorial both of the Centennial and of the great natura it?

We night continue, and devote columns to suggestions similar to the above, did we believe the same were necessary to interest the people. That such interest has been aroused and has borne fruit is seen in the offer of Mr. Gordon Burnham to place a statue of Daniel Webster in our beautiful park, at his individual expense. Now let some of our millionaires help the people of the city to establish the Museum of Natural History, the corner stone of which has just been laid, or to found a free lending library, or to add to the Metropolitan Museum of Art, or to build the proposed aquarium in Central Park. Or perhaps we have another Peter Cooper among us, who will erect such another grand and enduring monument of whole souled charity, or a second Peabody who will give our working classes cheap and commodious homes and emancipate them from the miseries of the tenement houses
But it must be remembered that in thus honoring the past to serve the future, it will not do to delay. What is to be done, must be done now. Those first in the field will do the greater service in arousing others to like action. If every one, and the gift is purely a matter of individual choice, will determine to contribute something, whether a subscription of a few pence or a check for thousands, and carry out his determination right speedily, we shall have such a celebration for our hundredth birthday as the world never before saw, and besides shall have conferred upon posterity lasting benefits, of which as a nation we may well be roud.

## THE AMERICAN MUSEUM OF NATURAL HISTORY.

"In this country, we popularize knowledge and give to Science a holiday air ; and instead of putting our collection as some have proposed, into cold catacombs of Science and stuffed, and covered with dust, in a manner well adapted to create weariness rather than to attract people to the study of natural objects, it is our purpose to provide such structures as shall furnish agreeable entertainment to the gencral visitor, while at the same time affording valuable aid to
common school education." We quote from the very able address of Mr. Salem H. Wales, read, in the absence of that gentleman, by Mr. Henry G. Stebbins, on the occasion
of the recent laying of the corner stone of the Museum of of Natural History in this city; and the words, we are confident, will excite the hearty satisfaction not only of our own citizens, but of every advocate of popular science throughout the country. They denote the fact that the days when the people were content to read of the rare and wonderful in Nature, or when even their knowledge of her teachings was
confined to the limited horizon of their daily existences and abodes, all else being but as abstractions, are passed. We are no longer satisfied with the claptrap of the showman and the presentation of Nature in connection with the tinsel of the arena; nor yet with the other extreme, as exemplified in the classic collections of the academy, which, buried under a mountain of technical knowledge, speak but to the erudite, and are dumb to the ordinary mind. With the parent ing for Science and her teachings, so palpably ap for closer intimacy with the foundation on which our human learning is based, and in that spirit of inquiry the people demand to see more of Nature in intelligible form.
To gratify this thirst almost as soon as recognized has been and is the object of all thinking men, who, in the wider dissemination of useful and valuable knowledge throughout the masses, see the road to a higher national existence and
prosperity. In this great movement the press is the pio prosperity. In this great movement the press is the pio pand and impress the ideas suggested; and lastly, as the out growth of the interest awakened, appears the museum, in which the public may study, in palpable shape, objects existing formerly but in the imaginalion. Here in the metropolis, the journalist and the teacher have labored long and aithfully, and it is to their lasting credit that, amid the whirl and confusion of a vast city, more rapid, more active in its business life than any other in the world, temples of Science, now nearly equal in magnitude to, perhaps in time to excel, all elsewhere, are slowly rearing their massive walls. New York, although at present behind some of her sister ities in devotion to scientific culture, will, be believe, even tually lead in the van; and the recent ceremonies initiating the construction of the first of her great permanent muse ums, to which the presence of the Chief Magistrate of the country lent a dignity and importance which they well merited, are but the presage of future and
which will more than cover past deficiencies.
The Museum of Natural History was incor orated by the legislature of this State some five years agu. Up to the present the trustees have been steadily at work curing collections and carrying into pra3tical operation tio object of their trust. Many contributions have been received from public spirited citizens, and with means mainly thus raised onging to the late Prince Maxımilian, of Neuwied, the Elli-
ott collection of birds, besides a large part of the celebrated Verreaux and other collections of specimens in natural history, have been purchased, the whole forming a large and sufficient nucleus for future additions. These objects are now temporarily deposited in the former arsenal within the limits of Central Park, a building too small to contain even he aggregate of all now in the possession of the institution. In view of the latter fact, as well as from the appreciation of the need of popular museums in the city, a number of in fluential citizens petitioned the legislature for a permanent and fitting structure, in response to which a large plot of ground, covering some four city blocks, known as Manhattan Square, and adjoining the Central Park on Eighth avenue was set aside for the site of a substantial fireproof edifice. to cost $\$ 600,000$. The basement of this structure has been completed, and the exterior walls rise, at the present time to a few feet above. The materials used will be brick, gran ite, and iron, and the building will be four stories high, with mansard roofs and towers. The ground floor will measure 66 feet by 230 feet.
The proceedings incident to the laying of the corner stone were witnessed by a large gathering of the best known residents of the city. There was an address by the President of the Museum, Mr. Robert L. Stuart, giving the objects of the institution, followed by the speech from which, as above emarked, we extract the initial paragraph of this article. Mr. Stebbins, after reading Mr. Wales' written address, hinted that at some future time the Museum of Natural His tory, now begun on one side of the Central Park, together with the Lenox Library, nearly finished, and the Metropolitan Museum of Art, soon to be commenced on the other side, might be joined with other buildings to form a national uni versity worthy of the greatest city on the continent. The idea is a lofty one, and, from its magnitude and grandeur, may well invoke serious consideration. Governor John A. Dix then made a few appropriate remarks, and an able and learned address by Professor Joseph Henry, mainly devoted to the subjects of endowments for fostering original research, and the value of popular museums as educators, closed the verbal portion of the ceremony. The stone under which copies of the city papers, coin, currency, etc, had been deposited, was then lowered, the mortar being previously spread by the President. A promenade concert and inspection of the collections, at the Arsenal where they are deposited, completed the proceedings.

## STEEP GRADIENTS

We are indebted to Mr. Henry Handyside, of London, for a copy of a small publication entitled as above, containing a description of his newly invented method of surmounting steep railway grades, together with a statement of its merits and other facts relating to railways in general. Mr. Handy ide's invention consists in attaching a drum and traction ope to the bottom of the locomotive or tender. When the rain reaches the foot of a steep grade, the engine is uncoupled from the train, and runs up the grade, paying out the rope, one end of which is attached to the train. On reaching the summit the locomotive is locked to the track by means of a pair of griping levers, steam is applied to the drum, the ope wound and the train drawn up. By the use of this simple and cheap attachment, Mr. Handyside shows that any ordinary locomotive will readily draw the heaviest trains up rades of one foot in ten, or 528 feet to the mile, and he therefore proceeds to point a few of the advantages that
would result in railway construction by the adoption of his plan of operation, among which are the following:
Saving in first cost of survey. Saving on embankments. Saving on face cuttings. Saving in the length of tunnels. Saving in ihe length and hight of viaducts. Materially hortening all lines which have high land between their exremities. A corresponding saving in length of rails. Any locomotive capable of hauling a given weight up a gradient of say 1 in 50 to be capable of hauling the same load up 1 in 10 or even 1 in 8 . A much lighter class of locomotive necessary. A corresponding reduction in weight of rails. Sim. plicity of construction, inexpensive, and not easily deranged. Less friction and ware and tear on all steep gradients, of say 1 in 10, than on the generality of gradients now in ordinary use. No break of gage necessary, and applicable to any gage. Especially applicable to tramways, which as feeder lines will often penetrate into hilly districts. The carrying power along the whole line not limited by the frequent occurrence of steep gradients.
All of these are important points in favor of the invention which will be readily appreciated by railway engineers and projectors.
An application of steam to the towage of canal boats, somewhat analogous to the foregoing, was patented in this country last year, by G. S. Olin. He uses a light steam tug carrying a rope drum on deck, one end of the rope to be attached to a train of boats. The tug steams rapidly ahead, paying out the rope, then drops poleanchors, and winds up the rope, drawing the boats along at a good speed. The tug then starts ahead, unreels the repe, and,before the boats have lost beadway, begins to wind up the rope again. In this way a small tug of light draft, burning but little fuel, may successfully tow several hund red tuns of freight through the canals, at the required average velocity of 3 miles per hour. This method appears capable of being worked out into a valuable system of canal navigation. It is worthy of careful attention and encouragement.

A whale, 60 feet in length and 10 feet in diameter, was recently captured in the Raritan river, near Perth Amboy, N. J. The fish accidentally ran aground, and was shot by a

## A NEW DOMESTIC STEAM ENGINE

M. Fontaine bas rectntly received a. prize of $\$ 200$ from the French Société d'Encouragemelt, for the invention of the domestic steam motor represented in the annexed engravings. The boiler of the device contains enough water to furnish some 42 foot pounds, during the continuous period of work of a woman-some four or five hours; and the design is to renew the supply during meal hours, allowing such interval for the generation of steam, ready to begin work again. The device is composed of a generator-an engine and a gas furnace with automatic register. The engraving shows the exterior of the invention, and also a sectional view. A is the body of the boiler, in the lower side of which are twenty four copper tubes, B, the upper ends of which enter the smoke box, $C$. D is a sleeve through which the gases of combus tion descend to the chimney, and E is a superheating tube which is closed at the bottom and extends down through the smoke box, as shown. $F$ is the feed water. tube, closed by a screw plug, indicated by dotted lines. Water cannot be put into the boiler except when there is no pressure of steam. At $G$, dotted lines, is a cock which draws off the steam when water is to be supplied, through a pipe, $H$, and thence into the chimney. I is the flue connecting with the sleeve, $D$. $J$ is the furnace composed of twenty five Bunsen burners. The gas, on leaving the meter, goes to the upper part of the machine and enters at $L$. Here it meets a flexible tube, $M$, which resembles a bellows, and forms a pressure regulator. N is a counterweight suspended to the tube, M, maintaining it at a length corresponding to the desired pressure. When the limit fixed is exceeded, the tube elongates and checks the flow of gas by closing smaller the orifice, $L$. K is the tube conducting the gas from this apparatus to the burners. Steam is taken from the superheating pipe by the tube, $O$, and is led to the slide valve, $P$, which communicates with the cylinder, $Q . \quad R$ is the slide eccentric, $S$ the crank, $T$ the belt wheel, $U$ the exhaust pipe leading to the chimney, V the manometer, and W the supporting legs of the apparatus. $X$ is the wooden envelope, having dilatable joints which surround the boiler and cylinder, and is lined with thick felting. Ye is a small inclined mirror, which allows the operator to see a reflection of the gas burners, and so to judge of the heat of the fire.
Cylinder, valve, chest, slides, and frame of the engine are all cast in a single block, in which the necessary a pertures are bored. No cures are uised in the molding. Steam goes to a simple slide valre operated by an eccentric, and is ad mitted during one third, and exhausted during five sixths, of the stroke. The shaft, craok, and eccentric are cast in one piece. All ruhhing smrfaces are of ateel. The piston is
made in segments, of cast iron, or the Ramsbottom system and all the porte are circular.

Tbe object of the device is to do any light work now performed by havd, such as driving sewing or washing macbines, turning wringers, operating pumps, etc. Its hight from floor to top of fly wheel is about 43 inches, and exterior diameter 14 inches.

## Wire and its Manufacture.

We extract from the Commercial Bulletin the following nteresting faets regarding the manufacture of wire in New England, and the various uses to which it is employed:
There are now sixteen wire drawing establishments in New England, of which two are located in Maise, two in Connecticut, and twelve in Massachusetts. OY these last, Boston claims two. Among the Massachussetts wiredrawing mills, that of the Washburn \& Moen Manufacturing Company, of Worcester, is probably the largest in the country.

## VARIED USES OF MIRE

There are few branches of metal manufacture whose pro ducts are in wider use. Wire is emplosed for the thousands of miles of telegraph lines; it is woven by machinery, strong enough to make fences, and of such delieacy as to make the finest wire cloth; large quanities are used for galvanic batferies and for other scientific purposes; it is twistr $\mathbf{d}$ into the powerful cables of suspension bridges, and furnishes cables for submarine telegraphs, and ropes for ships for use in mines, and for other purposes. From steel are madecrino line wire and wire to be drawn into needles of all kinds. A large business has sprung up in the manufacture of wire for piano strings, and of the delicate plated wire for covering the strings. Tinned broom wire makes a considerable item. Of late years there has been a great sale for white wire cu'inary and ornamental table utensils. It is used in the manufacture of card clothing, heddles, reeds, and other ma chinery. Woren wire of iron, brass and copper, appears in flour, paper, and other machinery; it makes its way into baskets, screena, siever, cages, fenders, dish covers, nets,and an infinite variety of similar forms. Coppered pail bail wire is a consideratle product. Gold and silver wire is plated or woven into exquisite filagree work, into chains, and invo tbreads for making gold lace; and wires of the various metals are employed for scores of other purposes, in articles useful and ornamental.

## PROCESS OF MANUFACTURE.

The wire rods, varying from a quarter to a half an inch in
dles, are beated and re rolled in grooved rollers, one abowe another, so that the rod can run from the first roll to then second, and so on, without reheating. The rollers run with great rapidity, and the final groove reduces the rod to a coarse wire, about one eighth of an inch in thickness, which is ready for the first hole in the draw plate.
The draw plate, the most distinctive pioce of mechanism in this manu facture, is a flat piece of hard steel, with holes corresponding to the various numbers or sizes to which wire for different purposes is drawn. The best ones are made of a combined plate of highly tempered wrought iron and steel, the steel face being on the side through which the wire is to come. The holes are tapering, the smallest end being on the steel side. For drawing very fine wire, in whish the greatest uniformity is necessary, the plates are prepared with perforated ribies or other hard stones.
The wire is annealed and drawn cold. The machinery for doing this includes a draw bench, which lifts the wire from a reel to the first hole in the draw plate. The wire passes through this to another reel or drum, on which it is wound, ready for its journey through the second orifice. The same process is continued down the series, until the wire is reduced to the required size. The wire has to be often annealed and cooled during the process, since it becomes less dactile and more brittle as it is drawn down. Grease and wax are used for lubricating. A method has come into use lately of covering brass wire with a thin film of copper, which is of great help in drawing, while the copper can be wholly removed at the last annealing.
The ductility of the metal and the size of the wire reguate the rapidity of drawing. Zinc is the least ductile of the metals used, then brass, next iron, steel, copper, silver, platinum and gold. As the wire becomes attenuated the speed may be increased. Iron and brass, according to size may be drawn from twelve inches per second to forty-five inches per second and the tiner sizes of silver and copper are drawn at the rate of sixty or seventy inches per second

## wires of remarkable length.

Silver wire has been run through plates of rubies to the length of one hundred and seventy miles, in which the most delicate test could detect no difference in diameter in any ine" for the field of a telescope, by coating the metal with silver, drawing it down to the finest number, and then removing the coating by acid, leaving the almost imperceptible interior wire, which, in an experiment made in Liondon, was ao attenuated that a mile's length weighed oaly a grain.


## may's Patent butter worker.

Our illustration represents a new butter worker, by the aid of which, the inventor claime, two or three men can work, rework, color, and pack ready for sbipment from two to four thousand pounds of butter per day. The machine, it is stated, will work all colors of either soft or hard butter, mixing the same so thorougtly as to cause it to appear fresh ly cburned. The sour milk and water are removed, and the butter, being solidified and condensed, is greatly improved, both in quality and in capability of preservation.
The cylindrical vessel shown is secured to the platform, and within it rotates a central shaft, A. On the inside of the body, and attached to the shaft, are placed, one above another, a series of horizontal and rounded arms, B, each pair of which is located at an augle to the couple next above or be cated at an angle the couple low. Across the interior of the vessel, and on
opposite sides, are secured the stationary chord opposite sides, are secured the stationary chord
pieces, C, alsn made rounded. The shaft is jour naled to the diametrical board, $D$, and power is applied to its upper extremity by means of a sweep, as shown. The vessel has at the bottom a discharge orifice, E , which is cut obliquely in order to allow the butter to escape freely, as the lower pair of rotary arms carry it around.

The mode of operation consists in placing the lbutter in the receptacle, where it is successively worked by the arms and bars until it reaches the Boottom, whence it emerges by the aperture above referced to. It will be noticed that the entire weridiog parts of the machine are of wood, and that me metal comes at any time in contact with the batter.
Patented, through the Scientific American Pat ent Agency, March 10, 1874. For furtber information address the inventor, Mr. Alexander May, No. 419 West Market street, Louisville, Ky.

The American Tin Ware Trade.
For a long time past one of the best customers of the British maker for tin and terne plates has been the United States of America. At one time we were sending to that country great consignments of tin plate goods in varied shapes and of different values; lately the Americans have learned themselves to use up the tin plates, and now we have them shipping tin plate wares to this country, made from the tin plates with which we have supplied them. In America itself it was at one time thought an extraordinary thing for the $W$ estern and
Southern States to send into the Northern States articles for which they had before been indebted exclusively to the lat ter. It was only a few months before that, in conversing with a manufacturer in the Western $S$ :ates of hardware goods $a^{t}$ nne time obtained by the new world almosi solely from Birmingham, we were assured by the American that he should soon be forwarding this same class of goods to compete with those of the Birmingham district in their home market. The gooas were not those which hace tin plate mark. fabric; but what the in plate makers of the Ulate States aredoing would seem to imply that his assurance was something more than empty boasting. The United States manufacturer displays an amount of ingenuity in invention which is but seldom seen in England, and the handicrafts men in the new world, unlike those of the old, are ready to adapt themselves to a new pattern so soon as it can be shown that it is at all probable to be a success. The American tin plate goods that are now being offered in Birmingham and South Staffordshire are described as simply marvelous, both as to the price of the articles and the ing?nuity displayed in their construction. Surely there is something very wrong in this country when the Americans, after buying our tin plates and paying heavier wages for the manufacture of the article, are able to offer it here at prices much under those at which we can produce it. -The Engineer.

## DR. MAREY'S CHRONOGRAPH

The use of the tuning fork for the measuremen of very short intervals of time presents certain advantages which have led to its extended employment in recent chronographic apparatus. Our illustration represents a new instrument of this descrip. tion, which is an improvement on a device of $M$. Mercadier, or rather is an attachment to the latter for the purpose of ensuring greater accuracy. M. Mercadier's invention is shown in the upper portion of the engraving, and consists of a tuning fork horizontally placed. One branch is attracted by an by an electromagnet. Its movement toward the core, however, breaks the current, causing the arms to spring back. This phenomenon is repeated indefinitely, throwing the branch into very rapid vibrations, each of which causes the contact of a brations, each of which causes the cirk of a platinum wire win a suall plat nicating with the battery. Suitable registering devices were connected with this instrument which it is unnecessary here to describe, as Dr. Marey found that its employment was frequently difficult on account of the extremely small amplitude of the vibrations. In order to remedy this defect, the above inventor places, in the crrcuit of the electromagnet of the tuning fork, a second electromagnet which naturally becomes magnetized or demagnetized coincidently with the first. The second coil has a single bobbin, and attracts its armature a hundrtd times per second. The
armature moves in a plane parallel to the polar face, and is
carried by a spring. In order to obtain an absolute unison between the two vibrations, the spring is regulated to proper length by means of a delicate screw. The armatury being attracted laterally, its sudden stoppage is avoided, and a much larger amplitude is obtained; and by means of a piece of quill, forming a prolongation, it traces curves corresponding to hundredths of seconds on a blackened surface. The electromagnet is carried, as shown in the principal figure, in a handle through which paeses the conducting wires establishing the communication with the battery and tuning fork. These wires, which for convenience are united in a


## MAY'S PATENT BUTTER WORKER

single cord, may be of suitable length to allow of using the nstrument in any portion, for instarce, of a rocm.
If it be desired to measure the exact period of revolution of a pulley and its variations of velocity during its rotation, the faca of the wheel is covered with lampblack, and the quill point of the chronograph brought in con act therewith. The tracing will show the angular movement during each one hundredth of a second, enabling the builder, for example, of a machine requiring delicacy of construction, to detect errors which otherwise might escape his notice. By the samemeans, suitably arranged, Dr. Marey is enabled to govern the movement of an escaprment, and hence to regulate accu rately the operation of a train of wheels, an application of value in telegraphic instru ments.

Rattlesnakes and Tarantulas in Colorado. The Rocky Mountain Miner and Mechnnic, publisbed a Denver, under the head of "Cyclupæaia Colorado," devotes column or two to describing some of the natural products of that wonderful region. In the last number, the editor peaks of rattlesnakes as venomous serpents, to be found a all parts of Colorado
He says: "It is popularly supposed that the age of the snake can be estimated by the number of rattles; but this is a mistake, for though these mas increase with age, their fragility is such that many may be lost by accident; and moreover, more than one may be added annually owing to
the vigor, food, state of cap:ivity, etc., of the reptilethe vigor, food, state of capivity, etc., of the reptile-
twenty are not unfrequently seen in large specimens, but it $\quad \mathrm{m}$


DR. MAREY'S CHRONOGRAPH.
would be incorrect to conclude from these that the snake was neither more nor less than twenty years old. As the been these reptiles is speedily fatal to small animals, it has been generally believed that the use of the rattles is to
warn animals and man of its vicinity; but it is more likely hat its use is to startle the creatures, upon which it preys, from their retreat, and bring them within the reach of its pring; or some other purpose for its own welfare rathe han the safety of man. Dangerous as they are, they rarely attack man unless provoked, and are fortunately sluggish in heir movements, unable to spring except from a coil, and are dipabled by slight blows. They are viviparous, the eggs being retained until hatched, and the young espelled alive In winter they retire to holes in the ground, and there re main torpid, sevs ral interlaced with each other. They are unable to climb trees in purstit of prey, and do not follow a retreating animal that has es caped thi ir spring. The most common of the rattlesnake tribe found in Colorado, the prairie rattlesnake (c. tergeminus), is a little over two fet long; it is cinorous above, with a tripl eries of dark brown spots, and a double serie of dusky spots below; it is fond of hiding in he holes of the prairie dog
From the same source and under the same heading, we learn something of the tarantula or tarentula, "which," the writer says," is a terrestrial hunting or wolf spider, belonging to the genus lycosa, the l. tarantula (Laur.) It is the largest of spiders, measuring $1 \frac{1}{2}$ to 2 inches in the length of the body; the color is ashy brown above, marked with gray on the thorax, and with triangular spots and curved streaks of black bordered with white on the abdomen; below saffron colored, with a trans verse black band. It received its popula name from being common in the vicinity of Tarants, in South Italy. It makes no webwandering for prey which it runs down with great swiftness, and hiding in holes in the ground and crevices lined with its silk; there is one spiracle on each side, one pulmonary sac, and eight eyes; it is very active and fierce and the females defend their young and eggs with self sacrificing bravery. Its bite is supposed to be higbly poisonous. The $l$. Carolinen sis (Bosc) is called tarantula in the Southern States; it attains a length of 2 inches, with an extent of legs of 4 ; it is mouse-colored above, with white sides and whitish dots and lines on the abdounen; below, blackish; legs whitish tipped with black. It makes deep excavations n the ground, which it lines with silk; the females carry their young on the back, giving them a hideous aopearance, if covered with warts; the young run off in all directions f the mother be disturbed. Its poison is active. Both inds are found in Colorado, but the latter are the most nuerous. A favorite haunt is the hole of the prairie dog, where the rattlesnake, the tarantula, and the dog maygenrally be found sociably living together.
[It would seem from the above that the attractions of Colorado are notstrictly confined to its grand scenery or its agricul:ural and mineral products, but that the naturalist may there find specimens venomous enough to gratify the mbition of the most enthusiastic stud+nt of Nature.-EDs.]

## Expansion of Steam

At a recont meeting of the South Midland Institute, Mr. Barnard Walker said that the subject of economizing fuel in he production of motive power, or, in other words, the prinpal points in the construction of steam engines, on which epended their wastefulness, was one of great importance, and nowhere more so than in that district. Professor Joule had calculated that the best engines at present in existence did not render available more than from one tenth to one welfth of the motive force stored up in the fuel. Remembering that the ordinary steam engives used in manufacto. ies, in mines. and on railwayp, consumed at least four times more fuel than if they had been made according to well known scientific principles, the national loss thus arising must strike every one as enormous, but the loss was far greater by the use of ill constructed engines. In this part of the country, in the past, consequent on low priced fuel, this matter had been disregarded. Now, however, with costly fuel, it behoved every one to consider the avoidadce of warte. From considerable acquaintance with the kind of steam engine used in England, he assumed that few were taking less tban from $7 \frac{1}{2}$ to $10 \frac{1}{2}$ lbs. of coal per horse power per hour. Those of the best construction, however, were being worked with as low a consumption as $1 \frac{1}{2}$ lbs. to 2 lbs. of fuel. Mr. Walker thought simple, plain, easily managed engines, that, with ordinary care, would not require more than $2 \frac{1}{2}$ lbs. to 3 lbe. of slack per horse power per hour, could be made. After pointing out the importance of all those numerous ittms included under the head of "good wornmanship," and appealing to the members to detail the results of their observations as to the perfection being attained in these respects, he drew attention to the great saving that was being effected by what was termed working steam ergines expanaively, and the principles therein involved. Mr. Walker then showed cogent reasons for expecting better results from double than single cylinder engines. The drawback to their employment appeared chiefly due to their greater first cost and expense of maintenance, but in very many-nay, most-cases, the ving of fuel thereby gained far more than compensated for the interest on first cost and amount of repairs.

## Carteg pandenct.

## Notes 1rom Washington.

To the Editor of the Srientific American:
Since my last letter, several bills have been introduced in Congress, having a bearing on patent matters. One, by Henry B. Sayler, "to regulate the manufacture, use, and sale of patent right articles," enacts that every patent shall grant to the inventor, for two years only, the exclusive right ; and on application before the expiration of this term, an extension of 15 years ahall be granted without further pay ment, subject, however, to the condition that any person may manufacture and use such patented article or machine by paying a royalty of ten per cent of the market value. The same bill also allows the printing of any book protected by copyright on paying ten per cent of the wholesale market value.

A bill, introduced by Mr. McDougal, provides that no injunction shall ba granted prior to final decree unless the complainantshall execute to the defendant an undertaking conditioned to pay to such defendant all damages which shall be sustained by him by reason of the issuing of such injunc tion, in case the court shall finally decide that said complainant was not entitled thereto; and further provides that in case of appeal from the final decree, the appellant may stay the effect thereof, during the pendency of the appeal, by executing a like bond.
Mr. Mills introduced a billon the 18th instant to annul the patent No. 110,774, issued to T. W. Mitchell, of Fore Bend, Texas, for a cotton worm destroyer.
Another bill, introduced by Mr. Amos Clark, appropriates $\$ 100,000$ to pay Montgomery \& McClure for the use of their patent No. 24,947 for journal boxes, in the vessels in the United States service.
There was quite a discussion in the House on a bill to allow Norman Wiard to make a new application for an invention that has been forfeited under the two years' clause of the act of 1870. One of the members wanted to make a provision in the act that the United States should have the free use of the invention. Wiard's friends objected, and quite a spicy debate ensued, in which considerable personality was indulged in, after which the bill passed without the obnoxious.clause.
One of the largest of the extensive jobs before Congressthe Atwood car wheel-has been reported unfavorably.
I understand that the House Committee on Patents decided on Tuesday last the course to be pursued with respect to the sewing machine extensions, but all information on this sub. ject is denied.
The Senate Committee heard the argument to day of John Pope Hodnett, counsel for the opponents to the extension of the patent of the Wilson sewing machine, when the Committee, at the request of the applicants, deferred the further consideration of the subject for two weeks. A large number of opponents were present, and much interest was manifested by the contestants.
As mentioned in my last, Mr. Sutro is giving a series of lectures on " Mines and Mining," but devoted mainly to a description of the Comstock lode, the Sutro tunnel, and the advantages that will result therefrom on its completion. These lectures are illustrated by a large number of photographic views, which are exhibited by the aid of a stereopticon and the calcium light, and, being free to all, are tolerably well attended.
The Sutro tunnel is designed mainly for an immense drain to carry off the water which is constantly accumulating in the mines of the Comstock lode, and also a means for removing the ore and providing proper ventilation to the mines. To thoroughly understand the imporiance and necessity for the tunnel, it will be ad visable to give a brief description of the Comstock lode: This celeorated mining district is found at the foot of Mount Davidson, in the Washoe Mountains, and appears to have been formed by some terrible convulsion of Nature, which caused the separation of the surrounding greenstone formation from the mass of rock forming Mount
Davidson,leaving a fissure, which became filled in the course of time with argentiferous rock and is now known as the Comstock lode. It was discovered by some poor miners, who wore prospecting for gold, of which they had washed out a smail quantity, but in washing were troubled by what appeared to bo a heary black sand, which they could not readily separate by the ordinary process, and which was consequently a great difficulty in their way. Happening, however, to subject some of it to the action of fire, they discovered that it was silvor. Previous to this discovery, they had thrown away aboat five thousand dollars worth of this black
sand. Directly after this the lode was quickly covered with sand. Directly after this the lode was quickly covered with
claims, and mining has been pursued with so much success claims, and mining has been pursued with so much success
that about two handred million dollars worth of silver has already been taken from it.
One of the greatest hindrances to the profitable operation of these mines is found in the immense quantities of water collecting in them, which requires a large number of very powerful pumps to keep them going, and in the ditticulty of supplying fuel for the engines employed for working these pumps and raising the ore (of which there are not less than sixty on the Comstock lode alone), requiring, it is said, about six hundred cords of wood in each twenty-four hours. This wood has to be brought to the mines over a railroad which is probably the crookedest railroad in the world, as it pursues a waving course of twenty-three miles to reach a distance of about four and a half miles, owing to the necessities of the grade, there bsing something near twenty-five hundred feet rise in that distance.
The expense of operating this railroad, most of the fuel,
and the great danger and delay caused by the mishaps to the pumping apparatus, whereby the mines are liable to be flooded, will be saved by the tunnel which Mr. Sutro is running to connect with the mines. It stands at a distance of over four miles from the lode, at a point more than two thousand feet below its upper surface, and is intended to run in a westerly direction until it strikes the lode, after which
main branches will be run north and south, parallel with the main branches will be run north and south, parallel with the
lode; and from these main arteries smaller branches will be driven in various directions to connect with such mines as may be off the principal lines.
The main stem is now being run in and reaches about six thousand feet. Its length is rapidly increasing. There are four shafts, to increase the facilities for working, ventilation, etc. The first of these is 525 fest deep, and the second 1,042 , both of which are completed, and the first has been drifted to wards the mouth until it met the drift coming from it, soit is now in communication with the mouth. The third would be 1,385 feet deep if completed, but, owing to the immense infux of water, it had to be abandoned. The fourth will be, when completed, 1,500 feet, of which over 700 are now done.
The bottom of the tunnel will form an immense sewer or drain, abovewhich will be placed a double track railroad to convey the mineral to the mouth of the tunnel, which being on a down grade will require very little power to operate. The water issuing from the tunnel will be used to drive immense reduction works conveniently situated at its mouth, and, after doing iss duty there, will be employed in irrigating the land surrounding the town of Sutro.
In all those mines not sunk below the bed of the tunnel, the immense expense entailed by hoisting ore and pumping water will be avoided. A few figures will give some idea of the large amount of material to be raised. According to Mr. Sutro, 1,000 tuns of waste rock and 2,000 tuns of ore are raised each twenty-four hours; and with each tun lifted, five tuns of dead weight are raised, namely, cable four tuns, and cage and car one tun each, making 15,000 tuns of dead weight, and 3,000 tuns of ore and waste rock, to which must be added 8,640 tuns of water. All of this immense weight has to be lifted on an average to each tun of silver obtained after the ore has passed through the reducing process.
When the tunnel is completed, all this amount of hoisting and pumping will cease, as the water will run out through the tunnel, and the rock, ore, etc., may be allowed to fall to the bottom, or it may be lowered in a cage and its weight utilized in raising timber and other needed supplies; and it may even, with suitable machinery, be made to assist in pumping water from those mines which have been sunk bequantitunnel. The water that now collectsin such large quantities in the upper parts of the lode may be used in the ame manner before entering the tunnel, by passing it through mines as may be below the tunnel will be kept dry by the same water that is now such a trouble, thus turning a curse into a blessing.
In addition to the economicadvantages thus obtained,there is another feature, which is the most important in a humani tarian point of view, namely, the ready means of escape the tunnel gives in case of fire in the shafts above the miners. One fire in the Yellow Jacket mine caused the loss of fortytwo miners, who were burnt and smothered to death, but might have been alive at this day had the tunnel been in conection with the bottom of the mine.
In view of these ad vantages, the cost of mining will be so much reduced by the completion of the tunnel that it will pay to mine for low grade ores that are now passed by as useless It is estimated by Mr. Sutro that, of the immense quantity of ore in the lode that can be profiably worked when the tun nel is completed, only one per cant will pay for working under the present expensive system.
The idea of tunneling for drainage is.no new and untried dea, for it has been practiced in Europe for hundreds of years, where mining tunnels are of a length undreamed of as yet in the United States, there being two in the Hartz Mounains, the Georg and the Ernst- $A$ ugust, ten and a half and fourteen miles long respectively, besides several shorter ones $d$ still longer one may be found at Freiburg, which twenty.four miles in length. Occasional.
Washington, D. C.

## Aerial Navigation.

To the Editor of the Scientific American:
A sailing bird, in a calm atmosphere, spreads its wings and tail, throws its head forward, and slides downward and forward. Now, after it has arrived at the foot of the plane, f all the conditions which caused it to fall thus were reversed, it would slide upward and forward to the top of the ame plane; that is, if the position of the bird were reversed, and every part of it made as much lighter than the air as it was heavier in falling, the size remaining the same, it would
fall upward and forward, obeying all the laws of descent fall upward and forward, obeying all the laws of descent. This same result will also be seen in many faling leaves, convex side down, or by pressing the fan under water with the more convex side up; the fan in the one case will fall and in the other rise, in the direction of the handle. An aerial boat, built somewhat after the model of a bird while sailing, would thus sail upward and forward by reason of the surplus buoyancy, and sail downward and for-
ward by reason of a discharge of this buoyancy, keeping the bow of the boat elevated while rising and depressed in fall ing, and thus in one ascent and descent a journey would be made. The angles of ascent and descent and the momen tum will depend upon the amount of surplus buoyancy, the weight, and the size of the wings or resisters.
For the purposes of aerial navigation, we are at the bottom
of a boundless sea; and in a boat constructed as I suggest, with surplus buoyancy, we will be pushed upward, and with weight we will be pushed downward, the forward move ment depending upon the form of the boat and of the resisters, and on the elevation or depression of the bow, as stated. In a very imperfect model, I have secured, in a hall, a forward movement of thirty feet in rising or falling eight $a$ forv
feet.
As t
As this idea is new to me, I would like the opinion of some practical aeronaut as to its probable utility.
Wilkes Barre, Pa.

## Combining Steam Engines and Water Wheels.

 To the Editor of the Srientific American:In an answer to N. P. S., page 363 , issue of June ${ }^{6}$, in regard to using a steam engine to assist a water wheel, it is advised to "use each separately, and divide the work to be done between them." In ninety-nine cases in a hundred this could not be done.
Wherever more power is needed, either constantly, or at seasons of low water, or when variable work is being done, a steam engine may be attached to theline shaft which leads from the water wheel, by means of its main band passing over a pulley on said line shaft (situated as near the wheel as practicable), said pulley to have such diameter as will permit both the engine and the water wheel to make each its own regular speed. The effect of this is as follows: When the supply of water is ample for the work, the governor on the engine will shut off its supply of steam or nearly so and the steam will be retained in the boiler, little fuel being consumed. But when the supply of water fails, or the work is greater, for longer or shorter intervals of time, the speed of the water [wheel is decreased, when this governor in stantly opens the steam upon the engine, which in turn supplies just the amount of power needed to supplement and maintain the requisite speed of the line shaft. So that, as long as the power from the water wheel is sufficient to over come its own friction and that of the line shafting, so long will its own water be utilized, even when it would be insufficient alone to accomplish any work at all beyond overoming said friction.

Horace L. Emery.
Albany, N. Y.

## Steam Pressure on River Steamers.

To the Editor of the Scientific American:
I am glad to see, by your issue of June 6, that Mr. Little has called attention to the excessive steam pressure allowed tow boats on our rivers. I am informed that the new law allows an increase of steam pressure on our passenger vessels of 20 per cent for single-riveted boilers; in other words, instead of requiring one sixth of the tensile strength of the iron for the working pressure, it allows one fifth. Under the present law, a cylindrical boiler, $\frac{1}{4}$ inch thick, 40 inches in diameter, of $60,000 \mathrm{lbs}$. tensile strength, singleriveted, is allowed a working pressure of 125 Jbs to th square inch. By the new law it will be allowed 150 lbs.
If this be the case, we are going backwards. I have for many years investigated this matter of boiler explosions on our western steamboats, and am prepared to say that I do not know of a single instance (except in some cases where the flue collapsed) that the cause could not be traced to either the boiler being too weak or the steam too strong Some of the oldest and most experienced river men have ex pressed the opinion that 100 lbs. per square inch should be the maximum. It is a matter of mere dollars and cents. By increasing the size of the cylinder, you reduce the pressure in the boiler, and the boat will run just as well This has been tried
Cincinnati, Ohio.

## New Local Anæsthetic.

To the Editor of the Scientific American:
Noticing a paragraph with this heading in your issue of May 30, detailing the action of camphor rubbed up with a few drops of spirit in connection with chloral hydrate, it oc curred to me to call the attention of your chemical readers to the action of chloral hydrate on gum camphor when brought in coatact in the solid state. If a piece of gum camphor be placed in a phial in which there has been pre viously placed an equal amount of chloral hydrate, each substance begins slowly to deliquesce, forming a very limpid, viscous, and highly refractive liquid. In the course of a few hours, the solution of the two solids will be complete. I have used this camphor chloral, or chloral camphor, as a local anæsthetic in neuralgia, and also as an anterotic and hypnotic in the chordee of blennorrhagia with cousidera. ble success. I should be much pleased to have some of the many able chemists who read your paper examine and report on the compound. A country practitioner in these egions has neither the means nor the time to experiment.
$\begin{aligned} & \text { Osceola, Ark. } \\ & \text { F. L. J. }\end{aligned}$

## Fish in Alkaline Waters.

To the Editor of the Scientific American:
The disastrous effects of alkali, with which our water it trongly impregnated, upon the finny tribe was strikingly llustrated during the past winter, when the thermometer anged as low as $41^{\circ}$ below zero Fah. The lagoons adjacent to the Humboldt river vary in depth from two to four feet at this season of the year, and are well stocked with fish. During the past winter, ice formed on many of them, 20 nches in thickness; as a result of the freezing process, the alkali was precipitated and formed so strong a solution that oth fish and frogs all perished.
F. Elko, Nev.

## PRACTICAL MECHANISM.

$\qquad$
by Josiva ross.

## side rake.

The power required to feed a lathe or other tool, which is moved into its feed at the same time that it is cutting, is con siderable when a heavy cut is being taken, unless it posses ses what is termed side rake, as represented in Fig. 6.


The edge, B, is here supposed to be the cutting one, the face from $a$, to B , being an inclined plane (as compared to the face $\mathrm{C} D$ ) of which B is the apex, the sectional view at $a$, B, being as given in Fig. 7.


This form gives the tool a tendency to feed itself along and into the cut, the cause of which is that the pressure upon the top face, B, $a$, (the result of its having to bend the shaving out of the straight line) is placed, in consequence of the side incline, more upon the side and less upon the top of the face. It has, in fact, followed the direction of the rake, decreasing its tendency to run or spring in (as shown in Fig. 3), with a corresponding gain in the above mentioned inclination to feed itself along, or into, its lateral cut.
When side rake is called into use, a corresponding amount of front rake must be dispensed with, or its tendency to feed itself becomes so great that it will swing round, using the tool post as a center, and (feeding rapidly into the cut) spring in and break from the undue pressure, particularly if the lathe or machine has any. play in the slides. So much side rake may be given to a tool that it will feed itself without the aid of any feed motion, for the force required to bend the shaving (in heavy cuts only) will react upon the tool, forcing it up and into its cut, while the amount of bottom rake, or ctearance as it is sometimes called, may be made just sufficient to permit the tool to enter its cut to the required thickness of shaving or feed and no more; and it will, after the cut is once $\mathrm{b}_{\mathrm{e}}$ gun, feed itself and stop of itself when the cut is over. But to grind a tool to this exactitude is too delicate an operation for ordinary practice. The experiment has, however, been successfully tried; but it was found necessa ry to have the alides of the latae very nicely adjusted, and to take up the lost motion in the crossfeed screw.
For roughing out and for long continuous cuts, this tool is the best of any that can be used; because it presents a keen cutting edge to the metal, and the cutting edge re ceives the maximum of support from the steel beneath or behind it. It recerves less strain from the shaving than any other; and will, in consequence of these virtues combined, take a heavier cut, and stand it longer, than any other tool bat it is not so good for taking a finishing cut as one having front rake, as shown in Fig. 1.
Having determined the position of the requisite rake, the next consideration is that of the proper form of the cutting edge, the main principles of which are as follows

ROUND NOSED TOOLS,
as shown in Fig. 8, have more cutting edge to them (the
Fig. $\delta$.

depth of the cuts being equal) than the straighter nosed ones, shown in Fig. 9, receiving as the result more strain

from, and becoming more liable to run into or out from, the cut. If sufficient rake is given to the tool to obviate this defect, it will, under a heavy cut,spring in. It is, however, well adapted to cutting out curves, or taking finishing cuts on wrought iron work, which is so strong and stiff as not to spring away from it, because it can be used with a coarse feed without leaving deep or rough tool or feed marks; it should, however, always be used with a slow speed. On coming into contact with the scale or skin of the metal, in case the work will not true up, it is liable to spring away from its cut. If held far out from the tool post, it is apt to jar or chatter; and unless the work and the tool are both firmly held, it is liable to cut deeper into the softer than into the harder parts of the metal. The angles or sides of a cutting tool must not of necessity be quite flat (unless for ase on slight work, as rods or spindles), but slightly curved,
in Fig. 9. If the angles were left flat and the point sharp, the tool would leave deep and ragged feed marks; the ex treme point, wearing away quickly, would soon render the ool too dull for use, and the point would be apt to break.
For the finishing cuts of heavy cast iron work, which is otliable to spring, the broad square nosed tool, given in


Fig. 10, is the most advantageous.
SQUARE NOSED TOOLS
A feed can be used with this tool almost as broad at a cut as the nose of the tool itself, providing, however, that it is set in position with great exactitude, so that its flat nose or front will be even or true with the face of the work it is in tended to cut, and that it is held as close in to the tool post as it can conveniently be, and that, if fed by band, it be fed evenly, because all tools possessing a broad cutting surface are subservient to spring, which spring is always in a direction (as in this case) to deepen the cut; so that, if more direction (as in this case) to deepen the cut; so that, if more
cut is taken at one revolution or stroke than at another, the cut is taken at one revolution or stroke than at another, the
one cut will be deeper than the other. They are likewise liable to jar or tremble, the only remedy for which is to grind away some of the cutting face or edge, making it nar rower. For taking finishing cuts on cast iron, mose top rake may be given to the tool than is employed to rough it out, unless the metal to be cut is very hard; else the metal will be found, upon inspection, to have numerous small holes on the face that has been cut, appearing as though it were very porous. This occurs because the tool has not cut keenly enough, and has broken the grain of the metal out a little in advance of the cut, in consequence of an undue pressure sustained by the metal at the moment of its being severed by the tool edge.

HOLDING TOOLS.
All tools should be fastened or held so that their cutting edges are as near the tool post as possible, so as to avoid their springing, and to check as far as possible their giving way to the cut, in consequence of the play there may be in the slides of the tool rest; but if, from the nature of the work to be performed, the tool must of necessity stand out farfrom the tool post, we should give the tool but little top rake, and be sure not to place it above the horizontal center of the work. The point or fulcrum, off which the spring of a lathe tool takes place, is denoted in Fig. 11, by C, the

dotted line, $A$, indicating the direction in which the point of the tool would spring, and the dotted line, B, representing the direction in which it would spring if it stood at B; from which it becomes apparent that, if placed at the point, B, the spring would be more in a direction to run into the cut or diameter of the shaft, $D$, than is the case when placed at
$a$.


Cutting tools used in a planer are subject to the same con ditions, as represented in Fig. 12. $a$ is the fulcrum from

which the tool springs, C is the work to be cut, and the dotzed line, B, represents the direction in which the point of
the tool springs into the work, thus increasing the cut accord ing to the amount of spring, as in the case of a lathe too This may be obviated, a planer tool, by bending its body, as shown in Fig. 13. $a$ is the fulcrum off which the too takes its spring, $B$ is the work to be cut; and the dotted line, C , is the line in which the point of the tool would spring (being in the direction denoted by the arrow) which is not in this case into the cut, but rather away from it, in con sequence of the point of the tool standing back from a line perpendicular to the line of the back part of the tool, as shown by the dotted line, $D$.
Tools that are necessarily straight in form, especially tbose for use in a planer, are more subservient to the evil effects of spring than those of stouter body; and in light planers, when the tool springs in, the table will sometimes lift up, and the machine becomes locked, the cut being too deep for the belt to drive. The tool most subservient to spring is the parting or grooving tool shown in Fig. 14, which,

Fig. 14.

having a square nose and a broad cutting surface placed par. allel to the depth of the cut, and requiring at times to be slight in body, combines all the elements which predispose a tool to spring, to obviate which, it should be placed at or a little below the center, if used in a lathe under disadvantageous conditions, and bent similarly to the tool shown in Fig. 13, if for use in a planer, unless under favorable condiions.
The pointat C is made thicker than the width at D to give clearance to the sides, so that it will only cut at the end, C;

and the breadth at $a$, B , is left wider than other parts to compensate in some measure for the lack of substance in the thickness. 'An excellent substitute for bending the body of the tool is to set the cutting edge of the tool back, as shown in Fig. 14', which represents a parting tool for wrough ${ }_{7}$ iron.

The Value of Oatmeal as Infants' Food.
In a communication to the Sociêté Médicale des Hôpitaux, MM. Dujardin.Beaumetz and Hardy make known the results of the employment of oatmeal on the alimentation and hygiene of infants. According to them, oatmeal is the aliment which, by reason of its plastic and respiratory elements, makes the nearest approach to human milk. It also is one of those which contains most iron and salts, and especially the phosphate of lime, so necessary forinfants. It also bas the property of preventing and arresting the diarrhœas which are so frequent and so dangerous at this age. According to the trials made by M. Marie, infants from four to eleven months of age fed exclusively upon Scotch oatmeal and cow's milk thrive very nearly as well as do children of the same age suckled by a good nurse.

## A Beneficent Californian.

We bave heretofore published an account of the donaticn of Mr. James Lick to the public, consisting of a sum of money for the purpose of building the largest telescope ever known, the scheme for which has been much commented on in these columns. We now hear from San Francisco that Mr. Lick has deeded more than a million dollars additional, to be devoted to several most praiseworthy objects. The total amount of these benefactions is $\$ 1,780,000$, and its distribution is as follows: $\$ 700,000$ to the construction of the largest and best telescope in the world and for the observatory at Lake Tahoe ; $\$ 420,000$ for public monuments; 150,000 for public baths in his city; $\$ 100,000$ for the Old Ladies' Home; $\$ 10,000$ to the Society for the Protection of Animals ; $\$ 25,000$ to the Ladies' Protection Relief Society; $\$ 10,000$ to the Mechanics' Library ; $\$ 25,000$ to the Protestant Orpban Asylum; $\$ 25,000$ to the city of San Jose for an Orphan Asylum; $\$ 150,00$ i for the erection of a bronze monument to the author of the "Star Spangled Banner," in Golden Gate Park: $\$ 300,000$ for the endowment of a School of Mechanical Arts in California, and the residue to the Pioneer Society. He makes ample provision for his relatives, and reserves a homestead and $\$ 25,000$ per annum for himself.
Mr. Lick, by this judicious liberality, has the pleasure, perhaps the highest a man can attain, of seeing his wealth do good and fructify during his lifetime, instead of being a bone of contention to his heirs after his death.

To Build a Transverse Sled Body.
W. A. W. says: "The best way to build a traverse sled body is to make the sills out of one inch or three quarte boards, with cross pieces of the same thickness bolted between the sills, which are double. You can make these very light and limber. Now put on your side boards with a bolt down through the rave and sill, which will make it very tiff, and can be made very light, and with all the strength possible. This is the best form I ever saw in practice."

## IMPROVED PUNCH AND SCREWDRIVER.

The invention which our engravings illustrate furnishes a method of applying power to two \&seful implements, so as to gain a stroug purchase through the interposition of simple and effective mechanical contrivances.
Fig. 1 is a punch, such as may be used for piercing boiler plates or other metal. The construction is such that no plates or other metal. The construction is such tbat no long lever is required, and bence room is great
while the mecnanism by which several movewhile the mechanism by which several move-
ments of the short hand lever are transmitments of the short hand lever are transmit-
ted to produce a very short motion of the ted to produce a very short motion of the
punch, and to develop in the latter a strong power, is quite simple and readily understood. The hand lever, A, is provided with jaws which are pivoted to a block, B, which turns loosely and is secured by a nut on a horizontal shaft. Upon the latter is fastened a ditk, $C$ the foce which is notched as a dirk, C, the face of which is notched as shown. Upon the under aide of the lever, A,
and just at the throat of the jaw, is a projection and just at the throat of the jaw, is a projection
which fits into any of the grooves on the disk, which fits into any of the grooves on the disk,
C. The shaft of the latter is journaled in the frame and carries on its other end a pinion. This is not shown in Fig. 1, but its position is such that its teeth engrge with the gear wheel, D. This wheel is also journaled in the frame, and on the further end of its ehaft carries a pinion, which, as clearly shown in the engraving, engages with the teeth of a vertical rack, E. The lower and plain portion of the latter enters a hole in the frame, so that by this means, together with a suitable guide grasping the rack above, the rack is kept perpendicular. Just below the toothed portion of the rack is a slotted enlargement of the same, through which passes loosely the diminished end of the punch lever, F. This is pivoted to the frame, and connects, in the simple manner depicted, with the punch bar, $G$.


The operation consists in lifting the lever, A, and causing its projection to engage in the highest notch on the disk, C. The lever is then pressed down, turning the disk until the former strikes the floor. Then the project:on is removed from the notch, the lever again raised, and a new hold taken, repeating the procesf, which, in fact, is precisely the same as tbat adapted in moving a heary weight with a crowbar. The workman lifts the load as far as possible with the latter, then blocks it in position, and shifts his bar for a new purchase, and so on until the labor is accomplished. By means of a crank to be placed upon the shaft of the disk, $D$ (not shown in our engraving), the punch, after descending, may be raised very quickly. This avoids the delay of engaging the lever projection in the successive notches of the

disk, and of turning the arm in the opposite direction from before.

We need not enter into any details of the inter-relation of the wheel, pinions, and levers, to show that an immense power may thus be applied piecemeal toward forcing down the punch; nor is it perhaps necessary to add that this machine, as is the case with many others which have appeared in our columns, is an ingenious plan for utilizing hand power where other motors do not exist or where their application would be inconvenient.
Passing to our second illustration, we have another adaptation of the device, to a screwdriver. Further description of the mechanism is not needed; so that in that connection it remains but to say that the dotted lines indicate the position of the lever when its projection, $H$, is engaged with a notch in the disk, and that the block to which the jaws are attached necessarily works loose on the shaft. The invention, as shown, is a convenient substitute for the unhandy combination of screwdriver and tongs commonly employed. The
leverage is'straight and applied at the best advantage. The instrument moy be employed for cutting tapsin corners, and it is constructed to bold screwdrivers of any proper form It will, we think, prove of especial handiness in operating upon
tool.
For further particulars regarding sale of rights, in both For further particulars regarding sale of rights, in both
inventions, etc., address Mr. Warren Lyon, Mamaroneck YONS' IMPROVED PUNCH AND SSCREWDRIVER.

Westohester county. N. Y. The tools will bo manufactured
by the Biddle Machine and Tool Company, of 164 West 27th by the Biddle Machine and Tool Company, of 164 W est 27 th
street, New York city, at which eatablishmènt they will shortly be ready for examination.

Theist. Gothard Tunnel.
In reply, no doubt, to rumors, circulated from French sources, that the St. Gothard tunnel was to be abandoned as a failure, its progress being so slow as not to promise its completion for twenty years, the Swiss Federal Government is now making public, after proper verification of their correctness, the montbly reports received by it of the state of vance of the boring for the month was as nearly as possible 500 feet linear, the proportion on the Swiss side being greate than that made from Airolo by nearly a third. The total length gained since the first trials were made sixteen month ago is an actual advance of seven eighths of a mile, of which very nearly 1,200 yards are clearsd out to the complete section of the tunnel. The number of wort men now employed on an a verage daily is 1,380 ; but this appears to include the labor in extensive worksbops outside each of the two openings. The boring from the Swiss end continues to be entirely through solid gneiss rock. The temperature is found remarkably equable within the tunnel, varying litile during the month from $70^{\circ}$, while outside the average was $41^{\circ}$. At the southern $n$ nd the mica echist,through which the boring has been carried, has ceased to contain quartz, and
has become of a much softer and looser cbaracter as the has become of a much softer and looser cbaracter as the
work advances. The reports as to the leakage of spring work advances. The reports as to the leakage of springs into the tunnei are decisiventity of water entering in March cording to which the quant. It is also announced that so far from the Belgian boring machines of Dubois and François baving been given up as a failure, they are working on with the greatest success.-Pall Mall Gazette.

## Painting Magic Lantern Slides

The following are the methods employed by the artists whose profession is the painting of magic lantern slides: 1. Use traneparent colors, like Prussian blue, gamboge and carmine. These will give the three primary colors, and by their misture the other tints. Apply with a brush, and a transparent orging varsish, like dammar varnish. Allow one coat to dry before applying a second. Considera ble aid can be derived from stippling, the color being strengthened, where necessary, by applying it with the point of a fine brush. The colors must not be used too thin.
2. Flow the glass plate with albumen, after the manner of photographers, and paint with aniline colors. This process gives great softness and brilliancy to the pictures, but they are apt to fade.
3. Paint with water colors and then flow the entire surface with Canada balsam, covering the painted side with glass plate.
4. Use water colors, but mix them with turpentine, instead of water, and work rapidly.

The Sphygmograph in Bright's Disease.
The in vertigations of Mr. Mahomed, of the fever hospi tal, Madras, tend to show that in the form of Bright's disease which follows scarlet fever, there is an early stage, the first indication of which is usually a pulse exhibiting high tension, though this may be preceded by dry skin and conined bowels. Next comes, as first in the order of change in the kidney, a urine which contains no albumen recogni-
zable by the ordinary tests, but some blood stuff, which yields the blue reaction with ozonic etber and tincture of guaiacum. If matters still go on, this is followed by the ordinary serum albumen, and when that is abundant no blue reaction can be obtained. Moreover, Mr. Mahomed says that he has only been able to get this blue reaction when the tension is arte rial, not when it is purely venous.

Fuel in Furnaces.
M. Foucault, in a report to the Industrial Society at Rheims, combats the idea that the smokelessness of a fire can effect a no table saving in the amount of fuel burnt. He alleges also, on the other band, that a considerable loss of economy is produced by smoke-consuming apparalus. He brings in support of his opinion the long series of observations made by the Industrial Aocie ty of Mulbouse, which have proved that, with the ordinary boiler furnaces, it is only necessary to consume from 125 to 150 cubic feet of air for each pound of coal, while for the most part furnaces pass twice that quantity. If the draft be reduced in quantity much smoke is evolved, but the products of combustion, circulating more slowly, part with their heat more readily to the boiler flues. It is further proved that the best means of reducing the loss of heat by the cbimney is by the use of feed heaters in the flue, so as finally to reduce to $200^{\circ}$ the products of combustion, which are often discharged as hot as $400^{\circ}$. Feed water heaters, well set, will produce an - conomy of from eleven to twenty per cent with a reduced dıaft.
The conclusion is that furnaces with large area and suitable feed heaters are the most economical in all reapects. But in mor to obtain the bast realte, much order to obtain the best results, much care
is needed in stoking. A little at a time
and often, should the coal be spread over the front of the fire, and the bright coal pushed back to the bridge. At the same time, the least possible quantity of cold air should be admitted.

## IMPROVED HAMMER.

In drawing old or poorly made nails with the claw end of a hammer, it is a common annoyance for the heads of the former to be pulled off, causing considerable difficulty in extracting the remaining portion. Mr. Candidus Bilharz, of Pittsylvania Court House, Va., has recently devised an inge nious arrangement which, in connection with the ordinary hammer, is stated to obviate the trouble. The tool is represented in the annexed engraving, and the portion above referred to is shown in section in Fig. 2. At the base of the claws is an orifice, A, in which, by a pivot pin, an eccentric jaw, B, is attacbed. This jaw works in connection with the jaw, B, is attacbed. This jaw works in connection with the
forward end of the orifice, and is pressed toward that end by forward end of the oritice, and is pressed toward that end by
a sping, C. Its face is notched or serrated to prevent slipa sping, C. Its fac
ping from the nail.
When the pull on the claw tears off the head, the end of the nail is made to enter the orifice, $\Delta$, between the serrated side of the jaw and the body of the hammer, and, becoming thus tightly held, is drawn in the usual manner. The improve-

ment will gripe and hold anything that can be introduced, and hence may be applied to other uses than simply extracting nails.
The claw end of the hammer (Fig. 1), it will be noticed, is provided with one long and one short claw. At the extremity of the former is made a point in order to enable the operator to punch a hole in the wood in which the nail will stick without holding previous to driving. The short claw is suitably formed on its end for driving tacks.
This invention was patented through the Scientific American Patent Agency, April 21, 1874. Further particulars, as to sale of patent or rights to manufacture, may be obtained by addressing the inventor as above.

Dyeing with Mahogany Sawdust.-A Mr. C. Dreyfuss correspondent of the Farber Zeitung residing in England has patented mahogany sawdust as a ware for dyeing and printing browns on cotton. He mordants with tin, and uses a little lime and glue in the dye beck.

## A MICROSCOPIC AQUARIUM.

Our engraving represents a microscopic aquarium, such as would be seen if there could be embraced, at a single view in the instrument, the majority of objects examined by the microscopist, when the wonders of the infinitely little world existing in stagnant fresh water are studied.
The illustration, for which we are indebted to La Nature though presenting a somewhat fantastic appearance, is, ne vertheless, simply a combination of separate observations. The objects were drawn from their images on the field of the microscope, and then grouped so as to show their positions during the natural state.
All have their names. At the upper portion of the pictur is a scrap of reed stem, a thin branch like a stalk of straw, beneath which a crowd of conferves have sought shelter against the agitations in the water. The parasite life of the latter is necessary for their existence, because of their extreme delicateness. The diatoms, which are placed beside the conferve, are represented in their natural state, that is, pendent in bunches. The diatoma vulgaris, which is the variety shown, is found in so great abundance that hundreds of thousands are often united in a single group. They propagate themselves in indeinite clusters, united by delicate though strong membranes.
At the lower part of the aquarium are shown confervac less elementary than those above. These do not become paraeites, and, in fact, have some relation to aerial vegetation. Such are the characce, the batrachosperma. and the multitude of alga, which are often taken for simple mold. In the midst of the vegetation, which appears to belong to another world, are infusoria of all sizes, from the proteus, a mere gelatinous mass, to the superior organisms furnished with exterior members.
If the infini'y of forms which aquatic vegetables assume in some stagnant pool be examined, it will be found that all the floating bits of stick and the stalks of the weeds growing in the water are covered with a light brown and adherent slime. This is composed of a mass of conferve. If one of these stalks be removed and placed in a flask of clean water, it may be transported and submitted to scrutiny under the microsicope, when nearly all the species represented in our engraving will be recognized. Sometimes the observer will see a spirogyra with its heliocoidal shape of a brilliant green, sometimes scattered diatoms. Frequently hideous infusoria suddenly appear, a mass of gelatinous substance, in the midst of which something resembling viscera muy be traced
Microscopy is one of the most beautiful studies in the world ; and to those of our readers whose coming summer will be passed in the country, we would recommend the purchase of a moderate prised instrument. To one not familiar with its revelations, the microscope opens a new world, and, in the drop of stagnant water, in the grain of earth, and in the leaf, shows wonders which are a constant source of surprise and admiration.

## REMARKABLE BALLOON ASCENT

Aerial navigation, since Science has util ized the balloon for the purpose of observation and investigation, has received a fresh impetus. Though Biot and Gay Lussac, as early as the year 1804, gave the first impulse to the employment of balloons for scientific research, it was not until the British Association for the Advancement of Science laid down (in Leeds, in 1858) the first systematized plan that regular balloon ascents were undertaken. Among a number of very valuable results ascertained thereby, the ex:stence of a warm current of air, which sweeps (at an altitude of about 18,000 feet,'and with a vertical magnitude of 2,000 feet) from the southwest to the northeast, in about the same direction as the Gulf Surtam, has been discovered. The French have hitherto undoubtedly held the foremost rank in aerial navigation. They show $\epsilon$ d, during the siege of Paris, the practical value of the balloon. The French papers are now seriously discussing a proposition for transferring the work of the surveyor to the aeronaut. It has been fourd necessary to revise the real eatate maps throughout France, and it is proposed that an aeronaut should take a photograph of each tract or section, which would, after being suitably enlarged, exactly indicate the contour and features of the district. This may be practically accomplished, as such photographs have already been made from a balloon; but the expense of carrying such a plan into execution, being estimated at about three and a cution, being estimated at about three and a
half million dollars for the whole country, half million dollars for the whole country,
is so large that the work may at present is so large that the work may at
be done at less cost by a surveyor.
MM. Crose-Spinelli and Sivel made, on March 22, a balloon ascent under the auspices of the Society for Aerial Navigation, to which we alluded on pp. $\mathcal{E} 80$ and 337 of
our current volume. We give an illustration showing the aeronauts in the car. They carried with them, as we have stated, a considerable quantity of oxygen, inclosed in suitale vessels, and inhaled by means of a tube. By similar of the atmosphere is such as to make breathing impossible. This latter was the main obstacle to higher ascents, and it has now been successfully overcome, and it is possible to re main at altitudes of 30,000 feet as long as the oxygen lasts. Of the many observations which were made by these aero. nauts at hights up to 21,000 feet, we will mention only two At 12,500 feet above the earth, they passed a cloud of sus pended ice crystals, which glittered in the sun, but were so


## A MICROSCOPIC AQUARIUM.

perfectly translucent that a clear view of the panorama below the balloon was seen, and it was not in the least blurred. The second point is one of great importance. 'The lines indicating waterin the solar spectrum have created much discussion ; and Father Secchi argued that they were watery eva


THE BALLOON ASCENT OF MM. SIVEL AND CROCE-SPINELLI
porations from the sun, while others assert that they are moist vapors in our atcosphere. The latter view is now
known to be the correct one, as the solar spectrum showed, known to be the correct one, as the solar spectrum showed, in the dry air of the upper altitudes, no water at all.

## Stalactites from Masonry.

The North Bridge, which spans the deep valley lying between the Old and New Towns of Edinburgh, Scotland, was built upwards of a hundred years ago. Between the arches of the bridge and the roadway above are a number of cham bers or vaults which have not been opened, till recently, since the bridge was built. One of them has boen visited by Professor Geikie, who says:
" From the vaulted ceiling, and especially from the joints of the masonry, hung hundreds of sta-lactites-delicate spar icicles of snowy whiteness. In many cases they reached to the floor, forming slender thread like pillars. Usually they were slim stalks, somewhat like thick and not very well made tobacco pipes : but towards the sides of the vaults they became thicker and stronger, ore which we carried off measuring about four fee in lengtb, and as stout as an ordinary walking tick. The same material as that forming the stalactites spread in ribbed sheets down the sides of the vault. The floor, too, was dotted all over with little monticules of the same snow-white crystaline spar.

- A more illustrative example of a stalactitic cavern could not be found. The whole process was laid open before us in all its stages. Along the joints of the masonry overhead could be seen here and there a drop of clear water ready to fall. At other places the drop hung by the end of a tiny white stone icicle, to which it was adding its own minute contribution as it evaporated. From the mere rudimentary stumps, the stalactites could be traced of all lengths until they were found firmly united to the spar hillocks on tle floor. Every one of these billocke, too, lay directly beneath the drip, catching the remainder of the stone dissolved in the dropping and evaporating water. In every case the stalactites were tubes; even the thickest of them, though it had undergone great changes from deposit in its outer surface, retained, revertheless, its bore. Usually there bung a clear water drop from the end of the stalk. ready to descend upon its white stony mound beneath.
For a hundred years this delicate uapestry has been hanging and growing, and breaking and growing again, quietly in darkness, beneath the grind of our carriage wheels, and yet high in air, with the stream of hu. man life flowing underneath it too.
"As the bridge is built of sandstone, wholly or almost wholly free from lime, itis evident that the material which has converted these vaults into such picturesque caverns has been derived from the mortar. All rain water, as is well known, takes upa little carbonic acid from the air, and of that acid there is in the air of $a$ town usually more than the normal pro portion. Filtering through the masonry, it dissolves the lime, carrying it downward in solation, and, if made to halt and evaporate, depositing it again in the form of the white crystaline substance which we call spar. It would be a curious question for the architect how long his masonry could resist this action. Certainly, in spite of what these vaults in the North Bridge reveal, the masonry of that structure is, to all appearance, as solid and firm as ever. It is evidently impossible, however, that the mortar, if necessary at all, can be piecemeal removed without in the end causing the destruction of a building."


## Oyster Culture in America

Frank Buckland, in Land and Water, says :-"As regards the cultivation of the New York oysters themselves, I must again hold up a warning hand to American proprietors. If they go on with thepresent system, the oysters will shortly run short. I protested, some months back, against burning the culch old shells for lime, instead of putting it back to catch spat ; and now I find they are selling their broods attached to the parent shell. I have picked out specimens from the tub at Scott's, at the top of the Haymarket. On the two shells of one edible oyster there were no less than twenty-three spais. In another case I counted a " clump." Two edible oysters only were in this clump, but it was covered all over with spat; so ths $t$ for the sum of 4 centa, between thirty and forty oysters were sold all at once, only two being edible. The tub at Scott's wes piled with examples of this "economy." I trust the American oyster dealers will not take it amiss if I warn them that, if they sell their young stock in this wasteful manner, they will soon be suffering. from an oyster famine."

Butterine--Artificial Butter.
J. Campbell Brown, D. Sc., says that a chemist, seeing the word butterine, would be apt to suppose that it is a misprint for butyrin, but it is not so; it is the registered name under which
substitute for butter is introduced in this country from New York. [Known in New York as artificial or suet butter]. Its York. [Known in New York as artificial or suet butter]. Its
general appearance, taste, and consistence are very similar to general appearance, taste, and consistence are very similar to
those of ordinary butter; but notwithatanding that its solidfying point is lower than that of some butters, it retains much of the peculiar crumbly texture and fracture of dripping.
Examined, it gives the following results: It softens at $78^{\circ}$ Fah., and melts at $86^{\circ}$; when heated and slowly cooled, it ob scures the thermometer at $62^{\circ}$, and solidifies at $60^{\circ}$ : It contains:

# Water. Salt. Curd... Fat. <br> Coloring matter. <br> 11.25 to 8.5 1.03 to 5.5 <br> 1.03 to 5.5 0.57 to 0.6 <br> 0.57 to 0.6 $-\quad-\quad$ 

## $\overline{100 \cdot 00}$

The fat consists of olein, palmitin, margarin (?), a trace of stearin, and about 5 or 6 per cent of butter. When dissolved in about four times its weight of ether, and allowed to evaporate spontaneously, it does not deposit any fat until more is not below $60^{\circ}$, the deposit is not solid. The first deposit, is not below $60^{\circ}$, the deposit is not solid. The first deposit,
when dried, fuses at $108^{\circ}$; the second deposit fuses at $88^{\circ}$, when dried, fuses at $108^{\circ}$; the second deposit fuses at 88 ,
and solidifies at $64^{\circ}$.
Under the microscope, butterine does not appear to con Under the microscope, butterine does not appear to con-
sists of acicular crystals of fat, but of irregular masses consists of acicular crystals of fat, but of inining a few batter globules, particles of curd, and crys tals of salt. With polarized light, the irregular crystaline structure is beautifully seen, and is clearly distinguishable from butter which has been melted and recongealed. When old and rancid, it acquires the odor and taste of dripping, but it keeps longer undecomposed than butter. When freeh, it is a wholesome substitute for real butter; and if not brought
into the market as butter, no one can reasonably take exception to its sale.
Butterine may be selected by the following characters

1. Its crumbly fracture.
2. Its loss of color when kept melted for a short time a $212^{\circ}$.

The behavior of its etheeral solution.
Its action on polarized light.

## Wheelerite, a new Fossil Resin.

During the past season's field work of the explorations and surveys west of the 100th meridian, under the command of Lieutenant George M. Wheeler, to which expedition I was attached as chemist, many interesting chemical facts were observed. Among these may be mentioned the occur rence of a new fossil reain, whose name heads this article. This reain, which is yellowish in color, was frequently found in the cretaceous lignite beds of northern New Mex ico, filing the fissures of the lignite, and even interstratified in thin layers with the same. More of this substance was seen in the vicinity of Nacimiento than in any other locality. The strata of lignite, slate and clay, in the numerous sandstone mesas of this region, are plainly to be seen in passing by. The behavior of this reain with reagents and the analysis made proves this to be a new compound, heretofore undescribed.
On treating the resin with alcohol, the principal portion is readily dissolved, while a small part remains insoluble. The hot alcoholic extract of the resin deposits, on cooling, a fow yeilow flocculi. After the separation of the solution from these flocculi, there remains, after evaporation, a yellowish resia, which is very brittle and becomes strongly electric on friction. This resin melts at $309^{\circ}$ Fah. At a higher temperature it emits an aromatic odor, burns with a smoky flame, and leaves a voluminous coal behind.
It is soluble in ether, less so in bisulphide of carbon. It dissolves readily in concentrated sulphuric acid, producing a dark brown solution. From this solution water precipitates it. It forms a compound with potassa in aqueous solution and is precipitated by acids unchanged. Strong nitric acid readily oxidizes it, with the evolution of nitrous fumes.
0.106 grm . gave 0.284 carbonic acid and 0.076 water.
0.101 grm. gave 0.270 carbonic acid and 0.071 water.

The data give the formula $\mathrm{C}_{5} \mathrm{H}_{6} \mathrm{O}$.

|  | Theory. | Expertment. |  |
| :--- | ---: | ---: | ---: |
|  |  | II. | I. |
| Carbon, | 73.11 | 73.07 | 72.87 |
| Hydrogen, | 7.31 | 795 | 7.88 |
| Oxygen, | 1958 |  |  |

The true molecule of the resin is probably 5-6 times larger than the above formula expresses. Many fossil resins have been investigated; but none identical with the above, so far as known, has been described.
The rotinic acid of Johnson, which he obtained by extracting the retinasphalt of Bovey with alcohol, is the only combination that bears a resemblance to the substance under discussion. This has the formula $\mathrm{C}_{40} \mathrm{H}_{45} \mathrm{O}_{6}$, is slightly solu ble in alcohol, readily so in ether, and melts at $248^{\circ} \mathrm{Fah}$.
I have taken the liberty of naming this new mineral after Lieutenant George M. Wheeler, Corps of Engineers, U. S. Army, the honored and energetic leader of the expedition Army. the honored and energetic leader of the expedition to which I am att
Science and Arts.
Gilding on Zinc.-C. D. Braun dissolves sulphide of gold in sulphide of ammonium, and deposits a layer of gold upon pieces of clean zinc plunged into it, the air being excluded as far as possible.

## Acoustics in Public Buildings.

A. W. C. states the inability to hear distinctly in our public buildings is due to the architects, and that those gen tlemen should remember that an ounce of prevention is worth more than a tun of cure. "Please advise any of your friends who contemplate building a church, hall, lecture room, or other public building, to observe the following rule room, or other public building, to observe the follo
and they will find the principles thereof to be true:
" Let the whole structure be held in entire subserviency to the auditorium. regardless of needless ornamentation, and let the clear inside lines thereof be as follows: Make or take the whole length as one sum in feet, make the whole width one half that sum, and the whole hight, to the center of the ceiling, one half of the latter sum."

## Interesting Legal Decision,

A St. Louis court, says The Trade Bureau, recently made the following decision as to how far an employer is answerable for injuries received by an employee in his service. The court said: While an employer is an insurer of the safety of his employee, as far as the apparatus and machinery are concerned, and for injuries received when the employee is unconscious of the defects in the apparatus, yet if the employee knows of the defects, and continues to work and ncur the risk, he must take the consequence of his own negligence. This view is sustained by recent decisions of the.Supreme Court, and by the General Term of the Circuit ing of a worn out rope, it was decided that he could not reing of a worn out rope, it was decided that he could not re-
cover, as he knew the condition of the rope, and continued cover, as he knew the
to use it at his peril.
A Madeira correspondent of Nature writes concerning the damage caused to objects of natural history from cedar wood cases. A naturalist in Madeira, to do his collection of the remarkable land shells of the island more honor, had made for them a case of this wood. Unobserved for a month, the shells were found drenched with the turpenting resin exhaling from the wood. Shells covered with a rough epidermis seemed to have attracted the oil less. Craspedopoepidermis seemed to have attracted the oil less. Craspedopo.
$m a$ and the smooth fresh water shells had especially suf $m a$ and the smooth fresh water shells had especially suf
fered ; semi-fossils full of sand had escaped; all othere, whether recent or semi-fossil, had suffered to such an extent that the cardboard to which they were attached was in many cases soaked. This occurred, however, only when the af fixed shells offered the needful point of attraction and condensation.

## DECISIONS OF THE COURTS.

United States Circuit Court.---District of Massachusetts.
company et al. v8. daniel He smit



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xperience, has been gathered from all parts of the country, its compila. lonhavingtaken more than three years. Messrs. Leffel are the manufacuters of the well known Leffel turbine, and are also editors of the Leffel Mechanical
interests.

## Inventions Patented in England by Americans.

 [Complled from the Commissioners of Patents' Journal.] From May 8 to May 21, 1874,ale Tif.-S. Parmly et al., New Orleans, La.
Burning Petrolifur.-O. Sweeney (of Philadelphia, Pa.), Liverpool, Eng dttons, etc.-R. H. Isbell, New Muford, Conn.
Centrifugal Machine.-S. S. Hepworth. New Yorl city, et al.
coling Drings.-C. L. Ridgway, Boston, Mass
Doa Collar.-w. T. Mersereau, Orange, N. J.
Electromagnetio AnNonolator.-L. Finger, Boston, Mass
urnace.-J. M. A yer, Chicago, Ill.
Gami Cards.-M. H. Cowell, Buflalo, n. Y.
roning Machine.-G. W. Cottigam st
roning Machinr.-G. W. Cottingham, St. Mary's, Texas.
aking Manesia Hydrate.- C. H. Phullipy, New
aing Magnesia Hydrate.-C. H. Phillips, New York city.
aper Pulp box.-s. Wheeler et al., Albany, N. X.
PLANE.-J. F. Baldwin, Boston, Mass.
ortabla Forai.-D. W. C. Baxter, Philladelphia, Pa
ock Drile.-J. B. Wartig, New York
Rock Drill.-J. b. Waring, New York city.
otary Enaine.-A. C. Gallahue Morlat
otary Engine.-A. C. Gallahue, Morrisania, n. Y.
ewing and Machink.-F. Curtis, Boston, Mass
ewing and Machink.-F. Curtls, Boston, Mas8.
HiP, ETC.-J. T. Parlour (of Brooklyn, N. Y.), London, England.
Stigam and otier Engines.-W. Wallace, Brooklyn, N. Y
Tram Injector.-Tube Works Company. Boston, Masa
Topper for Drawing Liquids.-E. R. Wilbur, New Pork city
obprinding Crocerbry in Kilns.-B. Jackson, Geddes, n. Y.
rlegraph Signal.-W. A. Camp (of New York city), Lonaon, Engiand. foret Punch.-Canceling Punch Compa
Torpedo boat.-J. L. Lay, Buffalo, N. Y.
tor Pistot.-C. B. Stepnens, Plainfileld, Conn., et al
WIRE TUbing AND MACHINE.-H. O. Lothrop, Milford, Mass.

## zecent American and foreign teatents.

Improved Car Coupling.
Jonn E. Stevenson, Wllton, Iowa.-A block is plvoted to the upper part of the drawhead, from whichplvot itis suspended und swings tu thecavity. A spring is attached to the pivot of the block, which serves to force the
block downward. The pin is supported on the shoulder of the olock, and block downward. The pin is supported on the shoulder of the olock, and
the end of the ling strikes the block and allows the pin to drop. The inner surface of the lower part of the drawhead ts provided with stops, whith receive the end of the hink where it is supported by the block when the
cars differ in hight. The drawhead ts so constructed that the coupling pin cars differin hight. The drawhead is so constructed that the coupling pin
may be supported when in the upper part by inclining it forward, the pin may be supported when in the upper part by lnclining it forward, the pin
mortise allowiug suffctent play for that purpose, whille the end rests on a shoulder.
Improved Cotton Press.
William B. Hollowell, Nashville, Tenn.- This is a powerful hand press. adapted to be constructed and used on plantations without very skilled
labor. The essental features of thisinventionarealeverand windlass for forclng the follower down by a vertically moving tollower stem. The operation ts accomplished by several movements of the lever, each one forcing
it a certain distance, thus dividing the labor and tncreasing the nower, so It a certain distance, thus dividing the labor and increasing the nower, so
that the balesmay be made as small and dense as by the ordtuary power that the b
presses.
Improved Press.
John Gramelspacher, Jasper, Indiana.- Thisinvention consists of a brake John Gramelspacher, Jasper, Indiana.- Thisinvention consists of a brake
leverpivoted at the middle in the top of the follower stem, and having a leverpivoted at the midale in the top of
fulcrum on each side of it on a rod working up and down through a gulding and supporting beam. The rod also works through a griplng pawl, whtch
allows it to descend freely, but gripes and holds it against rising, so that allows it to descend freely, but gripes and holds it against rising, so that pressing the follower down. This causes the follower to be forced down quickly by the vibrations of the levers.
Improved Sewing Machine Table.
Michael $W$. Murphy, Loulsville, Ky.-This invention consists in supporting the hinged portion of the table by a section of the subjacent case. It ing the hinged portion of the table by a section of the subjacent
is believed to be cheaper than the ordinary foldiag enclosing top.
Improved Composition for Cleaning and Polishing Metals.
Hosea Burrill, Lynn, Mass.-This 18 a composition for cleaning and pol1shing knives, forks, and all articles cf cutlery, as well as all other artcles for which it may be adapted, as surgical instrumente, arms, and milltary
equipments. It consists of emery, pulverized coal ashes, sawdust, and equipments. It consists of emery, pulverized coal ashe
soap, molded into cakes, which become hard by exposare.

Improved Door Alarm,
len Hope, Pa.-This is an tmprover
Abraham Neviling, Glen Hope, Pa.-This is an improved door alarm, which In addition to striking a bell when the door is opened, as an ordinary or day and thus serve as a night alarm.

Improved Hay Knife.
Harrison R. Brown, Rochelle, , ill.-This invention is a hay knife having a
triangular blade with smooth cutting edges, standing at an angle to the triangular blade with smooth cutting edges, standing at an angle to the
handle, and having ai reversible stirrup attached by means of a tube sur handle, and having air
rounding the handle.
ounding the handle.
Improved Sash Balance.
Willam D. Goodnow. Rutland, Vt.-This invention consists in a case let into the tod bar of the lower sash, flush with its surface, and provided
with a plvoted bar, inclined block, and knob, whereby the cord that enters the weight grooves may be cramped, so as to connect and balance the sashes.
Improved Cattle Poke.
Warren L. Battle, of Geneva, Ga.-This cattle poke consists of a wood or Warren L. Battle, of Geneva, Ga.-This cattle poke consists of a wood or
metal bow, fittlog and secured close to the head by a face and nose strap
around the ncck of the animal. The lower ends of the bow are connected around the ncck of the animal. The lower ends of the bow are connected
together by a couple of pins, from the lower of which bangs a long curred together by a couple of pins, from the lower of which bangs a long curred
rod of wood, whose upper end risesabove and behind the nipper pin. This rod of wood, whose upper end risesabove and behind the ipper pin. Thi
causes the lower end, which 1s curved forward to some extent, to project canses the lower end, which is curved forward to some extent, to proce
still farther forward, so as to catch in the fence when the animal tries to jump. The plvot allows the rod to lie on the ground while the anlma
feeds, and said rod rises high enough above the ground when the anlmal holds his head up to clear it, so that he can walk about freely.

James Riebe, Cedar Lake. Ind.-A box Is ditlded Into two small compartments, and a seed bag ts made long so as to come up under the arme or the operator. The lower end of the bag 18 attached to a short tube,
which tis secured in the upper part of the tiner compartment of the box. From this potnt the corn passes into a cavity in a allding bar, which its
tnto and slldes up and down in the outer compartment of the box. $A$ tnto and slldes up and down in the outer compartment of the box. A
A brush acts as a cut-off to prevent any more corn than enough to fil the


 apper part of whth extends up along the tnner slde of the sllde. The
lower part of the plate ts bent $t$ wice at right angles, so as to pass through

 tached a block or such a size that when the dropplag silde 18 pushed down.
ward the block will push back a spring and allow the corn to drop tinto the ground

## Improved Lifting Jack.

 alsing the axle of the wagon, the fulcrum belng the foor or surface of

 upright posttion. In bring ing the lever to this position, tes short end and
a bar act as the members of a toggle jolnt, and with constantly fincreasing power, until the bearing polnts are tin line with each other.

Inproved Follower for Brine Barrels.
George Enoch we purrect, for the purpose of holding meat, fisn, vegetables, and other construct, for the purpose of holding meat, ing, vegetables. and other
artcleles under brine, a follo wer wblen may be readily and securely aduasted In higher or low fr position tn the barrel. The Invention constats o of a
follower which is attached to the side of the barrel by flotted arms
 and turned by a central shaft of the follower.

Improved Step Ladder.
New York clty.-The
Charles F. Baroard, New York clty.-The side boards of the step ladder the plyots of the sald hinges may be a little below the under aurtace ot the pirots or he sald hings may be a ittle below the uner surface or
the steps. The other ends of the steps are hliged to the other silde. The arrangement is such that all the screws that hold the hngges enter across
the grati of the wood, and thus take a frmer hold. The lege are plvoted. the graln of the wood, and thus take a frmer hold. The legs are plvoted.
near their upper eppas, to the outer stides of the stlies, and are made of such a lentt as to hold de he hadder it proper positlon ซhen extended. Their the legs are plvoted bars. which are made with a bend near sald lower

 Ward end of thetr llots , 18 formed a notch to rececte the ecrews, and thus
lock the legs in place when extended. To to lege are proted braces. Which, when the ladder tis extended, cross each other, and their lower
ends are secured to the legs by plvoted catches, the heads of which pass
 lock ald braces and legs sonether. These eatches are os oromed that they
may be conventently turned to fasten and unfasten the braces. To the tnner surface of one of the sides, Just below one of the steps, is attached
 secured by a hand nut. By thts constructon, the sides and steps of the secured by hand nut. By that coniruction, the stdes and steps of the then
step ladder will be held riglily in place when sald ladder is extended. John Stevens, New York citt, and George J. Cating.
 sildes forward and back and lias an long colled spring on it to throw the jaws forward, and allow them to be pusheded back out of the war of the
drawhead of the car to be coupled on. Sald rod aleo has a short strong drawhead of the car to be coupled on. Sald rod aleo has a short atrong
colled spring on it to ease the shock on the drawhead when the cars cou-

 the cars meet. Over the front end of the latch 18 a lever, to ratie tit up for
uncoupling. To this lever a spring catch is provided, which tit hrown back by the lever when pressed down agating tit, and springs formard after the
lever has passed, and locks it to lock the coupling latch. It leaves the latch unlocked in case it ts wanted to allow the cars to uncouple if one is
thrown off the track. The jaws are curved out ward considerably near the thrn wn of the track. The Jwa are curved out ward coniderably year the
outer enas, to recelve the link from elther slde of the center, as $1 t ~ w i l l ~ b e ~$ presented when the cars are on a curved track.

Improved Isinglass in the Liquid Form
 the sounds are steeped in the usual way, but the scum, instead of betng
taken off, is stirred in. The isinglass is then carefully strained through sleves and cloths. The effect of the scum upon the istnglass, when treated
In this way, is to make it more limoer than when it is skimmed off in the old way. In soaking the sounds, wasbing soda is added to each barrel of the cold water in which they are soaked, which removes the oll and gives
the sifinlase a better color and qualty. The soda solution, after standing the cold water in which lhey are soakta, The soda solution, after standing
the sinnass a better color and qualty. The
several hours, is poured off and thrown a way; the sounds are then steeped several hours, is poured of and thrown away; the sounds are then steeped
in new clear water, after which the liquid is strained, has a small quantity of alcohol added to it, and is poured, while still hot, into tin cans, which John E. Bemts, Cutcego, Ill.-Thts invention car.
John E. Bemls, Cutcsgo, ill.-This invention consists of a movable platorm, which is supported and firmly attached to trucks in such a manner
hat by turaing a longtitndinal rod with spiral shoulders the connection that by turaing a longitndinal rod with spiral shoulders the connection of into gear with pinion driven in co inection with the truck axles. The mo-
tion of the trucks in elther direction carries the platform sidewise till it tips by the welght of the load thereon for nnloading, belng carried bock matically thereon by sultable mechanism, which releases the sliding seg

Charles S. Smith, Westfleld, Mass., assignor to the No
ing Company, same place.-The radlators are made in sectly Steam Heatton consisting of two korizontal tubes connected at thelr ends by two short tubes. Upon the upper end of the outer stde of the end tube of each
lower section is formed a rabbet, into which fits a lug formed upon the lower end of the outer slde of the end tube of each upper section ; so that when the sald upper section has been screwed down upon a nipple, the free ends of said sections may be secured to each other by a screw passing
through the lag of the upper section, and screwing into the tube of the lower section.

1mproved Hand Power Circular Saw.
Ole T. Gronner, Baltimore, Md.-This invention consists in combining the parts of a hand power circular saw frame so that the same 18 rendered
readily portable, can be quickly thrown into working condition, and requires but little actuating force.

Improved Mortising Machine.
Harbert K. Forbis, Danville, Ky., assignor to himself and John W. Proctor, s3me place. -The mortising tool mandrel is fitted in bearings on a bas
pivoted on thesildeand pivoted near theother end by a slotted hole. The ba is plvoted at the rear on a stud, so as to have an endwise movement, to ac-
commodate the movements at the other end on the sllde, which works in a straight way parallel to the edge of the work, and thas causes the tool to cut the mortise the same depth throughout its length. The work table

Improved Catting Pliers.
Van Allen Pugsley, New York city.-This invention consists in an imments formed upon them at the bases of their Jaws. A circular recess and a slot are made in the enlargement of the one part, and a cylindrical prorection and a slot in the enlargement of the other part
sept in place upon each other by a guard bar or plate.

## Improved Nut Lock.

Loftus Sykes and Joseph Sykes, Philladelphia, Pa.-This invention relates to improved means for preventing the nuts of bolts from turning off by means of Jar or concussion, more espectally designed for fish plates at ratl
joints. When the nut is screwed down, the blocks are tightly compressed號 $\nabla$ shaped grooves of the nut. The other ends are held by ratchet teeth,
which effectually prevent a backward movement of the nut; and a rib on the washer being fast in a groove of the fish plate, the connection is ren-
dered permanent and safe.

Improved Cutter Bar Machine for Harvesters. Willam M. and George H. Howe, Lansing, Minn.-This invention consists in providing a harvester wheel with studs and spokes arranged atter-
nately, and entering near opposite edges of the rim, and combining there-

Improved Tobacco Bag Attachment
James Wright Chambers, Baltimore, Md.-This invention
bacco bag attachment formed of a metailic case having consists in tured circular bottom with npper and lower outwardly obliqued flange, to recelve an elastic stopper and allow the edge of bag to be conventently thed.

## Improved Hydrant.

Joseph V. Miskelly, Baltimore, Md.-This invention consists in combin but the working elements are easily and conventenily reached fopexamina

## Improved Gutter Head for Moldings.

William Smith, Baltimore, Md.-This invention relates to molding cutters for bringing plano legs or other woodwork into some definite shape. the flanges of stock, a sertes of plates and bolts for fastening the molding

Improved Lard Lamp.
Charles A. Gabe, Sr., and Charles A. Gabe, Jr., Boonsboro, Md.-This invention relates to that class of lamps which are adapted to the burning of
lard, and consista in a new and improved arrangement by means of which hrd, and consists in a new and improved arrangement by means of which
the lard is better reduced to a condition to be affected by capillary attrac tion and the manipulation of the wick fachitated.
Process of Making Calendering Rollers from Paper Pulp. facturing calendering rolls of paper pulp and a novel method of manu operation of forming the roller is expedtted, and a more perfect article is produced. The invention consists in molding the mass around a heated Improved Apparatus for Evaporating and Cooling Liquids.
Archibald Rogers, Hyde Park, N. Y.-Thls is an improved device for Archibald Rogers, Hyde Park, N. Y.-This is an improved device for in contact with the liquid to be evaporated, and which may be used with qual facility as a csoler for cooling liquids. The steam is introduced through a hollow hub, and passes through large plpes and ont of smaller
tubes radilly attached to them. It thus enters a escapes through a hollow hub. The water of condensation, as it forms, lows out of the plpes into the drum, where it is recelved upona spout, and flows out through the bub. By shutting off the steam and forcing cold air

Improved Sawing Machine.
Winfeld S. Gerrish, Herses, Mich.- object of this invention is to furnish a crosscut sa wing machine which mav be worked by one man with
great raplaty, saving time and handa thereby. The invention consists a crosscut saw which moves in a sultable stirrup, and conncets by two
curved plates with the rear of a carriage silding on the supporting frame. A wheel with curved cams or wings is rotated by a hand crank, and acts on elastic rollers of the silding carriage, producting therebs the rapid rectpr cating motion

Improved Measuring Can.
Marshall M. Barney and S. L. Datly, Leon, Iowa.-Liquitd is admitted rom the cask to one of the chambers of the measure while betng dis inlet orffice and close the discharge orffice simultaneously, and viceversa. The vent openings are closed and opened, as required, by a float which rise and falls with the liquid in elther chamber.

Improved Machine for Bending Wood.
A. Higging, New Portland, Me.-This is an tmpro
Barnabas A. Higgins, New Portland, Me.-This is an improved machine for forming the tops of shovel and fork bandles, etc.. Which forms the
topa rapidly, and at the same time so gently as not to break or split the handle, and will hold said tops in perfect shape unt11 seasoned. The woo

Improved Still for Refining Oils.
Cornelius J. Cronin, Rouseville, Pa.-This is an improved still, in which the process of evaporating and distilling of crude oll or petroleum may be
carried on with a considerable saving of fuel, and with greater rapldity, nd also the formation of sediment on the bottom of the still be effectnally revented. The cleaning of the still is greatly factiltated, and not required chambers extending below the bottom of the still, lito which the sedt ments are carried by a lateral traveling plece with adjustable scrapers moring along a longitudinal galde screw turned by reciprocating gear.

Improved Carriage Curtain Knob.
, curtain knobs, and conslats in a cross to construcpring, and grooved button on the shank. When it is desired to turn the button, it is forced on the spring by pressure, and over a shoulder, which arsengages grooves on the button from a cross piece, and allows it to b the but in elfier drechion. When released, he aprig reacts and throw be button outward: and when is turned for astening the curtan, tis When it is turned for unfastening. or piven a quarter of a revolution, ano ther groo
position.
Improved Washing Machine.
Thomas Stumm, Ada, O.-By sultable construction, by sliding a rubbing oard up or down, a presser board will be adjusted to leave more or les washed may washed may require. The clothes rest upon a curved perforated board
whlle betng operated upon, which slldes back and forth beneath the sald clothes as the frame is oscillated upon its sbaft. In using the machine, the frame and Its at:achments are 10 wered into the suds box, and the clothes are placed in the space between the presser board and the dasher board, and allowing them to be again saturated. When the clothes have been juds and the water the rased out nishes a powerful leverage for pressing the water out of the clothes, and enables it to be done so thoroughis
ine directly from the machine.
 te boller. These troughs communicate with the boller by means of aper ures, which are closed by valves. The apertures are long slots at the bot
om of the troughs, so arranged that the cooked meal or food, which is in semi-fuld state, may flow from the boller into the troughs, and thus come

Improved Washing Machine. liat bottom, vertical ends, and rear side and inclined forward atde. The , when swung forward, ralses the clothes from the bottom of the box, is rectangular. A corrugated angle block is fitted into the angle at
the bottom of the inclined formard side of the box, and againgt it the lower horizontal bar of the beater $\varepsilon$ trikes when swong forward. The ruboer board is corrugated, and upon the lower parts of the end edges are formed
pivots which enter grooves in the box. so that the sald rubbing board can be removed and inserted at will. When washing, the corrugated board is turned back, and is secured in place by a button. The corragated board and the beater, when swung forward, form a triangular space, into which the clothes are compressed oy the forward movement of the beater, to fall
back fnto the water, and be again saturated as the beater moves back. The back into the water, and he again saturated as the beater
beater may be operated from elther side of the machine.

Improved Wrought Iron Grating.
Daniel D. Boyce. New York city.-This is an improved grating to cover openings in the sidewalk in front of stores and other places where they
will be walked upon, which shall be so constructed as to prevent people from slipping upon them. The invention consists in an improved wrought iron grating, having the upper edges of its bars roughened by having pro jections and depressions formed upon them.

## Improved Temporary Binder.

Charles W. Batrd, Rye, N. Y.-This consists of two flanged strips-one on each side of the papers or pamphlets filed, or on the covers when the pa-
pers or pamphlets are bound-and two or more metallic fastenivg strips or wires. The flanges of these strips turn over on and hold the back. The olied. The papers as well as the strips are perforated to allow the fastenings to pass through, when the ends are bent down to keep the angle strips securely fastened to the papers or covers.

## Improved Churn Cover

David M. Pease, Concord, Ohio.-This churn cover is locked on its seat by means of a set screw or spring, and provided with a flaring cup to $r$

Improved Skirt Protector.
Richard H. Gardaer, Troy, N. Y.- Hubber cloth, leather, or other material is attached so as to inclose the extreme edge of the skirt, and envelopes a device. The upper edge of the protector is stitched to the skirt or skirt ining.
Improved Manufacture of Jewelry,
Charles A. Gamwell, Providence, R. I., assignor to Amertcan Ename Company, same place.-This invention consitsts in productng the body of ral, and preparing the outer surface of the same by azzing, and varnishig in bronze, gold, sllver, aniline, or other colorg, or productag by the use of emery, fine sand, or other material, and a second sizing, a frosted gold, sil
ver, or other colored surface and fintshed appearance of the goods. Varied ver, or other colored surface and inished appesrance of the goods. Varied
and neat effects are thus obtained by very slmple means, espectally as, by and neat effects are thus obtained by very simple means, especialy as, by
paintlig and varnishing the bronzed or other surfaces in anline and other colors, any desired shade may be produced.

Improved Shirt: Bosom.
Jonathan Ramsey, Jr., Middletown, Conn., assignor to himself and Mid dletown Shirt Company, same place.-This is an improved shirt besom fo
shirts opening at the back, which is made of one continuous plece, and olded into regular plaits, so as to produce a neat outside appearance, re thints sifness, and save material thereby. The ifvention consists of a platts overlapping narrower plaits at the nnder side, and secured to the shirt by the sttching that defines the middle plait, and at each side of the

## Improved Shingle Machine.

Spencer B. Peugu, Salem, had.-The shingle blocks are cut fron the log in the size of the shingles required, firmly attached to a block fasten'ng
rame, and fed, by the motion of the carriage, to the saw. Each trip of the carriage cuts off a shingle from each block. The inclination of the block is then changed for the next trip by a lever, so that shingles with alcer
aating butt and point endsarecut from the blocks. The regular size of the hingles is then produced from the sections so cut by ripping them to

Improved Extension Table Slide.
Wilhelm Valent $1:$, Cullege Pont, N. $\Gamma$-The rans are
Wilhelm Valent, College Point, N. T.-The ralis are provided with mall rectangular recesses along the edges, and to the middle of each rall ame project over the recesses, while the space between their inner edges forms a groove. The connection of the ralls is produced by one or mo L-3haped gutde plates, which are screwed to both sides of the ralls, run
ing with tbetr projecting parts along the baad, and serving also as stops ang with tbetr projecting parts along the baad, and serving also as stops earings for small rollers, which run, with their conical ends, in simillar Improved Bush for Mill Spindles.
hich mpindle and support 1t. On each of thesides of these pleces is a rib, formlug he bearing polats of the sides, which come in contact with the sides of the recess, in rear of each of the box pleces. Set screws pass the ack upperends of these pleces, by turning which screws the boxes are forced up to the spindle, whlle at the same time they readily adjust themselves to
the spindle. By this arrangement, the boxing is adjusted to the spindleearing in an accurate manner, whtle any looseness caused from friction wear is easily taken up by turning the set screws.
Improved Machine for Making Metallic Shoe Shanks.
John Hyslop, Jr., Aotngton, assignor to himself and Otis M. Holbrook John Hyslop, Jr., Aoington, assignor to himself and Otis M. Holbrook
ranklin, Mase.-This invention consists of a movable die for cutting the hank off the metal strip and shaping the edges, contrived also in sultable ond, aud also the reverse bend, and comblned with a stationary count art die. The cutting, shaping, and bending may thus all be accomplished one operation, considerably simplifying and cheapening the machine and faclitating the work. There is also a peculiar arrangement of dis.
chargers in connection with the cutting dies for throwing off the waste leces. The invention also consists of a novel arrangement of discharger comblnation with the

Improved Dish Washer.
 lock having a hole through which the rod passes, and a slotced bey wrenck and locking spring, the slot of the key wrench being somewhat narrower
than the rod, the rod belng notched in the sides to allow the key wrench he wrench is slipped on and holds the wrench from slipping off. The key rench holds the rod so that the lever will lift a basket and let it fall; and Lalso serves for turning the basket forward and backward, at the same tme the lever is worked, to increase the actlon of the water. When the the key wrench is again applied, and is used for a handle for liftlag the bas. the key wrench is again apple
ket out of the washing vessel.

## Improved Buggy Top.

Jolnville F. Fowier, Carrollton, Ohlo.-This top folds neatly and easily gether, and carriestue not exposed to the dust and wear by hanging over the body of the carrlage.
The invention consists of two bow sections or framea, which are ptroted the main supporting stays, and folded toward the same. Horizontal
 Voted to the main stays, and gearing, oy mutiated end pinions, with the rasing or lowering the main stays for instant adjustment, aid support the ame strongly and firmly thereon.

## Futiulss aud epersoual.

 The Cnaroe for Inesrion under int nead is $\$ 1$ a 4 no For Sale or Exchange-A first class GearCutter with Brown
 Makers. Woden Ware Machinery, send cir
culars to P.O., Lock Boa 6 690, New Oriean. Patent Right for Sale-A valuable improve-
ment on Cneck Looms. Victor Jagel P.O. Holypte, Ms An Experienced Engineer and Draftaman,
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nounced superior to all other brands by all $w$ bo noe them. Dectided excellence and moderate cost have made
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W. A. A. will find directions for moldin

 eing decelved by mineral rod men.- B. F. F. T. Will find
arections for enamelling cooking utenalls on p .137 , vol 27.-D. S. Jr. will ind a full deacription of an induction

 ks as to fulminat ting powder, must send his address.-

 ton is right, and the "Protessor"" wrons.-J. B. H. WIll
J. A. L. says: I have an engine of 24 inches



ngineer.
H. $G$.
H. G. D. asks: $\begin{aligned} & \text { 1. Have tubular grates, car- } \\ & \text { THng a current of water } \\ & \text { trom the pump to boiler }\end{aligned}$ through them, ever been in use or been patented? A.
Yea. 2. If a tube carries a current of water from the pump of an englne through the firebox to the boller, and the eurrent should cease by gtopptop the pump, would
the water divide or be driven out of the tube by the rreat heat, the preasure of the boller belpg on the tube D. asks: Why does chloral hydrate decom-
 pered bottle, , bich 18 the epoper plan. With corks, it
forms by decomposition certain subetitution prodacte Fhich by decomposilition certaly deatroy the cork.
J. B. R. Aask: 1. Is there any practical intensity withnut using carbon pointa? If there be, will
in you tell me where I can find a deseriptoon of it? A. A.see
deacripton of Mr. A. Ladiguin's electric lamp, p. ss7, description of Mr. A. Ladignin's electric lamp, p. p. 387 ,
vol. 29. 2 . Can frictional electrictty be induced in sulcont quantity to create light? A. Yes, but only wrth ven then the experiment ts not free from danger. A. A. asks: 1 . When a person is poisoned ected, and how does this polson operate? A. It frrat affects the stomach, productng nausea, pann, burnlngs,
vomittings, etc. Bealdes these local eftecta, there are Vomitings, etc. Bestdes these local eftrecta, there are
others of a general character, buch as general anfer.

 J. O. R. asks: Is there any mode of intensi Pylng one pole of a battery in relation 20 the other
Forexample, I would 1 Ike to increase the the nemative pole, , ,
Y. L. asks: How can I distil water for ma-
C.S.S. P. says:
tormula on p. 160, 1 . I tril. 27.
$A$
 go with sulphurtc actd. Altiough I have used much sibe, my tik is tery pale when flrat used. What can I do to bring ap the color? A. Your mistake wasin the
character and amount of the acld which yon emploged Ruo up in a porcelatn mortar 10 z. of indigo with 6 oze, of fuming oll of vitriol. Ordinary oil of vitriol may
also be emploged to diseolve indigo, but more than doualiso be employed to dissolve Indigo, but more than dou ble the quan tity of such acld is required, and it mnat be
heated to $130^{\circ}$ or $140^{\circ}$. If a suffelent amount of acld be employed, almost the whole of the indilgo may be dise solved, and if the llquid be allowed to stand for a few
oours, It will remalin clear on beling dilluted. It 18 then tered, and the filtrate wine an lenee bue. 2 Wha is wite copperas, as per p. 203, vol. 29? A. Copperas, water of crystalization and becomes grayish whtte (1s probsbly what yon mean,
R. L. asks: 1 . What amount of water must Four gallone of water to one of aquatortis. 2. How can
J. E. B. says: I have a small stationary en
 and the crank shatt $18 \%$ and $1-16$ inch 1 d dameter. The
 and glve power enough to drive a small road steamer by
gearing from crank shaft to driving shaft?
A. The en-

J. J. asks: Can two boilers of different size er plpe and steam plpe, and have the water alwayb at
 er of 50 Inches diameter with 90 three tnen tubes, and one
boller 44 triches diameter with 2 ten tinch fues. Will the boiler which generates
water trom itself to the other? A. The arrangement might posibly be made by rery carefnl management,
but it woald be very dangerous, and should on no ac-
B. . asks: How can I propel a boat for
annting wid geese (bost is 12 feet long) without causnuting wilk geese (bast to 12 seet long) without cave. tng disturbance enough to scare the geese before get-
ting within ginabot 7 A . Use a propeller about 10 Inch es In dameter at least. It would be necesary to hang
it under the boat, so as to get suffictent Immersion. It ou billd auch a boat, we are sure that
belnterested in hearing of the resilt.
S. P. P. says: 1. Two locomotives that will A. 1
 pull the ereatest losd, oae with 4 drivers with 18 tans on
driver, or one with the 18 tune on 2 drivers? $A$. If the rivers, or one with the 18 tuns on 2 2rivers? $A$. It the
weight lis properly distributed in each case., there will be no difference ti the tractive force. s. Whan pulls on an exact level with her cyllinders? $\boldsymbol{A}$. No.
R. \& W. T. asks: Is there any way to render paper perm
out the nee of
of dolng the.
T. asks for a recipe for covering the inside tion of water by heated alr, oxldation la carried on very raptily, and hee pan becomes caked and inlied with rust. Whice, it the water happens to be mpure, emits a foul
odor. $A$ preparation that could be lald on the ineside of odor. A preparation that conld be latd on the tnitide of
the iron pan, and not be titeelf affected by the action of
 ning which 18 generally used and answers these re.
ourrements 18 a Inting of porcelann. See p. 157 , vol. 27.
 Irom particle to partcle oft he wire." This might seem
probable where only an ordina. $y$ Morse clicente morked, but when a wire is duplexed, that tis, worked with stearn's duplex instrumente, In opposite directione

C. E. T. says: A mirror displayed one morn ng an unueual phenomenon. Its sarrace was embel. lished with a crystalization of some volatile anbatance,
whlch was deposited on orer half fte area, resembled the riont on the window panes. There are no sinks or drains from which gases might arise in the room. Several rooms in the bullatng contatn similar
ritrore, but only mine shows signs of the deposit. A. roscop the condensation upon anch a surface, the form of the
appareut orystalization having been determined by mestructural pecallarity of the
E.J. W. asks: 1. In your opinion how long at if exposed to the elements? A. Very many jeare, art 11 exposed to the elements? A. Very many yeara.
2.
It the coating of oxide formed by the atmosphere a perfect prrtection from the elements? A. It 18 gener-
ally regarded as excellent, but we haveno antbority for
 atter the costing has once formed? A. Some samples of oxlde or flice are sensibly soluble in water, others Howerer. water never diseolves more than a milllonth
 sphere. 5. When exposed to the elements, which ls the
most endurng. sllver or zlinc A . silver to not oxided at any temperature elther in a dry or molat atmo
 ally oxidized? A. It should not do so.
H. L. asks: What is indigo, chemically? ral matters of various percentages; 2 d , ind g go glue 3d, tadigo brown; 4 th, indigo red; 5th, Indigo buee, or
ndigotine, $\mathrm{C}_{16} \mathrm{H}_{10} \mathrm{~N}_{2} \mathrm{O}_{3}$ the pecculiar dye material for which ndigotine, $\mathrm{C}_{12} \mathrm{H}_{12} \mathrm{~N}_{2} \mathrm{O}_{3}$
the tindigo 18 valued.
E. asks: What is the best battery for using
nthe animal organim, as in cusea of potisoning? Batteries alone are not nued
had better use a mem coll.

 ple method of exbausting the alr in 2 a small chamber 6
ncheeb by 6 atted with two altught faucets, one on each de? How can 1 compressints the same chamber two riore atmospheres? A. There is no simpler method
than that of ualig an exhausting and condersing air
W. P. B. asks: 1. Where can I send and
 Can you tell me a good work on fosille? A. Dana's foosille, and the volumes deroted to palmontology the variona geological surveys of the States and TerItorles, the best partlcular dedcrip tons. 3. Can you
name any work on derivative woods? A. None havlug hit title. 4. Can you glve me the addrese of Dr. I. Ipha, Pa. 5. For what and how 19 gun cotton used? A. Gun cotton is ad van tageouply used in blastiog, betigg
exploded by the electric spark. Also as a substitute in ome cases for fulminatilig mercury tn gun caps, when pixed with chlorate of potassa. 6. Was the stesmship President, Which was wrecked in 1841, an American or
an Engilsh vessel? A. American. 7. A re the lumps and ogs in wet places the result of deposit? If not, what causes produce such formations? A. Deposition of
sitt, and the accumulation of vegetable growth in suitable places. 8. Can you name a work on the stuffing of birds and animals? A. See the instructions published
by Smithsontan Institution. 9. In putting upalcoholic y Smithsoantan Institution. 9. In putting apalcoholic
N. A. S. asks: How can I bleach wood tar?
Wasi repeatedy with caustic ooda, water, and oil of Itriol.
M. F. asks: Can you give me a recipe
Or diesolving copper wire in some kitid of acld?
 nith has been previously mixed with $31 / 2108$. of water.
o crystaliziog out the resulting body, you should obDo crystaliziog out the resulting body
ain nearly 3 lbs of nitrate of copper.
C. M. asks: Is there any substance which
ine poured into a
type metal mold, zet hard, and have the same color as ivory ? A. To liquid chlontde of $z^{\prime}$ nc of $50^{\circ}$ to $60^{\circ}$ Buamé, add 3 per cent of salammoniac hen addzinc white uotl the mass is of proper conslst. rd becomes as firm as marble.
J. F. B. says: 1. I have contended with' me during summer, near the streams, is maluly due to. the lands betng saturated with sonow water, and not nn.
frequently overfiown. I find by expertment that the ater flowing down these valleys always malntalns ite vel from one side of the valley to the other, no matter he surface of the lowlands which convey the water from the streams or main channels to all points in the valleys, according to its level in the streams. If we
dig for water, a half mile or more from the stream, we are always sure to ana it when reaching the level withi
 croosed. consequently the water passes off $\theta$ owly. thy frequently overlilining its banks. Now. I argue
that, if these streams are stialghtened, the water would pass off more raptdly and not flll thetr chamnels by four or five feet, thus leaving the lands high and dry, allow. tog them to become naturally warmed by the heat of
the summer's sun; while the frosts, with. the damp and chillynights, would disappear, and. the lande pecome t present, these lands, rich with alluvitum, are always at
during the summermonths saturated to their surtacı $s$ with snow water ; and farming tis not a succeps in cons-e
quence of frosts. I am speadiag more particularly of the valley of the Humboldt; and 1 also maintain that nal rays of the sun, woutd not be frozen by the influance of the surace irigation. Are those ideas in accordance with scientific princlples? A. Your ideas
eementirely reasonable. 2. In drinking anything hot. we naturally suckwind into the mouth ana swalluw; does this wind assist in filling the stomach? If so, then
we cheat ourselves of half our meals. A. The wind goes into the trachea, not into the $\boldsymbol{x}$ ’ophagus. 3. If
the dead were each incased in an airtlght sarcophagus, the dead were eacb incased in an alrtight sarcophagus,'
and buried, would not the process meet the demsods of $t$ thpse who are becoming alarmed at the presentissatem: Corial . A. No. 4. Is there any book or series of.
ooks pubitshed which contans the constitution andt codes of all the different States
know of no book of this kind.
B. L. asks: What ingredients shall II ase ing it? I want the color of the best red brick, to retain its color and not wash off in a wet climate. Can such a omposition be made without llme? A. Take a light atian red, or with a little of each, to produce a color to ant; if too dark, mix with lime to make it lighter, and suitable for rear or side walls only, and hardly fine
J. P. S. says: 1. I am running light maa 40 horse engine and makes two huudred revolntions per
minute. I use a three inch belt from a 20 inch pulley or minute. I use a three inch belt from a 20 inch pulley or plenty of power. What size of engine would, I require to
drive my countershaft? A. If you are drivemy conntersbaft? A. If you are using all the power transmitted by the belt, it would be well to put
in at least a three horse engine; an answer of this kind the only be very indefnite, at Woolwich, England, used for? A. For forging guns and armor plates 3. Is there any kind of acid that 1 sould soak garden peas in to kill the bugs and not de
stroy the growth of the peas? $A$. We do not know of stroy the growth of the peas? A. We do not know of
any. 4. How can I soften bone so as to cut theasily,
and so that it will get hard again? A We do not think that it can be done with ordinary bones. R. D. B. asks: 1. Is there a saving of steam gine runat full speed, or is it better to open it wide? the speed of the engine fuct as well with the throttl wide open, there will be little, if any, difference. 2 How can I makea red or brown paint for steam pipes, that
will not burn off? A. There is a very good material for such parposes called black varntsh. made from petrole
B. asks: What is the cost of building a bullt at a cost exceeding 850,000 ? A. We belleve the
average price rangen from 850,000 to $\$ 5,000$. The most
expensive car of which we have heard costa about 850
W. J. R says: 1. I have always had a taste led sereral books pertatinng directily to theee zajocett, and alagera as far as cubtic equations. I am now tryling
get into a machine sbop as an apprentice, belleving hat the theorettcal knowledge I con gali from books, Dacked by the practical. obtained in the shop,will at me $m$ lone. Would you adyise me to do as I propose? pot, what course do you think I should pursee? A. We thnt that your plan is a very good one. 2. What are
the beest murks to perfect me as a mechantcal engineer?
 such as Ganot's or Deschanel' A , and a rellable treatipe on workshop practice, suct as Knight's "Mechantclan and
Constructor," or the "Machnntist's and Millwrikht's As
T. H. C. asks : Can you give me the actual
umber of pounds of power which constute a horse
 Isa untt, origlaally ad 0 pred by James Watt, and now ork required to salse 33,000 pounds one


G. D. R. asks: 1. Would there be a gain in los the three cyllinders equididetant in a circle and at tachng the pltaton rods to the same crank? A. Such an
anglne tis manuacactured tin England, and has been described in our columns. See p. 291 , vol. 29. 29. Is there
any slmple test for detecting adulteration of linseed any
ant
Fat.
Fat
 of each of which 186 Inches. Bhas one, of which the
diameter 188.188 finches. All
other things belog the same, would a combtnation of the power of the steam
hat 1 sanues from the cylliders of noller A be lees, equal
 cylluders of the boller. A, taken together,are Juat equa)
 B. F. W. says: A friend of mine built a mill tead of running the water over it in the ordinary way it conies to the top of the wheel and makes a half turn thus running back ward or toward the fume tnstead of
running fromit. Is there iot a loss of power lu running it in this way, by fuddenly changing the course of the water? If so, how much? A. There 18 a los of power corres
by the turn.
G. D. F. asks: How can I raise a quarter put in a botile or a tube? A. We do onot get a very clear
dea of what you mean. If you intend to have the welght suapended by a cord over a pulley, some mercury
or alco bol can be attached to the other end of the cord, or ralse it. By means of a bent tabe, the welght placed no one leg can be ratised by the
N. O. B. asks: 1. Has the magnet ever The varation differs, and Is constantly changing at diff
ferent polits of the earth's surface.
There are points
 paper devoted to general literature can give you the ad dreas of a number of auch perdons. s. 1s there any
pump that will pump water enough to drive itself? A.
W. D. S. sends an ingect which has excited
 lear water. Which runs only tn wet eeasons. The tnsec
pooked llike bright red blood ; but on close inspection 1 proved to be a small worm. The worms accumulated
untll there was a mass which sparkiled and gllstened tin ay an motion in the waterand when out or tit and lett dry.
they eoond de. I Bend a sample In a bottle. A. The in.
 nose
Cnaracteristices: Foot Jaws small, simple : Interior an
 three marnine. Canthocamptur minutus: Thorax and ab.
domen not distinctly feparate, consititig of ten seg.

 antenne simple, $t$ wo-jotnted, the frat jotnt with a sma lateral jotat, terminated by four reta; feet, five pairs
Common in ditchen, color reddish, length about 06 Inch "Micographic Dittionary," Grifth \& Henfrey. Dr.Par nell states that the Lock Leven trout owes its superior
weetness and richnees of flavor to
 bouod 1 both fresh and salt water. The ova are fir opaque aubsance, presenting a minutely cellular ap
pearance, and occupylng the 1 interspace between the body of the antmal and the back of tee shell. This called the ephipplum. The shell 18 orten beautifull
traneparent, sometlmes spotted with plgment; it con
 copious efferrescence onddtlo small quantt! of acld; and when bolled tit turns red, llike the lob back, and resemblling the blvalve shell of a museel
others are elmply folded at the back, so as to appear like a bivalve, but arereally not so ; or they consist of namoer or rlogs or segments (c. minutus, for instance)
All the entomostraca are best preserved in a solution or chloride of lime.- (Hogg's "Micro
Not useful for
 that, when the full throw of one to ap, that of the other
18 own and In thera again, when the throw of one tis trics are set with centers opposite, generally one is to moring the valve when the engine is golng ahead, and lie other is for the backing motion. When the center of the eccentric is $90^{\circ}$ away from the other, the
J. H. asks: What are the objections to the
caloric engine; A. at to too large and heary, on acW. B. asks: What is used to fill and make R. F. B. says: I wish to build a sail boat low water. Which will be tiee best, a centerboard or a
ketl boat. and of what dimensons shall $I$ make it? $I$ keel boat.and of what dimensions shall I make it ?
want it about 16 feet long and to be a mwitt runner. How shall it be rigred and of what shall it be built? trom 6 to 7 feet beam.
J. L. K. asks: Which runs the easier, a
wagon with 4 foot wheels or one with 8 foot wheels? A. The former.
C. W. K. asks: How can I calculate rolling of a car wheel on the track ? 18 there any work which
treats on this subect creats on this subject ? A. It must be determined by
expertment. See Morlos' "Mechantcs, "Clarke's "Ras

R. J. J.- You do not send sufficient date
E. W. A. asks: Why is the name live oak
plied to the tree of that name? $\mathbf{A}$. The name or flve oar was no donbtapplled to this tree on account or tit
great durabilty, Bs the following quotation from

 South, it is a fine park tree, when cultiv ted growing about 40 Teet high, with, ho wever, a rather wide and low
head. The thick oval leaves are evergreen, and tit to nuch to be regretted that this noble tree $\begin{aligned} & \text { III } \\ & \text { not }\end{aligned}$
C. R. P. asks: What is the power of a
eam englne with cyinder 15 inches in dlameter and 24 Inches stroke, wth steam at 30 libs. per square tnch,
sildes cutting off at 9 Inchees, and running at 75 revoluHons per minute? A. As we have frequently potnted out in former replites, questions of this nature cannot
be answered with sny degree of certalinty, anless furtherdata are given, that can only be determmed by ex the pressure of steam to the boller is 80 lbs., we can onl guess at the tnitial pressure in the cylloder; and al.
thoug the polnt of cuttignoff 18 given, we cannot de. takes p ressure. It the case is or much importance, you had
 361nches, to run an engine 1 13xy 10ches; the fre 18 below
one end and the heat goes up around the bolltr about hall way. A coal fre will run the engine slowly, but wood fre tncreases the speed to about donble that on
the coal. I would like to know how to fix tit so as to
to run the engine with a coal Irre. It can be done of brick
tong the boller in and exposing almost all Ing the boiler tin and exposing almost all of the surface
to the Are; but that ts not practicable in this case, as the boller is in the third story. The engine exhansts into
the culmney and 1 about 5 feet from the boller. A. We the chlmney and la about 5 feet from the boller. A. We
do not understand whether or not you are troubled about the dratt. If not, it might be well to ratise your
grate. If the dratt 18 bad, probably there tis sometliting wrong with the chlmeney, or the manner of connection. P. S. asks: 1. What can I saturate or patnt a cuble foot of 114 tnch boards mith, to make
mich harder and duramile for fron to rub againgt?
a. Timber Impregnated with corrosive sublimate, resino matters, or creasote is sald to be harder than before. 2
Willit do to have a clitern sunk tn the cellar of a
 the water? Of course, I will have a dratn for the over
plus. A. Such cliterns are rery common. s. Is the we
 ooses? A. Yes. 4. Which 18 the cheapest and best fo
a
stphon to purposes? A. Galvanizec iron will answer very well.
 are lately core ed ours steam plpe from bollers to en
gine; it takes the same presaure at boollers to do the work as before we corered plpe. J. C. thinks I had ing covered. I clatm that it makee no difference as to
presure, but that steam can be made and kept up with
 right A. You do not Bend envugh detalls. As a gen.
eral rule, the lose of presesure is less with covered plpes man
A. D. P. asks: Is there any compound for ase under any and all circumstances? We are obliged
use water from various localities, and the tmpurte use water from various locailites, and the tmpurtite changting. A. We do not know of anything of eneral a preventive character.

 rivet or patcon, If the sheet is cracked; caulktig, 11 the escribed on p. 7 , vol. 90 , and $I$ use a double conver lens or the eyeplece. Would a plano-convex lens magnify
W. S. W. asks: 1. What is the correct de-
and nittion of sound? A. Sound lis a pecullar sensation ex.
cited in the organ of hearlng by the vibratory motion thed in the organ or hearing by the vibratory mote toan
of then this motion is tranemitted to the ear through an elastc medtum
Would there be any sound? A. Not as we undcritand
it. s. Is not sound produced only tin the ear and no-

W. T. W. asks: Which is the proper way
 W
W. P. S. asks: Can you tell me what course Or stuyin mpechanical engineering 18 neceesarar atter
leating college, and on what terms are learroers taken and machine shops and engineering morkg? what
time ts necessary to learn the trade? 4 . If you po in. to a machine ebop, the pay will be merely nominal, ins
nfty centsa day. Many young men purane thic course
S. P. B. asks: Upon what conditions are
oad seeamer permitted to run on common roads, in rond steamers permitted to run on common roads, in
he states where they are now belng used? A. We be. eve that in general mat ters of thi
ne township or conaty authorite
J. H. O'K. Says: A friend of mine has a 15
Orse engine of about 3 fee 6 inches stroke and 6 Inches
 in the exnaust so much that it can be heard for nearly
mille. I contend that, If you reduce the exhaust plpe mile. I I ontend that, if you reduce the exhaust pife
oone half 1 to dameter and dispenae
with a bell which
 I rinht? If not, , hat will prevent it, as it anops me
and my neighors very much? A. It seems probatle hat your plan would stop the nitse, which, however Ight tincrease the back presuure sllgutly, to make such

F. D. says: 1. In the cab of a locomotive wo long-neck squashes, joined tofether at the top. The
reman sags that there 10 an arrangement tnetde such
 ormsa vacnum. What is that arrangement, and is it patented 1 sit as economical as a aracum pump would
be in the use of steam? A. It works on the princtple of the ejector condenser, or the stesm siphon. Proba-.
oly titis not as economical as an ordlaary pump, but tit 18 more conventient. 2. Would not an engine atted for for
steam run the exhust plpe were kept in a vacuum nd the supply plpe opened Into the alr, without ualing
P. W. D. asks: What kind of wire gauze sused Yor miners
mampe of
mo. 20 wire, with 36 meshes to the luch.
F. H. D. asks: If it takes a certain amount much agatn to drive it twelve inches, with the same
preesure upon it? What 18 the proportion of steam be. reesure upon it? What is the proportion of steam be sem pressura upon each I $\mathbf{A}$. If, as we underatand your question, the full pressure of steam 18 admartted 1 n each case as the length of the second cyllider exceeds that ene frot.
P. D. R. asks : 1. Why will a spoon in a slage fri or tumbler prevent tis beligg cracked when hot
water is poured in?
$A$. Betore we attempt to
give an explanation, we desire to satisfy ourselves of the fact,
Whether or no a tumbler, that will break if hot water oured break when the spoon 18 in it. Bat in attempting to make the expertment we encountered the following di-
nemma: If the tumbler does not break without a hemma: If the tumbler does not break without a spoon,
when hot water ts poured ta. what use tis there of trylog he experiment with a spoon. If it does break, with What mlght have happened with the spoon. It 18 evi.
ent that one and the same tumbler muat be used ; 14 dent that one and the same tumbler mast be used ; 1 ,
villnot do to compare different tumblers. If our cor respondent will get over thts difllculty and prove the
fact, we shall repeat the experiments and work out the

A. P., of Vienna, Austria, says, in reply to
 on to call this P . Have a Wrthnt the basin. Have a perpendicular line drawn You can tell, by experiment, how many cobbct feet of wa. half tis hight,and mark the place on the scale. Let the orran sit in the water so deep that nts head will be just
out of water; mark agali the place on the ceale, and the difference of the $t$ too places will show exactly the
cublc volume of the body $\begin{aligned} & \text { without head ; let us cull this }\end{aligned}$ then Let the person plange enirely thto the rer that the head dilso 10 under water, and mark agatin the
place on the scale. The difference of thie number marked the frst tIme and this number will show the cu ne volume of the entire person Including the head; 1 le
is call this V . Now, of course, diferent volumes of the body betion taken,thelr welghts anust be to proportion to $\nabla$ is the cuble volume of entre person and $v$ the cuble Volume of pel 80 exclusive of the head; therefore,
$\mathrm{V}-\mathrm{v}=$ the cublc $\mathbf{~ v o l u m e ~ o f ~ t h e ~ h e a d , ~ a n d ~} P=$ the weight the head, person: and theref easily fund.
W. D. M. says that A. L. can make artificial sratns cream of tartar, 10 drops essence peppermint,and
31bs. stratined honey. Firrt ditsolve the sugar in water, and take off the scum: then diss ilve the cream of tar-
tar in a litte warm water, which you will add with some tar in 1 itrle warm water, which you will add with bome
litte strring; then add the honey; heat to a bolling
$\underset{\text { C. C. G. says, in reply to J. J. W. T. S. . . Whose }}{\text { Cut }}$ drinking water, and $I$ think you will have no further
H. A. says: In explanation of the difficulty
 your journal, isend the following solution, suggested "The Atmosphere as an Anvil." In blowing through the tube, the force exerted on the paper dilsk 18 connned to
the area of the titernal diameter of the tabe he area of the thternal diameter of the tube, the actual
increase of power g tren of the breath beling compara tively amall. This column of air, in order to displace
the paper, must move a column in front, and equal to the area of the paper. The disk of card 1 of use only to steady the paper, so as to keep it in a perpenitcular
position and to keep the forces exerted tn parallel lines. The stronger and more sudden the blast through the tube
the closer will be the adherence of the paper to the the clo
card.

Minkrals, extc.-Specimens have been re位帾 from the following corresp
O. D. R.-It constats of car conate of lime, carbonate
of magnesla, corbbonate of iron, and alllca - D. B. - 1 th 18 sulpharet of tron.-M. 8 No. 1 la black oxde of mangan ese. If this was found at the place where yonr letter was Inla, and showresting as $e$ the in United States where manganese is found. If there 18 s Luantry or the ore you should have it fully analyzed
and reported upon. No. 21 g galena oiz sulphuret of lead -w. J.c.- Shanll be glad to report on the enaracter of - R. D. They are garnets of different colors and varl
 pyrites. No. 218 iron pyrites.-D. P.s. The specimen contaning some magnetic oride of fron disemtnated
through a quartzose matrix, but no silver was found on assag. -J. M H. writea from Ne w Iberla, La., and send some specimens found on Pettit Anse tiliand. where the
Louisiana salt mones are stuated. formation of the tiland is rather curious, betng a anc cesiton of hills and valleys,rising suddenly from an end less salt marsh which surround h . The specimens wer laken from a deep run through one of the hills. Tb
 The bright crystals of black color and metallic las ter are rrombohedral crys:als of specular Iron ore. picked plcked out from the sand by running a strong mag
net turough it. Some of it contaling a certaln percent age of titanfum. The micute crystals are delicately tinted pink crgetals of quariz.
C. H. F. asks: $\overline{\text { What }}$ is slater's cement simple and cheap dry house for drytng frutt on a amal
scale? -0. J. T. asks: 1 . How can I case-harden breech actlons of breech loading guns, to glve them the clonded appearance ? 2. How can I color twist and laminated teel ghot gun barrels to anke them show the twitt, a we see 1 n mported ones?-s. H. R. asks; From whom
did the negroes spring, and what causes their black color?-R. P. asks: How can I make paper impenetra
ble to linseed oil? -B. F. B. says: There is a problem which some one has found in a work pubilished man years once which is as follows: "A man at the center of
a circle 560 yards in clameter, starts in pursuit of a horse running around its clrcnmference at the rate of
one mile in two minutes the man goes at the rate of one mile in six minutes, and runs directly towards the horse in whatever direction he may be Required the and what igure the man will describe." I hardly thin it admits of a solt tion under the above conditions ; bu were they reversed, that 18 , if the man were running at the rate of one mile in two minntes, and the borse on COMMONICATIONS RECEIVED.
The Editor of the Scientific American annowe with much pleasure, the r ceipt of original papers and contributions apon the following subjects

On the Vienna Exposition. By A. D.
On the Sun's Attraction. By H. B. and by
On Light Freight Cars. By H. S. B.
On the Madstone. By R. D. S.
so enquiries and answers from the follow ing:
Correspondents in different parts of the country ask Who furnishes plans and machtnery for steam laun
ries? Who supplies cotton seed hullers, decorticators and oll presses? Where can a subscriber obtain a cider preas? Who sells chestnut hoops for casks? Who makes
resifters and baskets? Who makes the beat metallic If-packing for plstons, with brass rings, etc? Maker $f$ the above artucles will probab's promote their inte OAN.
Correspondents whose inquiries fall to appear should
 ed ar declues

Several correspondents request as to publish replies othetr enquirles about the patentability of their in-
entions, etc. Such enquiries will only be answered by tier, and the parties should give their addresses, Correspondents who write to ask the address of certal manufacturers, or where specified articles are to be had,
also those haviug goods for sale, or who want to find partners, should send with their communications a amount sufficlent to cover the cost of publication unde he head of "Business and Personal," which is apecially

## [OFFICLAL.]

## Index of Inventions

 FOR WHICHLetters Patent of the United States

## May 19, 1874,

and each bearding that datr.


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Carrlage, chld's, W. Stewart.
Carrlage trimmings, rubber coated, A. Albright Cartrldge loaderand cap extractor, Hart \& Logan Carving tool, C. Fontana ............ ..... Chandeller sliding drop lywht, B. Thackar
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Clothes frame, L. Magee ......
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Coffee urn, C. Hitchcock (r)
oondenser, electrical, C. A. and I. s. Browne. Copper by tin, prectiptatting, 7 , s. Hunt........
Cordage, electric conducting, T. Corn and potato coverer, F. Dletz ............
Corn, removfng germs from, N. A. Conklin.. Crorset steel, J . M. Young ...
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APPLICATIONS FOR EXTENSIONS.

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 for the extension of the following Letters Patent. Hear the days heretnafter mentloned29,618.-Printing Priss.-J. E. Priest. August 12.
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EXTENSIONS GRANTED. 29.378.-Fire Escape.-L. King.
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