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[NEW BERIES.]
NEW YORK, MAY 30, 1874.
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## IMPROVED ROAD AND FARIM LOCOMOTIVE.

The traction engine and train of wagons which we illustrate are the manufacture of Mesers. Aveling \& Porter, of Rochester, England, and were awarded the prize medals for

The engines are very strougly and simply made, and ma. ${ }^{2}$ or coal. Their economy in this respect is stated to be very nifest the greatest care in their construction. The facility great. At the Wolverhampton trials an Aveling 10 horse with which they are guided and driven, both operations be engine, fitted with a single slide and ordinary link motion, Progress and Merit at the Vienna Exposition of last year. ingenuity. The almplicity of the machines enables them, it one fifth pounds of coal per horse power per hour.

The steam road rollers, built by the same eminent firm, were also awarded similar medals for Progress and Merit.
Since the very important ex periments with road engines at Paris, in 1867, and Wolverhampton, England, in 1871, their value, as substitutes for animal power, as feeders for animal power, as feeders for railroads, as pioneers in new districts, and eventually as au-
perseders of horse-drawn portable engines, is becoming generally and intelligently recog. nized. The number of these engines built up to this time, by Messrs. Aveling \& Porter, exceeds one thousand, and the trade is rapidly developing.

The economy in the cost of removal of heavy material, in certain localities, is certainly very great, and the manufacturers claim that the cost does not exceed one third that of doing the same work by horse power. The variety of uses to which the
engine can be applied, such as thrashing grain, hauling farm produce, plowing by direct traction, pumping, sawing, etc., materially add to its usefulness, and make it applicable for different kinds of work all the year round.


The following testimony of Mr. D. Brennan, the Presidert of the Telford Pavement Company, of Orange, N. J., who has two of these road locomotives, is given, as showing their value for hauling purposes: "We have used, for hauling stone, one of the Aveling \& Porter 6 horse power traction engines, purchased of you, and with very satisfactory lesults. Wehauled with this engine (with engineer and one assistant) about 75 tuns per day, a distance of a mile and a quarter, over a new road. There is no doubt that even better results can be obtained at longer distances, where the delays of loading and anload. ing are not so frequent, espe cially if on a cood road We ciallif on the we ill do engine will do hauling for one third the cost of the same work done
by horses, at $\$ 5$ per day for for team and driver, hauling is claimed, to be worked at a small cost for wear and tear, one and a kalf tuns at a load; and we are making prepara and the liability to accidənt from breakage is reduced to a tions for a more extensive use of them in the future. minimum. A large amount of boiler room is.given to each The smaller engraving shows one of the ordinary road loengine and the furnaces are constructed to burn either wood comotives fitted with a crene to lift two tuns. It has iron

whoela, fitted with compensating motion to its drivers, to ozable it to turn very sharp corners with facility. It is also driven and steered by one man. Crane engines almilar to this, and built by the same firm, were used at the Vienna Exposition during the orection of the building, and did a vast amount of excellent work in unloading and removing the heavy packages of merchandize as they a rived on the grounds.
Mr. W. C. Oastler, 43 Exchange Place, New York city, is Mesers. Aveling \& Porter's agent in the United States.

## Frientifir Ammerican.

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## PRESSURE NOT A MOTIVE POWER.

The error of contounding mere pressure with energy available to produce power is the main origin of the majority of attempts at perpetual motion, and even sometimes causes, among confused minds, exaggerated expectations about th effects to be obtained from mechanical contrivances.
We consider the alleged discovery or invention of Mr. Keely described on page 273 of our current volume, to be a case of the latter class. He is said to develope, by means which he carefully keeps secret, a gas under enormous pressure; and by the exhibition of this pressure, he has induced a few engineers (who should know better) to testify not only in regard to what they see, but to make inferences as to the enormous power to be expected from such an exhibition. They forget that this pressure cannot be utilized without letting it all, and that the great problem in producing motive power is not aimply to originate a great preasure, but to generate it abundantly, cheaply,
production of motion.
production of motion.
Fifty tuns weight su
Fifty tuns weight supported by three small blocks of one enbic inch each, will exert on each a pressure of some', 38,000 pounds to the square inch; but this mere pressure of 33,000 pounds is not a horse power; it only becomes so if we canse the 33,000 pounds to descend one foot per minute, and if, at the end of this descent, it can only be restored by lifting the weight back to its original hight.
A wound-up spring is perfectly equivalent to a weight; it may exert a certain pressure, large in proportion to its size and strength; but unless it allowed to unwind, it cannot produce motion or power; and the exhibition of a spring
pressing with a power of 12,000 pounds on one equare inch of material does not prove the possession of a principle of motive power, unless we can wind up the spring as fast as the power is expended.
It is the same with compressed air or gases; they are in fact nothing but wound-up springs: with the difference, however, that, in place of noeding mechanical power to wind them up, we may use, for their development under confinement and conseq
olectricity. olectricity.
The ste
of the first case; expenditure of heat keeps up a continuous generation of steam from water, supplying the loss as fast as necessary; or it expands confined air continually, and so
increases the pressure which, when moving the engine, is necessarily released. The chemical fire engine and the so called fire annihilators are illustrations of the second class the action of an acid on a carbonate (both in water, but kept set free with such energy that the water may be forcibly ejected with the gas and made useful as a ready substitute or a fire engine.
The pressure which it is possible to generate in this way is something enormous, and has more than once given rise to
serious accidents by the explosion, or rather the bursting, of serious accidents by the explosion, or rather the bursting, of
the vessel in which the pressure was generated. It is now the vessel in which the pressure was generated. It is now twenty years since Natterer, of Vienna, with a very power-
ful condensing apparatus constracted on the same principles, ful condensing apparatus constracted on the same principles,
attempted to liquefy the four gases which thus far have resisted all attempts at liquefaction, namely, nitrogen, oxygen, hydrogen, and oxide of carbon; but he did not succeed, notwithstanding that he carried the pressure to nearly 3,000 at mospheres, or 45,000 pounds to the square inch.
It is indeed surprising to notice the apparently irresistible It is indeed surprising to notice the apparently irresistible
force exerted by the molecules of bodies, when (induced by cold, heat, chemical action, or electric agency) the component particles are compelled to adopt another molecular arrangement. The expansion of freezing water may burst the
heaviest bombshells; that of steam, the strongest boilers; the development of gad by chemical agency may overcome any power with which we may oppose it by attempting its confinement. It is the same with electricity, which, subtle as the agent is, will, when its current induces the change of any substance into gases, serve to producea tremendous pressure within the walls of the vessel containing the oubstance. This method, we anticipate, will yet prove available for investi-
gations on the behavior of divers substances under pressures, surpassing even those of Natterer. For such ex periments the water to be decomposed is to be confined in a sufficiently strong vessel, in which are also the electrodes conducting the decomposing electric current.
As, in the invention of Mr. Keely, the heat and chemica action are said to be excluded, the only other agent which appears to be left is electricity, and we therefore suspect that the alleged enormous power, from the electric forces in cluded in a drop of water, is in fact nothing but the enormous pressure of the gas developed, from water under con finement, by a galvanic current, or the induced current from
a magneto-electric machine, driven by mechanical power. The pretence that the pressure is developed by a mechanical device, requiring little power, may be true, but that the power obtained from the pressure can possibly surpass that of the power employed is absurd and its application to motive power is simply a phantom.

## GOVERNORS FOR PHIME MOVERS.

The use of a governor is to preserve a perfectly regular speed in the engine, water wheel, or other prime mover to which it is attached, by varying the supply of steam, water, or other motor, as the work of the machine varies. The well in most cases. It has the defect, however, of requiring the use of heavy balle, and of demanding a somewhat wide range of action where it has any considerable forcs to overcome. It also is not perfectly isochronous, that is, it will not compel the engine to "come to speed" with precision, under all variations of load and steam pressare. The Porter governor, in which the balls are loaded down by a heavy weight on the spindle, and which is thus enabled to ard form, and is prompt in action and much more powerful. These are the advantages which have brought it into use so extensively in Europe. In this country, the Pickering governor, in which the same object is accomplished by carrying the balls on stiff steel springs, has come into use quite largely as possessing similar advantages.
The only isochronous governors which are used to any extent in the United Statos are the Huntoon governor and its modifications, in which a screw, rapidly rotating in a closed tank containing oil or water, exerts a force in the tle valve. While the engine is at speed, no movement of the valve occurs; but should the speed diminish, a weighted arm forces back the screw, and the valve opens. It will continue to open until the engine comes up to the proper speed again, whatever the conditions as to the load or steam pressure. Should the speed exceed that intended, the screw acts more energetically upon the liquid in which it
works, and the increased effort is sufficient to overcome the resistance of the weighted arm and to close the valve until the proper speed is again acquired. In Europe, the same parabolic governor, which is so arranged that the balls move in a parabolic instead of a circular arc. It can be shown by a mathematical argument, which cannot be given here, that his produces the effect of isochronism: that the governor speed, the one for which it has been proportioned and speeded. The late Professor Rankine inventod a very neat In a frietion class, which is perfoctly inochronous.
In a frietion governor invented by Professor Thurston, tained by making use of the varying friction of blocks pressed against a drum by centrifugal force. When above or below speed, the valve is compelled to move in the proper direction until the engine is brought to speed, or until the valve has been either entirely closed, or is wide open. Sie-
different from the latter in its general arrangement, and ntirely different in details. The Pitcher hydraulic regu ator, which was much used some years ago on engines fitted with the Sickles cut-off valve gear, was a pump which forced water into a chamber, having an orifice fitted with a plug which was capable of adjustment to give any desired size of opening. Ab8ve the chamber, and communicating with it, was a pump plunger counected with a throttle valve. When the engine ran above speed, the orifice was not of sufficient capacity to discharge the water as fast as was pumped inio the chamber, and the second planger was forced up, closing the throttle valve. When the speed was less than that proposed, the water issued from the chamer more rapidly than it was forced in, and the plunger, which was attached to the throttle, fell, opening the valve. This was another of the isochronous class of governors.
None of these regulators have sufficient power to overcome any serious resistance or to act through any considera. ble distance. Water wheel regulators, consequently, are usually of a different construction from those above described. In the best of the common forms, the fly ball governor is employed to move a clutch which engages a rain of gearing driven by the water wheel, and puts it in motion in one direction or the other, as the opening or closH of the gate to which it is connected is necessary.
Hundreds of patents have been issued to invento s of various forms of governors, in which it has been attempted combine sensitiveness, isochronism, and strength of action, but the problem still remains unsolved. What is wanted is device which, while combining these three requisites of a good regulator, shall also combine the requisites for commercial success, strengtb, durability, simplicity, and, above all, cheapness. Many of our best mechanics have tried to produce such a governor and have failed, but we cannot produce such a governor and have failed, but w
suppose the object aimed at entirely $u$ unattainable.

It will be remembered that our special Viénna correspon. dent described the next best form of steam engine to our standard drop cut off engine as a plain, neat, beautifully proportioned, and well finished English engine, baving a plain three-ported slide valve, with the Meyer expansion valve riding on the back of the main valve-just such an engine as is sold in New York by the agents of some of our best builders. This valve gear is well fitted to produce a sharp cut-off and an excellent distribution of steam. The sharp cut-off and an excellent distribution of steam. The
point of must, however, be adjusted by hand, and the governor attached to a throttle valve in the steam pipe, because this work is too heary to be done by the governor without entire loss of its sensitiveness and efficiency.
Putting the throttle valve in the steam pipe, as a regulating valve, is always avoided, if possible, by good engineers, because, by throttling the steam, a loss of efficiency occurs. It is always preferred to regulate the engine by so attaching the governor that, as in the best drop cut-off enginee, it shall determine the point of cat-off. We gave the reasons for this preference in our issue of May 23, on page 321 of our current volume. The invention of such a governor, which we have described as one of the wants of the time, would onable this simplest, and in other respects most satisfactory, style of engine to compete with the most expensive forms in the market in perfection of regalation and in economy of steam. It would thus confer a great benefit upon steam users and, consequently, a great pecuniary reward upon the inventor. Such a governor would find many other applica. tions, and would displace, not only the ordinary steam engine governor, but, in many instances, it would proba. bly take the place of the water wheel or disengagement governor.

## WHY DO PLANTS ABSORB OXYGEN DURING THE NIGHT? NIGHT?

When a number of freshly gathered and healthy leaves are placed during the night under a bell glass of atmospheric air, they condense a portion of the oxygen; the volume of the air diminishes, and there is a quantity of free carbonic acid formed, generally less than the volume of oxygen which has disappeared. If the leaves which have absorbed this oxygen during their stay in the dark be now exposed to the sun's light, they restore it nearly in equal quantity, so that, all corrections made, the atmosphere of the bell glass returns to its original composition and volume.
Leaves in general have the same effect when they are placed alternately in the light and in the dark there is however a very obvious difference in the intensity with which the phenomenon is produced, according to the nature of the leaves. The quantity of carbonic acid formed during the night is so much the less, as the leaves are more fleshy, thicker, and therefore more watery. The green matter of fleshy leaved plants, of the cactus opuntia, to quote a particular instance, does not produce any sensible quantity of carbonic acid in the dark: but these leaves condense oxygen and exhale it again like those which are less fleshy when they are brought into the sun, after having been kept for some time in the dark. De Saussure applied the names of inspiration and expiration of plants to these alternate effects being led by the analogy - somewhat remote, it must be confessed-which the pheomenon presents with the respiration of animals.
The inspiration of leaves has certain limits ; in prolonging their stay in the dark, the absorption becomes leas and leas; it eesses entirely when the leprep have condensed about thoir own volume of oxygen gas. And let it not be supposed that the nocturnal inspiration of leaves is the consequence of a merely mechanical action, comparable, for example, to that exerted by porous substances generally upon gases. The proof that it is not so is supplied by the fact that the same effects do not follow when leaves are immersed in carbonic acid,hydrogen,or nitrogen. In such circumstances, there is no
appreciable diminution of the atmosphere which surrounds the plant. The primary cause of the inspiration of oxygen by the leaves of living plants is, therefore, of a chemical nature. With the facts which have just been announced before us, it seems very probable that, during the nocturnal inspiration, the carbonic acid which appears is formed at the cost of carbon contained in the leaves, and that this acid is retained either wholly or in part, in proportion as the parenchyma of the leaf is more or less plentifully provided with water.
A plant that remains permanently in a dark place, exposed to the open air, loses carbon incessantly; the oxygen of the atmosphere then exerts an action that only terminates with the life of the plant: a result which is apparently in oppo sition to what takes place in an atmosphere of limited extent. But it is so, because in the free air the green parts of vegetables can never become entirely saturated with carionic acid, inasmuch as there is a ceaseless interchange going on between this gas, and the mass of the surrounding atmosphere; there is, then, incessant penetration of the gases,as it is called. There is a kind of slow combustion of the carbon of a plant which is abstracted from the reparative influence of the light.
The oxygen of the air also acts, but much less energetically, upon the organs of plants that do not possess a green color.

The roots buried in the ground are still subjected to the action of this gas. It is indeed well known that, to do their office properly, the soil must be soft and permeable, whence the repeated hoeinge and turnings of the soil, and the pains that are taken to give access to the air into the ground in so many of the operations of agriculture. The roots that penetrate to a great depth, such as those of many trees, are no less dependent on the same thing; the moisture that reaches them from without brings them the oxygen, in solution, which they require for their development. It is long since Dr. Stephen Hales showed that the interstices of vegetable earth still contained air mingled with a very considerable proportion of oxygen. The roots of vegetables, moreover,
appear generally to be stronger and more numerous as they are nearer the surface. In tropical countries, various plants have creeping rcots which often acquire dimensions little short of those of the trunk they feed.
If a root detached from the stem be introduced under a bell glass full of oxygen gas, the volume of the gas diminishes, carbonic acid is found, of which a portion only mingles with the gas of the receiver, a certain quantity being retained by the moisture of the root.
The volume of the gas thus retained is always less than that of the root itself, however long the experiment may be continued. In these circumstances, whether in the shade or in the sun, roots act precisely as leaves do when kept in the dark. Roots still connected with their stems give somewhat different results.
When the experiment is made with the stem and the leaves in the free air, while the roots are in a limited atmosphere of oxygen, they then abrorb several times their own volume of this gas. This is because the carbonic acid formed and absorbed is carried into the general system of the plant, where it is elaborated by the leaves if exposed to the same light, or simply exhaled if the plant be kept in the dark.
The presence of oxygen in the air which has access to the
oots is not merely favorable; it is absolutely indispensable roots is not merely favorable; it is absolutely indispensable
to the exercise of their functions. A plant, the stem and leaves of which are in the air, soon dies if its roots are in contact with pure carbonic acid, with hydrogen gas, or nitrogen. The use of oxygen, in the growth of the subterraneous parts of plants, explains why our annual plants, which have largely developed roots, require a friable and loose soil for their advantageous cultivation. This alfo onables us to un-
derstand why trees die when their roots are submerged derstand why trees die when their roots are submerged
in stagnant water, and why the effect of submersion in general is less iojurious when the water is running, such water always containing more air in solution than that which is stagnant.

MILK AS A DIET AND ITS EFFECT ON THE SYSTEM.
There is considerable difference of opinion on the subject of a milk diet. It is surrounded with a mass of whims, of prejudices, and of mistaken ideas, which are based more on
individual fancies than ùron certain fact. To one a glase of individual fancies than ur on certain fact. To one a glases of
milk imbibed is believed to be a sure provocation of a bilions atta $1 k$, to another, a disordered stomach, to a third, drowsiness, and so on, through such a category of simple though disagreeable ailments that we look aghast at the farmer who drains cup after cup of the freeh pure liquid, time and again during the day, and wonder at the resisting powers which his organization must possess. The truth is, however; that
milk is not unwholesome. On the contrary, it contains good milk is not unwholesome. On the contrary, it contains good
substantial bone, muscle,flesh, ard brain producing substances, which, assimilating, quickly act rapidly in building up the body. Naturally, we assert, it is nourishing; that it doen bring on certain troubles is nevertheless true, but the cause is in the individual stomach, not in the milk, provided, of course, the latter be freeh and sweet. The Commercial Advertiser of recent date has some excellent remarks on this subject which are well worthy of repetition. "Milk diluted with one third lime water," it is said, "will not cause any one biliousness or headache, and, if taken regularly, will so strengthen the stomach as to banish these disorders.
"It may be taken with acid of some kind when it does no easily digest. The idea that milk must not be eaten with pickles is not an intelligent one, as milk curdles in the stomach nearly as soon as it is swallowed. When milk is constipating, as it is frequently found to be by persons who
drink freely of it in the country in summer time, a little salt sprinkled in each glassful will prevent the difficulty. When it has an opposite effect, a few drops of brandy in each goblet of milk will obviate its purgative effect. As milk is so es sential to the health of our bodies, it is well to consider when to take it, and how. It is a mistake to drink milk be tween meals, or with food at the table. In the former case per to drink anything. After finishing each meal a goblet of pure milk should be drank; and if any one wishes to grow fleshy, a pint taken before retiring at night will soon cover the scrawniest bones. In cases of fever and summer complaint, milk is now given with excellent results. The idea that milk is "feverigh" has exploded, and it is now the physician's great reliance in bringing through typhoid patients, or those in too low a state to be nourished by solid food." Our contemporary, we notice, says that the persons with whom milk does not agree are the very ones who require it and whom it would probably regenerate, did they so prepare it as to make it palatable and suitable to their particular constitutions. Not exactly, we think. It should be remem bered that " what is one man's meat is another man's poison " is a very frequent case; and while, as we have above pointed out, milk may in perhaps a majority of instances be rendered agreeable to the stomach, still there are certain organizations which persistently refuse it in spite of any assisting admix ture. A similar illustration may be found in the case of wine; and we know of instances where persons, of otherwise strong digestion, are utterly unable to drink half a gill o even the purest grape jaice without experiencing the same
bilious and other derangements which many ascribe to milk. It is a fact, however, that for individuals troubled with dys pepsia, weak slomach,and kindred ills, milk has wrought remarkable and unexpected benefit, and the diet has in case among our own acquaintances resulted in great relief.
Milk drinking, particularly in this city, has during lat years received an unusual impetus through the establishment of dairies, or restaurants where the bill of fare is confined to few simple articles of farinaceous food and to generous bowls of milk and cream, retailed at very moäerate prices. The idea, we believe, originsted some five years ago in a small baker's shop, in one of the little down town streets,
which had a monopoly of the business for some time,making which had a monopoly of the business for some time,making large receipts. Others, being attraited by the gains, em
barked in the business, and now the dairy is as much a fix ture in New York city as the more pretentious restaurant As a matter of curiosity, we recently inquired of the man ager of the largest of these establishments as to the people who patronize the diet, and the effect of the increased de
mand upon the supply. His customers, he told us,comprised every class; the rich banker perches on the high stool beside his errand boy. Clergymen, lawyers, merchants, editors men whose reputation is world wide, throng into the doors, proving that,even if this sudden increase in milk drinking be merely a popula
The milk for the city is brought principally from Westchester and Dutchess counties in this State, and the neigh. boring counties in Connecticut. In the dairy above referred to, the stocks of several large farms are required to produce the necessary amount. Twelve handred quarts in cool
weather, and upwards of eighteen hundred quarts when the mercury makes excursions into the nineties, are daily consumed by an average of twenty.five hundred persons in the single establishment. This milk is sold at about ten cents a quart, realizing a fair profit.
The greater portion of the milk used in the city does not come direct to the seller, but goes through the same handling, by four or five " middle men," as the often doubtful fluid retailed by the peripatetic milkman. The farmer, for instance, binds himself to supply a certain number of cans to the contractor for a definite period, usually six months, at
the price of about 33 to 42 cents per can in summer or 45 cents in winter. The contractor receives the filled vessels from a collector, who gathers them from the different farms and deposits them at the railway stations. Under charge of the latter,they are transported in early trains to the city and sold at the depots to milkmon and dairy keepers at an adfamilies and grocers with the commodity, plus another profit which brings its cost to the consumer, as above stated to which brings its cost to

As to the quantity of milk daily consumed in New York, it is difficult to obtain any precise figures; but it is estimated that the supply does not fall short of two million quarts
every twenty-four hours. This on a rough calculation is the produce of some thirteen thoueand cows and an average of something over two quarts per diem to every soul of the population.

## THE RESPIRATION OF OXYGEN.

According to the older notions in regard to the prapision of Nature for the sustenance of life, the surrounding conditions have been expressly arranged for the benefit of aly living creatures, so as to secure not only their existence but, their welfare and comfort. According to late ideas, how.
ever, as the different living creatures were evolved undor previously existing conditions, the mode of their development was such as to accommodate the different organisms to these conditions; and when the conditions changed, a corresponding change occurred in the creatures themselves: those not adapted to the changed conditions perishing, and those most fit for the new era surviving and propagating their species. We will illustrate this by an example: In our at-
mosphere, the oxygen is diluted with very nearly four times mosphere, the oxygen is diluted with very nearly four times
its amount of nitrogen, and all the air-breathing animals,
including man, have become adapted to these conditions. If the amount of oxygen became less, a corresponding change would occur in the respiratory aystem, as is illustrated in the high lands of South America, where, by reason of the rarefied atmosphere, the amount of oxygen inhaled at each espiration is less than near the ocean level; and as a conequence, the human lungs are more developed there, and the nhabitants are remarkable for their largely developed cheats, allowing them to make up by quantity for the quality of the nspired air. The reverse is also the case ; it has been found that the effect of the compressed air (on those worimen whose constitutions allowed them to withstand the pressure and labor for some length of time in the caissons for the foundations of the Mississippi bridge at St. Louig, Mo., and the East river bridge, New York) was to narrow the volume of the chest, while deep respirations of the highly compressed air were painful.
Now comes an interesting discovery of M. P. Bert, who inds that it is not alone the pressure which is hurtful to he system, which can soon accommodate itself to it, but chiefly the concentration of the oxygen, which even acts like a most violent poison when inhaled pure, under a preasure of three or four atmospheres; consequently when (under a pressure of some 90 or more pounds to the square inch) an amount of oxygen surpassing the normal quantity some six or more times is inhaled at every respiration, its hurtful effects manifest themselves, one of them being a very great ncrease in animal heat, with a disturbed pulse; thin, of course,adds largely to the discomfort. This factsuggests that men who have to submit to conditions of greatly increased atmospheric pressure would be relieved and benefitted by inhaling an artificial atmosphere containing less than the normal amount of oxygen, 10 per cent oxygen to 90 of nitrogen for two atmospheres pressure, 5 per cent oxygen and 95 nitrogen for four atmospheres, and so on. The value of this suggestion is strengthened by the French physicist De Fonvielle, who maintains that the discomfort experienced by travelers on high mountain peaks, or by aeronaut when ascending to high altitudes, is not so much caused by the diminished atmospheric pressure as by the want of oxygen, which, in that rarefied condition, is not given to the lungs in sufficient quantity. He suggested, therefore, the inhalation of pure oxygen at those high altitudes; and two balloonists, Sivel and Croce. Sf inelli, have verified this theory during a recent ascent in the balloon Ettoile Polaire. M. Croce-Spinelli, when he had reached a hight of 16,400 feet, experienced a strong feeling of suffocation; he then resorted to the inhalation of pure oxygen (enclosed in a large rubber bag with which he was provided), and became not only relieved, but ecovered his normal condition of perfect comfort. The effect on the pulse was remarkable: while below it was 86 beats per minute, it rose, at a hight of 16,000 feet, to 140 ; when oxygen was respired, it descended at once to 120.
The published account of this ascent adds the following: When not using the respirator, the skies appeared to the bservers quite dark; but when freely respiring the oxygen, the blue color of the heavens was restored." As the blue color of the sky is due to the refraction of the solar light in the atmosphere, it is an objective phenomenon, and cannot be seen at such high altitudes, where there is little of the atmosphere (and that little very rarefied) left above the observer. The atatement that the blue color was restored by the inhalation of the oxygen would infer that the hueis aub jective and due to the condition of our eyes, induced by breathing the gan.
In regard to the hight which travelers are able to attain, we may state that Alexander von Humboldt, in his ascent of Chimborazo, was compelled to stop at a hight of 16,000 reet, at which point he had to give up from suffocation; but In late years the brothers Schlagintweit ascended the Himaayas, and slept all night in bivouac at a hight of 19,200 feet and later ascended the peak Ibi Gamin, 22,200 feet high.
The English astronomer Mr. Glaisher claims that he has sconded to a hight of 26,000 feet without feeling any difcomfort, and that only when reaching 32,000 feet he experionced any very serious feeling of suffocation. No doubt, different constitutions are differently affected; some are unable to resist diminished atmosphoric preasures, others increased preasure. We met even last aummer a consump. tive individual on Mount Washington (which is not much over 6,000 feet high), who stated that he felt suoh a feeling of suffocation that he was obliged to hastan down on the same day.

## THE AMERICAN SOCIAL SCIENCE CONGRESS.

The American Social Science Congress will hold its annual sersion in New York city, commencing on May 19 and terminating on May 23. The title of this institution is broad enough to cover a vast field of useful knowledge,and the subjects for investigation are very numerous and interesting Mr. George W. Curtis will preside, and papers by Rev. Dr. Woolsey on exemption of private property from capture at sea, by Mr. W. C. Flagg on the farmers' movement, by sea, by Mr. Wil. C. Flagg on the farmers movement, by
President Gilman on California, by Hon. D. A. Wells on taxation, by Professor Peirce on ocean lanes for steamshjp navigation, by Mr. G. G. Hubbard on railroads, and by Professor Sumner on the Finance Department, will be read Many other papers relating to public health, penal institutions, charity, and kindred subjects are promised, and the Boards of Health and Public Charitien will probably be in session on the same days.

The bill bofore Congresm for the grant of national aid to the extent of three millions of dollars in behalf of the Oentennial Exchibition hae been defeated.

## New EIghty-one Tun Gun.

Only two years ago the sobriquet "Woolwich infant"was playfally applied to a gun which had just been constructed in the gun factories of the Royal Arsenal at Woolwich, of the then unprecedented size of thirty-five tuns. Recent events have, however, proved that the name was by no means ill chosen, for a decision has been arrived at which will necessitate our viewing tinis gun actually in the light of a mere baby, a series of monstrous successors having been designed which will putits nose out of joint altogether. The first four of these, which are intended to form the armament of the future ironclad Inflexible, will be proceeded with so soon as the experimental one, which is the subject of the present paper, has been completed and proved.
The new gun will, it is expected, be of 2 weight slightly over or slightly under eighty one tuns. Its total length, ineighty one tuns. Its total length, in-
cluding the plugscrewed in at the breech end, 27 feet; the length of bore, 24 feet; the caliber will, in the first instance, be 14 inches, but ample provision is made in the thickness of the steel tube to increase that figure to 16 inches, if deemed desirable. The rifling has not as yet been decided on, but will be a maiter for consideration as the gun approaches completion, by which time the result of the present series of experiments with the $\frac{35}{38}$ tun gun will doubtless have thrown considerable light upon this vered question. The trunnions are to be 16 inches in diameter. The internal construction is similar to that of the 10 inch gun and upwards, except that the chase is divided into three portions instead of two.
The accompanying engraving will give some idea of the appearance of the proposed gun, and exhibits the grandeur of its proportions as compared even with those of its colossal predecessor. The 7 inch gun is also shown as demonstra. ting the immense advance that has taken place in modern artillery during the past eight years. When we consider that it was positively stated, when the 7 inch gun was produced, that we had attained the highest point we should ever reach in weight of metal, it seems almost incredible that in less than a de. cade we should be in possession of artillery twelve times as heavy. One is almost tempted to pervert the Latin proverb, and exclaim: "Tempora mutantur et arma mutantur in illis.
Neither the weight of projectile nor quantity of powder to be contained in the cartiidge for the 81 tun gun has been positively fixed, but the first will probably range botween $1,000 \mathrm{lbs}$. and $1,200 \mathrm{lbs}$, while the secondmay be estimated at about one sixth of that amount. In the following calcu. tions as to the probable energy of the new gun, or force of impact of its projectile, at the various ranges specified, three weights of shot or shell are respectively dealt with of 1,000 lbs., 1,100 lbs., and 1,200 lbs. An initial velocity has been assumed in all cases at the muzzle of the gun of 1,800 feet per second. It would possibly be considerably greater, but we desire to be within the mark. Working by the well known formula:

The energy in vis viva in pounds $=\frac{\mathrm{WV}^{2}}{2 g}$
, where $\mathbf{W}=$ weight of projectile in lbs., $\mathbf{V}=$ velocity in feet,
$g=$ force of gravity ( $32 \cdot 2$ ),
we find at the muzzle for the 1,000 lbs. projectile a blow of 11,715 foot.tuns, for the 1,100 lbs. projectile one of 12,886 foot-cuns, and for the 1,200 lbs. projectile the terrific force of 14,058 foot-tuns! These forces would, of course, be considerably enhauced by the higher velocity which would doubtless be obtained. When we compare such energies with those of the 35 tun and 7 inch guns, namely, 8,404 and 1,855 tuns, respectively, the latter sink into utter insignificance.

The actual penetrating powers of the 81 tun gun, as distinguished from the striking or racking powers, can only be decided by experiment. With the earlier natures of heavy ordnance, such as the 7 inch and 8 inch, a rough rule gave the penetrative or punching power as 1 inch in excess of the diameter of the projectile. Thus the 8 inch gan would penetrate armor 9 inches thick at a moderate distance. But as we ascend the series, this power developes itself in an increasing ratio, the 10 inch gun piercing armor of 12 inches in thickness, but not going through the backing; while the 12 inch gun of 36 tuns easily pierces 14 inches armor and backing, and only is arrested by the latter after going through 15 inch targets. Hence we may reasonably estimate the power of the gun now under consideration as capable of penetrating at least 19 inches or 20 inches of armor plates and their backing, at a distance of, aay, 500 yards. We are aware, of course, that by increasing the diameter of the bore to 16 inches, the charge remaining the same, a loss of penetrative power would result, but we anticipate that (by employment in making up the cartridges of the slow-burning $1 \frac{1}{2}$ inches or 2 inch cubes of pebble powder, some of which have been manufactured at Waltham Abbey, and with which good velocities and low pressures were obtained in recent experiments with the 38 tungun at the proof butts), as the caliber is increased, so the charge may be increased in proportion. That the 81 tun gan will ultimately have a calib
of certainly 5 inches, we little doubt.-The Engincer.

THE POLAS CLOCK-THE TIME OF DAY 8HOWN BY COLORS.
One of the most beautiful practical applications of the polarizing instrument is presented in Sir Charles Wheatstone's polar clock, shown in our engravings and described in the following passage by the inventor:
" At the extremity of a vertical pillar is fixed, within a brass ring, a glass disk, so inclined that its plane is perpen dicular to the polar axis of the earth. On the lower half of this disk is a graduated semicircle, divided into twelve parts (each of which is again subdivided into five or ten parts), and against the divisions the hours of the day are marked, commencing and terminating with VI. Within the fixed brass ring, containing the glass dial plate, the broad end of a coni-

81 tun gun. projectile 1,200 lbs. Cartridge 200 lbs.


35 tun gun. projectile 115 lbs. Cartridge 110 lbs.
 so fitted that it freely moves round its own axio this broad end is closed by another glass disk, in the center
of which is a small star or other figure, formed of thin film of which is a small star or other figure, formed of thin films of selenite, exhibiting when examined with polarized ligh
strongly contrasted colors; and 2 hand is painted in such a position as to be a prolongation of one of the principal sections of the crystaline films. At the smaller end of the conical tube a Nicol's prism is fixed so that either of its diagonals shall be $45^{\circ}$ from tho principal section of the selenite films. The instrument being so fixed that the axis of the conical tube shall coincide with the polar axis of the earth, and the eye of the observer being placed to the Nicol's prism, it will be remarked that the selenite star will, in general, be richly colored; but as the tube is turned on its axis the colors will vary in intensity, and in two positions will entirely disappear. In one of these positions a amaller circular disk in the center of the star will be a certain color (red, for instance), while in the other position it will exhibit the complementary color. This effect is obtained by placing the principal section of the small central disk $221^{\circ}$ from that of the other films of selenite which form the star. The rule to ascortain the time by this instrument is as follows: The tube must be turned round by the hand of the observer until the color star entirely disappears while the disk in the center re mains red; the hand will then point accurately to the hour. The accuracy with which the solar time may be indicated by

Fig. 1.
Fig. 2.


Wheatstone's Polar Clock.
this means will depend on the exactness with which the this means will depend on the exactness with which the
place of polarization can be determined; one degree or
change in the plane corresponds with four minutes of solar ime.
The instrument may be furnished with a graduated quadrant for the purpose of adapting it to any latitude ; but if it be intended to be fixed in any locality, it may be perma. nently adjusted to the proper polar elevation and the expense of the graduated quadrant be saved; a spirit level will be useful to adjast it accurately. The instrument might be set to its proper azimuth by the sun's shadow at noon, or by means of a declination needle; but an observation with the instrument itself may be more readily employed for this purpose. Ascertain the true solar time by means of a good watch and a time equation table, set the hand of the polar clock to correspond thereto, and turn the vertical pillar on its axis until the colors of the selenite star entirely disappear. The instrument then will be properly adjusted.
" The advantages a polar clock possesses over a sun dial are: 1st. The polar clock being constantly directed to the same point of the eky, there is no locality in which it cannot be employed, whereas, in order that the indications of a sun dial should be observed during the whole day, no obstacle must exist: at any time between the dial and the. places of the sun, and it therefore cannot be applied in any confined situation. The polar clock is consequently applicable in places where a sun dial would be of no avail : on the north side. of a mountain or of a lofty building, forinstance. 2d. It will continue to indicate the time after sunset and before sunrise, in fact, so long as any portion of the rays of the sun are reflected from the atmosphere. 3d. It will also indicate the time, but with less accuracy, when the sky is overcast, if the clouds. do not exceed a certain density.
"The plane of polarization of the north pole of the sky mover in the opposite direction to that of the hand of a watch; it is more convenient therefore to have the hours graduated on the lower semicircle, for the figaree will then be read in theirdirect order, wherethey would be read backworde on an as they would be read backwards on an upper semicircle. In ihe southern:
hemisphere the upper semicircle should be employed, for the plane of polarization of the south pole of the sky changes in the same direction as the hand of a watch. If both the upper and lower semicircles be graduated, the same instrament will serve equally for both hemispheres.
"The following is a description of one among several other forms of the polar clork which have been devised. This Fig. 8), though ruch lese accurate in its indications than the preceding, beautifully illustrates the principle.

Fig. 3.


Selenite Polar Clock.
"On a plate of glass twenty-five films of selenite of equal thickness are arranged at equal distances radially in a semicircle; they are so placed that the line bisecting the principal sections of the films shall correspond with the radil respectively, and figures corresponding to the hours are painted above each film in regular order. This plate of glass is fixed in a frame so that its plane is inclined to the horizon $38^{\circ} 32^{\prime}$, the complement of the polar elevation; the light, passing perpendicularly through this plate, falls at the polarizing angle, $56^{\circ} 45^{\prime}$, on a reflector of black glass, which is inclined $18^{\circ} 13^{\prime}$ to the horizon. This apparatus being properly adjusted, that is, so that the glass dial plate shall be perpendicular to the polar axis of the earth, the following will be the effects when presented towards an unclouded sky: At all times of the day the radii will appear of various shades of two complementary colors, which we will assume to be red and green, and the hour is indicated by the figure placed opposite the radius which contains the mostred; the half hour is indicated by the equality of two adjacent tinte."

A Correction.-An accidental error exists in the description of the bolt cutter of the Wood and Light Machine Co., which appeared on the first page of our issue of May 9. The beginning of the detailed reference should read: " $A$ is the face plate of the die holder," etc. Instead of the following sentence should appear : B is the head, caused to revolve by proper mechaniom, through which passes a mandrel, moving freely back and forth, in the spindle, $\mathbf{C}$.

THE green color of the boron flame maybe very well shown by boiling a mirture of boracic acid, alcohol, and aulphuric by boiling a mirture of boracic and igniting the vapor.
acid,

## HYDRAULIC RIVETING MACHIEE.

It is now no unusual thing to have boilers in use at sea with plates of one inch and even upwards in thickness. Such boilers require to be constructed with rivets of sizes that cannot be astisfactorily set up by mere manual labor; and of late years, after many applications of steam and gearing for this purpose, hydraulic power has been employed with the best results.
The first thing that strikes an observer of this new process, is the entire absence of that most deafening noise, the usual accompaniment of ordinary riveting; and a little further attention will show that this absence of noise is its least merit. By the quiet, steady pressure, rivets are enlarged throughout their length, and fill up all roughness or irregularities inside the punched holes they enter, so that they remain firmly fixed, even when one or both of the heads are cut off, and must be drilled out altogether should it ever be necessary to remove them. The pressure not only forms heads on the rivets, and effects the above named compression, but it holds them up, and the plates also, close together, until the former are sutticiently cooled to bear the strain, and even draws the plates closer together by subsequent contraction.
Our illustration shows Messrs. McKay and Macgeorge's patent hydraulic riveter which bas been for some time in use at the Millwall Docks Engineering Works, London. This machine is one of the most powerful of its class, and gives a pressure of 60 tuns upon the rivet, an amoun abundantly sufficient for the largest class of boiler work hitherto required for marine engines. Above the machine stands a powerful traveling crane, from which boilers are suspended over it, their (ordi nary) horizontal axis, of course, then be ing in a vertical position. Circular seams of rivets are brought to the machine by the simple process of turning the boile round on a swivel, and vertical seams, by raising or lowering it in the usual manner with mechanical arrangements of this class.
The pressure is derived from an accu mulator, and it amounts to 700 lbs. per square inch in the present case. This pressure is only admitted into the large cylinder when the dies come in contac with the hot rivet, the slack being taken up by the action of a smaller cylinder. By this arrangement a considerable saving of power is effected; for if the large cylinder took its supply and moved the levers their entire distance by accumulator pressure, it is evident that great waste of powar would ensue thereby, and in al direct acting steam-riveting machines thi direct acting steam-riveting machines thin
from the nature of their construction.

The hydraulic cylinder, and all val The hydraulic cylinder, and all valves, levers, weights, etc., are placed in a pit below ground, clear out of the way of men working, and safe from frost or accidental injury. Of course the pit is covered over, and in winter carefully protected from cold; and where, as is sometimes the case, these machines stand practically out of doors, a precaution of this kind should never be neglected.
The upper end of the powerful cast iron levers which form the most conspicuous part of this machine are perfectly free from all surroundings, except only a conveniently placed handle for starting or reversing; this handle stands behind one of the levers, and therefore does not appear in the present illustration. These levers are so strong that any accidental blow given to them can do no harm; and the readient access is obtained to every part of the machine. Steel dies are simply placed in bored holes, and naturally hold themselves there.
When all is prepared, and a heated rivet in position, a movement of the handle admits high pressure water to the smaller cylinder, the dies rapidly close upon the rivet, the self-acting valves admlt water to the larger cylinder, and without noise or vibration, the work is done. The dull, heavy pressure crushes together the thick plates; and after holding them and the rivet together for a moment that the latter may cool, the pressure is released, the dies recede, another rivet is soon completad, and a boiler is finished with astonishing ease and rapidity.
The distance, from the center shaft on which both levers work to the dies or center of the hydraulic cylinder, is 6 feet in the present case; so that, after deducting the center bearing and wrought iron straps to carry the tensile atrain, there remains a clear space of 5 feet for boiler plates, and this is found to be ample for the several classes of work for which this particular machine is used.-The Engineer.

## Now Australian Trees and Plante.

Mr. Walter Hill, the Government botanist, has reported to the Queensland Secretary for Lands that his party have ex amined the banks of the Mulgrave, Russell, Mossman, Daintree, and Hull rivers, and have been more or less successful in finding suitable land for sugar and other tropical and semi-tropical productions. The ascent of the summit of Bellenden Kerr was successfully made by Johnstone, Hill, and eight troopers. At 2,500 feet in hight they observed an
undescribed tree with crimson flowers, which excels the poinciana regia, colvillia racemosa, lagerestroma regia, and the jacaranda mimosifolia. At 4,400 feet a tree fern, which will excal in grandeur all others of the alboreous class. A palm tree at the same hight which will rival any of the British.Indian species in gracefulness. "On the banks of the Daintree we saw a palm tree cocoa, which far exceeds the unique specimens in the garden of the same genera from Brazil in grandeur and gracofulness. While cutting a given line on the banks of the river Johnstone, for the purpose of examining the land, an enormous fig tree stood in the way, far exceeding in stoutness and grandeur the renowned forest giants of California and Victoria. Three feet from the

to the British Medical Journal, confirms this statement, and ays that it is of the greatest value as a local application in neuralgia. Mr. Browne, having employed it during several months, has found great and sometimes instantaneous relief o follow its application in every case. It is only necessary o paint the mixture lightly over the painful part and allow it to dry. The application never blisters, though it may oc casion a tingling sensation of the skin. The compound has lso been found of great service in the relief of toothache. -Pharmaceutical Journal.

## Death Valley.

According to the recent expeditionary report of Lieutenant Wheeler, the Death Valley in Californis is a detrital sink of unique physical characteristics. This whole region presents a series of valleys or detrital plains, each ontirely inclosed by the ridges of Cordil leras that are more or less distinct as a series of mountain masses. The Death Valley proper is one of the most remark able of all known interior continental depressions, and has portiona near the cen ter of its axial line below the level of the sea, although far inland, and lying much to the north of the lower border of the grest interior basin. It is the aint of the Amargose river, which has its source the $\Delta$ argos rive, which has its source n the areas of dre th south.and east of Belmont, Nevada, tra verses the desert of that name while passing southward, until, reaching lat. $35^{\circ} 41^{\prime} 5^{\prime \prime}$, it makes an abrupt angle to the west, and thence, at right angles to the north, reaches the point of greatest depression, a little less than 500 feet be; low the sea level, in the heart of Death Valley proper. This valley, of the ordinary oval form, is fully 70 miles in length, varying from 5 to 15 miles in width, surrounded by frowning moun. tains of volcanic and sedimentary origin, the Telescope range, rising higher than 10,000 feet. The line crossing this dismal area from the mouth of Death Val ley cañon to the thermal springs in Furnace creek, presenting a labyrinthine maze of efflorescent, saline forms, create at the level of vision a ministur ocean, the vibrations of whose contorte waves has a sickening effect upon the senses. The lurid glare, horizoned by the bluish haze radiated from the mountain sides, appears focussed to this pit, though broad in expanse. It seems, coupled with the extreme heat, to call for the utmost powers of mental and phyaical endurance.

## HYDRAULIC RIVETING MACHINE.

ground it measured 150 feet in circumference; at 55 feet, where it sent forth giant branches, the stem was nearly 80 feet in circumference. The river Johnstone, within a lim. ited distance from the coast, offers the first and best induce ments to sugar cultivation."

## Effect or Pipe Smoking on Teeth

Dr. Erich Richter, of Ula, Col., gives, in Dental Cosmos, the accompanying engraving of dental abrasion from the use of clay pipes. The patient, a miner, a native of Germany, addicted to smoking, could not refrain from it even while at work. It was his custom, while using the pick or shovel, to support the pipe between the canines and first bicuspids, and, when making heavy strokes, the pipe would move a little. After a few years he could close his teeth and still have room for the pipe.


The accompanying diagram illustrates the effect upon the teeth. The left superior cuspid is worn down nearly to the gam, and looks as though it had been filed for pivoting and then polished. The pulp cavity is not exposed, but is covered with so thin a layer of dentine as to make the touch of an instrument painful. The other abrasions are all in the form of a segment of a circle, and are all highly polished. The second left lower and the first upper bisuspids have been extrac
bedly.

Now Local Anæuthetic.
Some time since the Medical Record quoted from an American source a statement that if camphor be powdered by rubbing it in a mortar with a few drops of spirit, and an equal weight of chloral hydrate added, a liquid is produced which is a valuable local anæathetic. Mr. Lennox Browne, writing

The journey through the Valley of sion, evinced through the octire seas the utmost apprehen the effect of the fearful cloud burst experienced while among the Telescops mountains, to the west, and the abence of the guide who had ventured toward the northwest orn arn of the valley, it was feared to return no more. The transit of 48 hours, in a temperature that remained at $117^{\circ}$ Fah. at midnight, so exhausted both men and animals that further travel was rendered precarious.

Tenting Dyen for Adulteration.
Red dyes must neither color soap and water nor lime wa. er, nor must they themselves become yellow or brown after boiling. This test shows the presence or absence of Brazil wood, archil, safflower, sandal wood, and the aniline colors. Yellow dyes must stand being boiled with alcohol, water, and ime water. The most stable yellow is madder yellow; the east stableare anatto and turmeric: fustic is rather better. Blue dyes must not color alcohol reddish, nor must they decompose on boiling with hydrochloric acid. The best purple colors are composed of indigo and cochineal, or purpurin. The ormer test applies also to them. Orange dyes must color neither water nor alcohol on boiling; green, neither alcohol nor hydrochloric acid. Brown dyes must not lose their color on standing with alcohol, or on boiling with water. If black colors have a basis of indigo, they turn greenish or blue on boiling with sodium carbonate; if the dye be pure gall nuts, it turns brown. If the material changes to red on boiling with hydrochloric acid, the coloring matter is logwood without a basis of indigo, and is not durable. If it changes to blue, indigo is present.-Dingler's Polytechnisches Journal.

## Phosphoric Acid on Oats.

E. Wolff describes water culture experiments in which the nourishing solutions, eight in number, supplied graduated quantities of phosphoric acid. The percentage of phospboric acid in the dry crop varied with the amount supplied. When this percentage fell below 0.33 (with good field oats it is abont $0 \cdot 44$ ) the amount of straw seriously diminished, but an increase of phosphoric acid above this point did not increase the straw. The corn, however, was greatly affected by an increased supply, and gave by much the largest yield when the phosphoric acid reached $1 \cdot 11$ per cent of the dry crop. The ash of the straw contained no silica, none having been supplied; its percentage of phosphoric acid was $4.4-18.9$, that in the ash of field oats (silica deducted) being $9 \cdot 1$. In the ash of the corn, the phosphoric acid varied only from $87 \cdot 7$ - $43 \cdot 9$ per ceart, the percentage in the ash of field oats being $41 \cdot 3$.

## Cotrespouftuce.

## Notes from Washington, D. C.

## To the Editor of the Scientific American

The Hon. M. D. Leggett, Commissioner of Patents, having been the subject of a series of scurrilous and defamatory articles in a disreputable paper, published in this city, and called the Capitol, has thought proper to strike back, and in a letter to the Zanesville Daily Courier makes public a variety of facts concerning the personal history of the editor author of the paper in question, which are anything but complimentary.
Donn Piatt, the editor of the paper, values the character thus given him by the Commissioner at about $\$ 20,000$, and has therefore brought a libel suit for the above amount. The case will probably come on for trial at the November term of this year, when we may expect to hear the truth about some very peculiar transactions that are now only vaguely hinted at
The ordinary business of the Office is still increasing, the number of patents issued during the month of April being 1,204 , or an average of 301 per week. The weekly average for the corresponding period of last year was only 263.

Among the patents lately issued is one for electro plating with cobalt, which,it is stated, will form a thick and useful covering that perfectly protects the plated surface from the action of the elements, and the coating is said to be very white, exceedingly hard and durable, tenacious, adherent, and not liable to tarnish
For many years past there has been an ugly pile of mar ble in this city, which has been an eyesore to our own people and a wonder to the visitors here: a wonder what it was originally designed for and (when informed) a wonder at its unfinished state. I refer to the Washington Monament, which in its present appearance suggests a cross between a factory chimney and a shot tower ; and if ever finished,'it will serve more as a memento of the want of taste in its design than as an honor to Washington. For ten or twelve years past nothing has been done $t$ t it, owing mainly to a lack of funds, which the wretchedly poor design has probably funds, which the wretchedly poor design has probably
caused, and partly to a very strong suspicion that the founcaused, and partly to a very strong suspicion that the foun-
dation is not strong enough to carry the immense weight which finishing the monument, according to the original deaign, would bring to bear on it. In view of this, Senator Morrill proposes that the material in it should be used to form a large monumental arch, by which plan, it is thought, a atructure that would not diagrace him in whose honor it was raised may be erected at less expense than it would take to finish the present abortion.
Mr. Sutro, of Sutro tunnel fame, is in this city looking after his interests before Congress, and has been giving a series of entertaining lectures on mines and mining. I shall send you a few inceresting items therefrom in my next.
Washington, May 19, 1874.
Occasional.

## The Overfiow of the Miseismippi.

To the Editor of the Scientific American.
The Mississippi river, its relation to commerce and agriculture, ànd especially the protection of these alluvial lands culture, and especially the protection of these alluvial lands
by the restriction of the waters which flow near, through, by the restriction of the waters which flow near, through,
and now over many of them, are points of vital interest to a large section of the great South.
As the Mississippi valley is the home of our chief staple, the nation should have yielded all the aid she lawfully could to every scheme looking to the protection of those lands and to enriching, draining, and cultivating them in a proper and scientific manner; but the government has absolutely refused to do anything,and has altogether withdrawn any semblance of encouragement to agriculture in this region. The water that irrigates this great valley turns the spindles of the Eastern and Middle States. Thousands of the laboring classes of these sections find the bread that we cast upon these waters come to them.
At this time, the condition of this country is attracting unusual attention. The overflow in the Miesissippi valley, the consequent damages to the crops, extending perhaps to an entire failure and the terrible results following the same, direct our notice and the action that should arise therefrom to the experience of those whose knowledge of the locality oxtends over a series of many years. In looking for protection from these, waters by embankments called levees, and endesvoring to place metes and bounds to this inland sea, we must admit that the treatment has failed. Levees have proved useless on smaller streams; and agriculturists on the lands of this river, who have had the advantage of twen-ty-five or fifty years experience, and who were, for the most part, in favor of the levee system as now used, are convinced
that it is and always will be a failure. If it could be successful, the advantage is not sufficient to justify the expense. That the lands are more productive, that better crops of corn and co

## cannot be doubted.

During the last half century, there has been but one year in which a crop could not have been made as well and better without a levee than with one. That year was 1858. Land sellers, speculators, and theorists on the subject, are the only advocates of that levee aystem. What we wish to find is nome better system of protection. There are two ideas provalent among practical men who acknowledge the inexpediency of the present system of protection. The one is to straighten the river and levee the outlets; the other is to divert the volume of water by caneling the upper portion of the river and the largent tributarien, and thereby lessen the quantity of water and the danger to this region, and also to level the outlets, as in the other suggestions. Fither
of these ideas, practically applied, would succeed in the direction of protection to these overflowed lands. And it would be much better judgment on the part of the nation to discass these ideas in a practical way before expending the public money on a scheme for the protection of the cotton region. The application of these ideas needs science and capital. The government can command both; and as it is a subject of eminent national import, the nation ought to take the matter in hand. It would be a public benefaction;
and the whole country, the readers of your valuable paper, would be greatly interested in the discussion of the scientific aspect of this subject.
Austin, Mise.
J. F. S.

## Boller Explosion at'Philadelphia.

To the Editor of the Scientific American:
On the 8th instant,about 3 o'clock P. M., a plain cylinder boiler exploded at the Keystone Mills on Callowhill street, owned by Mr. Henry Hoppen, who rents portions out to manufacturers, with power. The boiler room was located outside of the mill and contained 6 plain cylinder boilers set on the oven plan, in sets of two each, with separate feed, blow off and gafoty valves for each set. The two sets next to the mill wall have been in constant use in their present position for the past 8 years. The other two have been out of use pection of the Hartford Boiler Insurance Company. Owing to getting in a bad lot of coal, the four boilers in use would not maintain pressure to drive the engine up to speed. The other two were fired up a few days back so as to bring up the pressure ( 60 pounds per square inch) necessary to ran tbe mill at apeed. All seemed right until a short time previous to the explosion, when the engineer, Hugh Sweeny, found the outaide boiler was leaking. He immediately hauled hi fire from this set, and was in the act of blowing them off when the explosion took place. He was badly scalded, as also was Thomas Devoe, a lad 13 years old who was employed in the mill. Both of them died on the morning of May 10. On making an examination of the boiler, I find that it parted at the junction of the second and third rime, through the line of rivets a part of the way. The fourth rim had a now piece along its whole length and about 17 inches wide, which, Mr. Hoppen says, was ordered to be done by the inspector of the Hartford Boiler Insurance Com pany. My examination shows that the boiler has been cracked through the line of rivets at the point of rupture, no doubt for some years back, as there are no signs of junctions of metals, at the point of separation, in two places of over 2 feet in length.
How the inspector of the Hartford Company and the boilermakers who put on the new patch could have over looked these cracks passes my comprehension. I am eatis fed if the hammer test had been properly applied, followed by the hydraulic.pressure, the patch would have shown itself defective. The cause of the explosion is therefore ob vious; it exploded from wear and tear, having been in use
some 25 years. The average duration of boiler life is 10 years.
This latter is objectgd to by some people from the fact that a large number of boilers older than the above are working older than the above and have done so for yeare with steam of an equal or even a greater pressure; atill hey are continuing to do no only at a riak, and their pasi exemption is no security against explosion in the future. A year ago a boiler exploded which was 20 years old.and killed 11 persons. This boiler, over 25 years old, has killed 2 per sons. Now I believe that 13 human lives are worth more than all the boilers over ten years old in this city. The law should be that a boiler after ten year's use,no matter its condi tion, should be replaced. Our railroad companies understand this; after a car wheel has run a certain number of miles it is condemned, and why ahould not boilers be also? Man ars out by use, and so does iron.
W. barnet le van.

## A National Museum or Sctence

To the Editor of the Scientific American:
Would it not be an appropriate and beneficial mode of celebrating our Centennial, for Congress to make an appro priation for the erection of a maseum of natural history, mineralogy, and geology, the corner stone of which should be laid on July 4, 1876? It seems to me that it is a national diggrace that a country which is so wealthy, and one which possesses within itself so much material to make a first clase museum of the above description, should be contented with the miscellaneous collections now in the Smithsonian Institution, which has been supported almost entirely by the bounty of a foreigner. Let us leave to that institution the formation and development of an archæological and ethnological museum, and iet the nation excel the world in the magnificence of its natural history collections, for we can scarcely hope to rival European nations in our strictly ar collections.
Now that the time of the year is approaching when ou various scientific and educational bodies will hold their an nual meetinga, I think it would be well for them to take sorae action upon the subject, and, by memorials, show Congres that there is a large body of learned and thinking men in the country who have arrived at the conclusion that the time has come when our Government, "of and for the people," should expend annually as large a sum, in behalf of science, literature, and the useful arts, as it now expends in support ing one regiment of soldiers or one ship of war. I firmly believe (after extensive travels) that our people are the most iterented of any in the world in scientific parsuits; and
country in this way, without the aids which even the smallesz foreign nation extends to its investigators, I think that, Whin such aid, a very few years will not fail to see our land the home of the sciences, and filled with stadents from abroad. But at any rate, we ought to be as far progressed and civilized as Russia now is ; but at present we are fal be hind even her in our national liberality to culture and earning.
Chicago, Ill
s. G. L.

## The Ante of Brazill.

To the Editor of the Scientific American
An article on the army ants of Central America, their doings, habits, etc., in a recent number of your journal bringa to my mind some observations, which I made several years ago concerning a species of ants, inhabitants of the country along the banks of the Uruguay and Paraña rivers in South America, on parallel $35^{\circ}$ S. latitude. Their habitations con sist of mounds, some of which are at least ten feet in diameter, and rise above the ground some three or four feet. These mounds seem to be built of coarse grass (a sort of bent, common to that section of the country), intermixed with soil. At the base, at intervals of about a foot, were arches, about $\frac{1}{2}$ inch wide and the same hight in the center for ingress and egress. The country is rolling, lying en tirely open, with an occasional patch of dwarf trees on some high knoll, and ravines fringed with trees of larger growth. There are here and there roads, which are really nothing more than cattle trails, leading from the estanchios in the camp to the saladuos (salting establishments) which are situ ated near the river.
One of the large mounds was situated within a few feet of one of these trails; and as I was walking along the trail, I noticed that the front of the mound had a different appearance from any I had seen. So I examined it, and found all the ports on the front barricaded. All the rest of the way round, the ports were open and the ants were passing out seeming very diligent about their business. From each of these little ports or doors leads a path, away into the camp or open country. The first, next the trail, ran nearly paral lel, and I traced it more than a quarter of a mile. From the other ports, the paths led off, as spokes from the nave of a wheel.
To watch these ants and see them work and give tokens of recognition as they met each other was very interesting Each ant, on leaving the fortress, took his path and hurried away; and, on meeting some particular friend, would stop and apparently shake hands and pass on. Returning, each ant would have a piece of the stal'i of the grass, from a half nch to an inch long on his shoulder, as a soldier would carry his musket at easy march. When they arrived at the fort ress, they would dip down the forward end of their load and march in as naturally as human beings could ; and by steadily watching them for a while, you would almost imagine hat they were human beings on a small scale.
Stratford, Conn. Truman Hotcheiss.

## Bunsen's Battery Improved.

To the Editor of the Scientific American:
While Bunsen's battery is one of the most intense in use, considering its cost, there are two serious objections to its general adoption. The first is a want of continuous action, which renders it entirely unfit for many purposes ; secondly the offensive and deleterious vapor, which arises from it while in action, is an objection of scarcely less importance. I have been laboring for some time to improve the constancy of this form of battery, while at the same time preserving its intensity ; and this I have accomplished by filling the porous cup around the carbon with coarsely powdered (it should be powdered about as fine as gunpowder) graphite, which is a hard substance obtained from the inside of gas retorts. The battery is set in action by moistening the powder with nitric acid, which is done by pouring a tew spoon fuls into the porous cup. I have found that the current developed by this arrangement will be sustained for a long period of time, while its intensity is equal, if not superior, to that when acid alone is used. The poisonous vapor arising from the battery is very little, owing to the small quantity of acid employed.
There is, however, a circumstance attending the use of this battery, on which it will be well to make a remark. Sometimes, in making connections with the carbon, a screw is forced into it; and when this is the case, the screw becomes corroded and partially cuts off the current, and in some nstances I have known it to cut the connection almost en tirely off. If the points of the screws were plated with platinum or gold, the difficulty would be completely over-

Friendsville, 111.
James Pool.

But few persons are aware of the magnitude and perfection to which the manufacture of doorsand window blinds by machinery has arrived in the United Slates. It is stated by those who profess to know that the number of doors alone made within the one State of New York, exceeds 30,000 per day, or not far from nine millions per year. From statistics deemed reliable, it is believed that the amount of capital invested in this branch of manufactures in this country cannot fall short of $\$ 40,000,000$.

The home of the cactus family appears to be in southern Arizona. Here the grand cactus, cereus giganteus, is from thirty feet to forty feet high, and from three feet to four feet in diameter.

The San Francisco Bulletin tive Tree
Bulletin giver the following account of the eucalyptus globulus, or Australian gum tree, obtained prin cipally from Messrs. Sontag \& Co., of San Francisco, who have given much attention to its cultivation. (We recently published an engraving of this tree in the Scientific Ameri CAN).
The eucalyptus is favorably known to all residents of Cali ornia, where probably not less than $1,000,000$ trees are plan ed. In this city, in front of handsome residences, you will find it, with its magnificent drooping branches, making an effective and graceful shade tree. In Oakland, the broad avenues are lined with them, eucalyptus forests are planted in the country surrounding Oakland, and, in fact, in every country of this State where the cold winter will permit it to live, the eucalyptus will be found growing. The wonderful properties of this tree have only within the past few years been discovered and appreciated. It is justly claimed that when the tree flourishes in low, marshy, and feverish districts, all miasma will cease. It destroys the malarial element in any atmosphere where it grows, and is a great absorbent of moisture, draining the subsoil almost as thoroughly as a regular system of piping. The eucalyptus is an evergreen, and is found in its native country (Tasmania) in boundless forests, both on the hillside and in the lowlands, under extremes of climates, both as to heat and cold, ranging from $130^{\circ}$ to $20^{\circ} \mathrm{Fah}$. Whether it will endure a greater degree of cold, we think, has not as yet been determined. It is, however, worthy of a trial. Its remarkably rapid growth is a matter of much surprise, attaining, as it does, a maximum hight of about 300 feet, with a circumference of from thirty to fifty. For timber and fuel it is exceedingly useful, being hard and easily worked, and very serviceable for such purposes as the keels of vessels, bridges, etc., where strength and durability are essential. It is estimated that from $\$ 4,000,000$ to $\$ 5,000,000$ in value of this timber is exported annually from Australia. The leaves of this tree are of a dark bluish color, about ten inches long, an inch wide, thin, and oddly twisted. They exhale a strong camphor-like odor, quite agreeable and pleasant, which, with the large absorption of water by the roots, causes the beneficial influence of the tree. It bears a small white flower, having no odor. In consequence of its aati-febrile qualities, the English Government has planted it extensively in the East Indies and Africa, in fever districts, with the most satisfactory results. In France, Caba, Spain, Mexico, and many other places where malaria, fever, ague, and other pestilential diseases prevailed, the eucalypti have been planted. The won-
derful properties of this tree have been discussed by many scientific institutions in Europe. In the Academy of Sciences, in this city, its medicinal and anti-miasmatic qualities have received considerable attention. Dr. Pigne Dupuytren testified before that Academy of the virtues of the oucalyptus,
and stated that both he and Dr. D'Olivera had tested it in the French Hospital. In the garden surrounding this hospital, a large number of the trees are planted for sanitary purposes. It had been found efficacious in the treatment of affections of thelarynx and of the mucous membrane in general. Experiments, carefully made, have proved that, in a medicinal preparation, it cures cases of intermittent fever, against which quinine alone proves powerless. It is also valuable as a disinfectant. In Algeria its cultivation was undertaken on a large acale. Some 13,000 eucalypti were planted in an extremely pestilential and unhealthy section, where fever prevailed to a great extent every year. During the first year of their growth, at the time when the fever used to set in, not a single case of fever occurred, yet the trees were only nine feet high. Since then this place is reported free from its unwelcome visitations. In the vicinity of Constantinople, another fever spot, marshy and sickly, the whole ground was dried up by 14,000 of these trees. In Cuba, marsh diseases
are rapidly disappearing upon the introduction of this tree. are railway station in the Department of the Var was so pestilertial that the officials could not remain there longer than a year. Forty of these trees were planted, and the un healthy condition of the place was changed. Two mile from Haywards, in this State, the surveyor-general planted groves of the eucalyptus, one of about ninety acres and the other seventy acres, the whole comprising about 150,000 trees. They are now only about five years old, yet many of trees are forty to fifty feet high, the whole making a most ex tensive and beautiful forest, being, for fuel and timber pur poses, worth thousands of dollars.

## Dynamite as a Stump Puller for Land <br> Reclamation.

The following report of experiments with the newly dis covered blasting agent, dynamite, which were carried out on Sir W. S. Maxwell's Cadder estate, is from the Glasgow Her ald. Dynamite is nitro-glycerin mixed with a silicious earth found near Hamburgh, and known as kieselguhr, which, being used as a fine powder, absorbs and retains the liquid explosive.
Dynamite is a moist and plastic solid, of a pale brown color, not unlike the finer qualities of sugar. The dynamite is made up in cartridges of various sizes to suit the bore holes, one inch diameter being the general size. The great advantage of this substance over gunpowder is its greate omparative sion; when ignited without percussion, rapid combustion on
sues, but there is no explosion. In order to make dynamite effective, it is necessary to explode with it some detona ting substance. Specially prepared and extra powerfu percussion caps are the agents used, in connection with a suitable length of Bickford's fuse, which consists of a line or thread of gunpowder inclosed in a tube made of gutt percha, a piece of this fuse boing tipped with one of
the percussion caps. The cartridge wan placed on the
stump of an old tree and ignited. After a short interval stump of an old tree and ignited. After a short interva here was a loud and poworful explosion, accompanied with experiments verbatim from the pages of the Herald:
The stumps of a number of trees that had recently been cut down?were experimented upon. By means of an auger, cut down'were experimented upon. By means of an auger, a hole about one and a quarter inches in diameter was bored tumps ; and when it was found to be quite through the wood of the stump, it was continued by means of a crowbar to depth of fully two feet. Two or three cartridges were put into the bore hole and firmly driven home by means of a wooden rammer. Then a small cartridge, called a primer prepared with a cap-tipped fuse, was dropped in and rammed home, and the hole was tamped or stemmed by filling it to the top with water, care having in this case been taken to put a luting of clay round the junction of the cap with the fuse The latter was fired, the observers betook themselves to respectful distance, and in a brief space of time a great up heaval took place. The noise of the explosion, however was in a great measure smothered. When the members of uhe party returned to the spot, they found the stump to be rent in a most extraordinary manner ; but the general opin ion was that the bore hole had been made so deep that the onergy of the explosion had spent itself too much upon the subsoil and too little upon the wood. The stump next operated upon was bored to a less depth, and the result of the blasting process was more effective. In either case a few strokes with an ax, by way of severing the principal root members, would be quite sufficient to leave the woody masses in such a condition that they could easily be dragged out and lifted away.
It was suggested by Mr. John Scott that the operation of piercing with an auger should be dispensed with in blasting the next root stump, so as to do the work with as great economy of time as possible. In this instance, therefore, the owbar was brought into requisition instead of the auge and by means of it a hole was driven horizontally inward between two of the principal root members to about the cen ter of the stump. The whole was charged and fired in the usual way, the result being a much greater amount of erup tive and disruptive action, with a smaller expenditure of time and labor. One or two other root stumps of large size wore blasted in the same way, and it was clearly demonstra ted that, under certain circumstances, dynamite could be omployed to more advantage immediately underneath than in the mass of material to be operated on. Mr. Scott expresses himself to be fuily satisfied, from what he has now witnessed, that he could use the new blasting agent with great effect and economy in iand-clearing operations in Canada, so far as tree roots were concerned.

## Sebacic Acid.*

When castor oil is gently heated with sodium hydrate, the whole solidifies, after much frothing, to a soft yellow waxy mass of sodium ricinoleste. On raising the heat, this salt melts and decomposes, an oily distllate passing over, and the residue yields sebacic acid. This acid, discovered in 1802 by Thénard, usually crystalizes in a multitude of long, fine, feathery crystals, which, when dry, have a peculiar pearly uster, or from dilute ealine solution in long thin needles; but under certain conditions, it eeparates from the ammonium sebates in very thin, brillisnt laminæ, with apeculiar bright luster.

Soluble in 700 parts at $20^{\circ}$; in 400 parts at $40^{\circ}$; in 240 parts t $50^{\circ}$; in 50 parts of water at $100^{\circ}$. By prolonged boiling, it is possible to dissolve it in 22 parts of water, of which 1 part in 45 remains in solution at $96^{\circ}$. It is readily soluble in cold alcohol and ether, easily dissolved by hot ether, and exremely soluble in hot alcohol. It crystalizes from hot ethor in short, transparent needles, and from hot alcohol in the same manner as from hot water.
It is readily soluble in hot nitric acid, and not decomposed by boiling therewith for a moderate time, but separates out when cold ; easily soluble in hot hydrochloric acid without change, crystalizing out on cooling; readily soluble in cold ulphuric acid, extremely soluble in sulphuric acid at $100^{\circ}$, and separates out unaltered on dilution with water; not sensibly attached by digestion with nitrohydrochloric acid, or potassium permanganate and sulphuric acid.
Aqueous sebacic acid reddens litmus strongly, tastes acid and bitter, completely neutralizes the alkaline hydrates, decomposes the carbonates of potassium, sodium, barium, strontium, and magnesium, and precipitates solutions of lead ace tate and silver nitrate if dilute, but neither mercuric nor calcium chloride, nor silver nitrate if strong, but precipitates the ilver ammonio-nitrate.
Even after being twice recrystalized, it is apt to retain traces of a white solid hydrocarbon, molting below $100^{\circ}$, and a pale yellow hydrocarbon, which can be removed only by repeated recrystalization. A trace of hydrockloric acid is also is also best remosed by repested crystalization; but it is probably to this of retained hydroehdoric acid that one or to
due.

Of the two classes of salty formed by sobacic acid in its capacity of a bibasic acid, the nenteal ealte:would appear to be the more stable, the second class, or the acid salts, being apparently decomposed more readily, and even in some instances by prolonged boiling of their concentrated solution. The acid salts seem to be all more or less soluble in water, and

- From a paper read befora the Chemical Soctety, by E. Nelson, Principal
neutral salts of the heavy metals and of calcium insoluble i water, while the rest are soluble.
By treatment of sebacic acid with the salts of various metals, great variety of crystals and powders of different colors, blue, orange, green, red, white and purple, some of magnilent character, are produced.


## Formation of Gum in Fruit-Bearing Trees.

In the wood of a tree diseased with gum, a great num. ber of vessels are always seen more or less completely filled with gum; sometimes they are entirely filled to certain length, and sometimes the gum only forma a coating either upon all the periphery or only on one side. The gum first shows itself in very small drops, which gradually increase in size and touch each other, forming amall irregular masses. Recent German observers have stated that the formation of the gum is due to the disorganization and transformation of the internal part of the wall of the vessel, but the author has come to an oppnsite conclusion. In examining the wood of n apricot tree from which large masses of gum were ex racted, it was found that the veskels were marked with areolated puncturea, and with a spiral line due to a thickening of the membrane; also that the surfaces of the masses of gum were marked with deep furrows corresponding with the spir al lines of the vessel wall and even with small projection according with the punctures. It is thus certain, in the au thor's opinion, that the gum has poured into the interior of the vessel, and that the marks upon it areimprinted from the vessel wall.
In the production of gum in the cellule by the transforma mation of starch, it has been observed that, on the first appear ance of gum in the cellule, the unchanged starch gathers nto small masses, around which forms a thin coating of gum. Gradually the starch diminishes, while the coating of gum increases, until at last the starch disappears alto gether, leaving generally a vacant space in the center of the mass of gum.
Often the gum, produced in such considerablequantity, is formed neither in the vessel nor in the cellules, but in the spaces between the young tissues, generally between the wood and the bark, yet often also at the different depths in the wood. These gum spaces grow at the expense of the neigh boring tissues, which suffer important modifications: the cam biam, instead of producing woody fiber, forms cellules in which abundance of starch is deposited, which starch sub sequently becomes converted into the gum.-E. Prillieua (Comptes Rendus).

## Geology of the Went.

Among the geological deductions of the Wheeler expedition are the following: All that portion of the United States west of the plains is characterized by corrugation, that is, the geological formations once horizontal have been bent and broken and thrown into ridges so as to produce a mountainous country. The ridges vary greatly as to hight and length, but agree in general northerly trend; so that in traveling north and south, it is generally easy to follow valleys, while in going east or west one is confronted by range after range that he must climb or go around. In the lower parts of this great mountain sjstem, the slow but indefatigable agencies of rain and stream have accumulated so great an amount of detritus that the valleys are clogged and the mountains nearly or quite buried. In this way have been produced the great desert plains of Utah, Arizona, and Southern Califor nia, vast seas of sand and saline clay, from the surfaces of which a few half sunken peaks jut forth as islands. These intermissions of the mountainous character are mere concealments, not interruptions, of the corrugated structure; but that structure is interrupted in one place-perhaps in others, but in one notably-by a tract in which the strata are almost undisturbed. The general surface of this excep tional region lies from 6,000 to 8,000 feet above the ocean and it is intersected by the celebrated cañons of the Colorado and its tributaries. By these gorges and by other modifica tions, chiefly dependent on erosion, it is divided into a great number of plateaus which the surveys now in progress aro defining and naming. The geologists of the expeditions have found it convenient to designate the region, considered as a geological province, as the region of the plateaus, or the Colorado plateau system. It is surrounded on all sides by areas of corrugation, the ranges at the east constituting the Rocky Mountain system proper, and those at the west having been designated as the Cordilleras. At the north and south, these mountain areas coalesce.

## Explonion and Firing of Volatile oils.

A mixture of two parts of perfectly dry permanganate of potasaium with two or three parts of concentrated sulphuric acid is a most powerful oxydizing agent, owing to the separation of permanganic acid and its immediate decomposition with the liberation of oxygen. Volatile oils are violently affected by this mixture, if about ten drops are placed in a little dish and then touched with a stout glass rod previously dipped into the mirture. The following produce explosions, often most violently: Oils of thyme, mace, turpentine (rectified), spike, cinnamon, origanum, rue, cubebs, and lemon. The following oils are simply inflamed, particularly if poured upon blotting paper and touched with the mixture, though under certain still unknown circumstances explosion may occur: Oils of rosemary, lavender, cloves, rose, geranium, gaultheria, caraway, cajeput, bitter almond, and rectified petroleum. The following substances are ignited withoat explosion : Alcohol, ether, wood spirit, benzole, chlorelayl, sulphide of carbon, and cotton. Gun cotton and ganpowder are not ignited.-N. Repert. f. Pharm.

## IMPROVED DOUBLETREE

In the improved sway bar of a doubletree, whiffletree, or neck yoke, represented in our engraving, the strength of the wooden portion is materially increased by a brace rod, so that the barmay be made much lighter while still farnishing the necessary strength.
Each end of the sway bar is fitted with a cap or thimble, Each end of the away bar is fitted with a cap or thimble,
whereby it is protected from abrasion and splitting, and to which the clevises are attached in the ordinary way-set up at the ends of these caps. By the use of nuts, it is obvious that any degree of tension can be given to the brace rod, and, at the same time, the caps will be tightly secured to the ends of the bar.
The brace rod, as will be seen, passes through the staple by means of holes made for the purpose at proper distances from the rear side of the sway bar Fig. 2. By using the rod in connection with the wood, as described, the draft on the rod and pressure on the wood are both endwise, thereby, it is claimed, combining the utmost strength of both materials. These doubletrees, whiffletrees, and neckyokes Lave, we learn, been thoroughly tested with success. With not very expensive mabinery, it is stated, they can be manufactured with great facility. Two arrangements of thedevice are shown in the separate figures in our illuatration.
This improvement is covered by two patents obcained through the Scientific American Patent Agency. For farther particulars regarding sule of rights or sale of territory, etc., address A. N. Case, Kingeville, Ashtabula county, Ohio.

## TODD'S IMPROVED HORSESHOE.

Mr. George H. Todd, of Montgomery, Ala., bas recently invented a novel horseshoe, which seems well suited for use on city pavements. The object is to afford an elastic resistance to the step, this avoiding that pounding action upon the stones which injures the hoof and renders so many city horses valueless. Nature has made the hoof elastic, and to confine it, in a bar or kivdred inelastic shoe, produces a similar effect to that of inclosing the human foot in an iron boot. As the abrasion of the covering upon the human member causes coins, so does the badly formed or adjusted shoe produce similar infliction upon the feet of horses, subjecting them to tempgrary and often permanent lameness. Mr. Todd's invention is, therefore, desirable in both a humane and an economical sense, as it aims to restore the elasticity which is lost by the necessary protection of the shoe, and thus to preserve the animal for longer service.
The plan adopted is represented in perspective in Fig. 1, and section in Fig. 2, in the annexed engraving, and consista in making the shoe in two parts, $A$ and $B$, and confining between them a layer of rubber, $C$. The portion, $A$, which is nailed to the hoof in theordinary manner, may be made of common iron, and the lower part, which takes the shock and wear, of hardened steel or other suitable metal. The two portions and the rubber between them are connected by the screw, D, and the lugs in the ends of part, B, which enter

ndentations in part A, as shown in the sectional view, Fig. 2. It will be observed that the rubber intercepts the force generated by the impact of the shoe and the ground, and by its yielding reduces the shock before the same reaches the animal. We are informed that there is no permanent spreading of the rubber by compression, and that it answers admirably the above purpose for which it is intended. The inventor states that he was enabled to use a horse when thus shod, which, when wearing the ordinary shoe, was too lame to use.
There are advantages other than those noted, which readily suggest themselves. The shoe is rendered much lighter, and the wear comes almost entirely upon the outer portion; the rubber can be cheaply renewed; the foot piece will out wear a number of the outer plates.
The form of shoe, as represented in our engraving, is somewhat modified to adapt it for trotting horsee, to gain greater ligbtness. To this end the outer piece, with the exception of the toe, through which the holding screw passes, is cut down on its inner side to a mere rim, curved in section, inside of which the rubber, also diminished in size, is
placed as before. The inventor infornis us that, instead of making the rubber simply to line the shoe, it may be left a flat piece, extending entirely across the under portion of the hoof. When thus arranged, the latter may be stuffed and the tow or other material held closely in place, the under sarface of the rubber serving as additional foothold. The durability of the portion which is directly nailed to the hoof, offers also an additional advantage, in that, when once accurately fitted, the shoe remains so for an indefinite period, and hence the chances of the animal being injured from improperly adjusted shoes are necessarily not so great as when old ones, on wearing out, are constantly replaced.
Further particulars may be obtained by addressing the in-


## IMPROVED DOUBLETREE.

ventor as above, or the shoe itself may be seen at the atore of Spies, Kissam \& Co., 279 Broadway, New York city.

IMPROVED MITER MACHINE AND FRAME VISE.
Our engravings represent a simple, cheap, and durable device, by means of which frames can be easily made and put together without requiring the work of a skilled mechanic. It consists of a miter box for cutting the ends of the mato rial to proper angles, and a vise which holds the frame firmly while being fastened together. The apparatus, which is

constructed of iron, has on its table a square, A, Fig. 1. B B are two movable blocks which clamp the moldings to be mitered against the sides of the aquare by pressing against the backs of the pieces, and thus not injuring the faces. The clamps are moved back and forth by a screw, $C$, on which travels a block, D, Fig. 2, to which are pivoted arms, E, which are connected with blocks, B, underneath the table, as shown. The latter is hinged to the bench, and in Fig. 2 is represented as turned up so as to show its under side. The

motion of the screw and adjacent parts is indicated by the docted lines.
After one end of the molding is mitered, the piece is placed on the other aide of the aquare, and its extremity
adjusted to such a mark on the measuring arm, $F$, as denotes the length desired. It is then immediately cut by the saw thus obviating the trouble of measuring and marking each side of the frame, and also the liability of mistakes. After the pieces are mitered, they may be placed on the square and clamped tight by the blocks, when they can be readily nailed together. Thus constructed the sides will be accurately fitted, as, being firmly held during the fastening, they cannot move out of square. This operation repeated for th other corners, completes the frame. If, in fastening, it is found that the molding has become sprung or twisted, the joint, we are informed, may be quickly made perfect by run ning the saw through it, thus enabling the operator to use moldings which would in the ordinery manner of working, be of little utility The saw guide blocks, $G$, are of wood One is screwed within the square and the other to the bench. The latter may be made to slide back and forth so as to be brought against the molding. As the blocks wear away, they can be brought together, the screws underneath working through slots for the purpose.

The machine may be hinged to the bencb as shown, or may be imbedded in the lat ter flush with the surface. A circular saw may be employed instead of the hand in. strument, if desired
For further particulars address the in ventor, Mr. cames H. Van Ness, Char lotte, N. C.

Electrical Currents from Albumenold Substances. M. Becquérel has shown that, when two heterogeneous liquids are separated by an organic membrane or by a capil lary space, they givean electric current capable of producing chemical and mechanical effects, reduction of metals, and dou ble decomposition, etc. M. Onimus finds that the interposition of a layer of albumenoid matter (white of egg, albumen of blood) has the same electro-chemical results. Thus with the solutions of sulphate of copper and of oxalate of potash separated in a tube by albumenoid substance, beautiful blue crystals of oxalate of copper and potash are obtained. The phenomena, he points out, may throw light on the formation of phosphate of lime in animals.

## JENEINS' PATENT COMPOUND HATCHET.

This hatchet is formed simply by punching the blade out of sheet steel, about No. 12, with a hole near the top. The blade is then set in a mold and a head cast on it, the melted ron uniting through the hole and forming a perfect fasten ing. It is then tempered, ground, and finished.


It is claimed that, in this manner, a hatchet carrying a good cutting edge, and having a head sufficient for ordinary purposes, may be manufactured at a comparatively small cost.
Patented through the Scientific American Patent Agency. The entire right for sale, or a license to manufacture on a royalty may be obtained. For further particulars address Mr. J. Jenkins, Coulter street, Germantown, Pa.

The French expedition which has been exploring Terra del Fuego reports the finding, in the interior, of a large lake 15 miles in circumference, surrounded by luxuriant vegetation, and literally covered by an army of wild fowl, among which the most abundant were ducks and geese. These re gions are inhabited by rude but hospitable tribes; the women especially are very affable and obliging. One of them, in exchange for some pieces of sugar and common handker chiefs, gave the leader of the expedition an object to which she attached an immense value, and which she preserved as relic-the lid of a sardine box.

## THE 8EAFORTHIA ELEGANS

Few of the larger growing palms, stys a correspondent of the London Garden, to which we are indebted for the accompanying engraving, equal this species in beauty; and it has, what is many cases a great advantage, the property of being a rapid grower. Its proper place is planted out in a conservatory that is cool in summer, and kept regularly a few degrees above freezing in winter. Planted out in such a position in a bed of rich loam, and abundantly supplied with moisture, it soon makes a noble plant. Although a native of tropical Australia, it is sufficiently robust in constitution to succeed out of doors as a sub-tropical plant during our summer season, when it should be plunged on a well drained bottom.

Our illustration, showing the way in which it is used in French gardens, exbibits the graceful port of this species at a glance, and also the singularly effective character of the plant when associated with yuccas and other fine foliaged subjects in the open air. Scarcely any other palm is better adapted than this for a center plant in any well arranged group of foliage or flowering plants; and amall specimens are useful for this purpoes, as well as for the deco ration of apartments and reception rooms. It is readily propagated from seods sown in light soil in pots plunged in a gentle moist bottom heat, and the plants are ornamental from the time they attain 9 or 10 inches in hight until they outgrow the quarters allotted to them. Frequent syringings overhead are beneficial to them, especially during hot weather in order to keep down red spider ; and as soon as the pot or tub becomes filled with roots, a little manure water is advantageous to them.
We have noted several small plants doing well in apartments, but they require a plentiful and regular supply of water at the root, and the hard foliage should be washed at least once a week with a soff sponge and clean tepid water. If soap is used be particularly careful to remove every particle of it be particularly careful to remove overy particle of it
from the plant afterwards, by either ayringing or from the plant afterwards, by either ayringing or
sponging with clean water. If only one palm is sponging with clean water. If only one palm is
required, for either pot culture or for planting out in required, for either pot culture or for planting out in
the conservatory, we should recommend this before all others, on account of its graceful habit and easy culture.

## An Oyater Patent

One of the great troubles which oyatermen have to contend with is the starfish. This rapacious enemy destroys thousands of bushels of oysters every year, and no device has heretofore proved effective as a protection. But the ingenuily of a Connecticut Yankee has at last triumphed. Mr. Oliver Cook, of Yankee has at last triumphed. Mr. Oliver Cook, of
Darien, Conn., has lately obtained a patent on the subject. His invention consists in epreedifg a net, under water, on the ground composing the oyster bed. Mr. Starfish puckers his fingers together, squeezes himself up through the meshes of the net, and then extends his digits again. Being now upon the upper side of the net, he will be infallibly captured whenever the oysterman raises the net to the surface. This is to be frequently done until the enemy is cleared from the coast, when the oysters at once begin to laugh and grow fat.

## A Metallic Larynx.

The total extirpation of the larynx was performed not long ago, for the first time, by Professor Billroth, in Vienna, in consequence of epithelial disease, so extensive as to be amenable to no less severe procedure. The correspondent of the Boston Medical and Surgical Journal reports that tracheotomy was performed in order to accustom the patient to the use of the canula; when this was accomplished, the extirpation of the larynx was undertaken, by carefully dissecting it away from the surrounding tissues, leavirg the hyoid bone and sound portion of the epiglottis. That night, hyoid bone and sound portion of the epiglottis. That night,
brisk hæmorrhage occurred from some of the smaller arteries, and the patient seemed, for a time, in imminent danger of and the patient seemed, for a time, in imminent danger of
suffocation; it was also necessary, during the first fortnight, to administer liquid food through an cesophageal tube; but the extensive wound has entirely healed, and the operation must be conceded to be a success, and to reflect no little credit on its originator.
After the operation the man still possessed the power of communicating his wauts in an indistinct but intelligible whisper. Subsequently a metallic larynx, provided with vibratory reeds, was fitted to the upper convex surface of the tracheotomy tube, and the man "can congratulate him. self that, if his voice is a trifle monotonous in pitch, it is by no means unmusical in tone."

## Premervation of Telegraph Poles, Posts and Rallway

 Sleepers.In the course of a recent discussion before the Society of Telegraph Engineers, London, concerning the best methods of preventing decay in wooden telegraph poles, it was stated that an experience of several years with hop poles had shows that, when their lower ends were simply boiled in an open vessel of creosote, the wood was greatly preserved from decay. The more perfect method of creosoting wood is to boil in creosote under a pressure of 120 lbs. to 150 lbs. per square inch. This involves expeizsive apparatus, but the wood thus treated will last indefinitely.
It was alleged that simply painting the bottoms of green poles with tar hastened decay, as the sap was sealed up at that point. When the poles were well dried, the application of tar was believed to be useful.


## THE SEAFORTHIA ELEGANS.

line. They were poles made of trees growing in the interior of South America, and which were called in the native language the urunday and the curupay trees. They were generally called by English people iron wood. The wood was so hard that it was impossible to drive a nail into it. It would, perhaps, be an advantage if it could be brought to this country, and used for telegraph poles. He should think that it would last for hundreds of years. It might be worth while for some of our investigators to experiment with the iron wood with a view to its acclimation here.

Galvanic Electricity without Chemical Action. At a recent meeting of the Physical Society, Mr. Fleming showed his new battery, in which the metallic contact of dissimilar metals is entirely avoided. The arrangement consists of thirty-six test tubes of dilute nitric acid, and the same number of tubes of sodium pentasulphide, all well insulated, alternating with one another. But strips of alternate lead and copper connect the neighboring tubes; by which means the terminals are of similar metal, and a current of sufficient intensity to violently affect a quantity galvanometer obtained. The potential increases, as in the ordinary galvanic arrangement, with the number of cells employed, until sixty cells showed an electro-motive force exceeding that of the same number of Daniell's elements. In this new battery the acid lead is positive to copper, while in the sulphide it is negative. Mr. Fleming further showed how, by using the aingle fluid nitric acid, and the single metal iron, a similar battery could be constructed, provided one half of each iron strip was rendered passive. This is an important discovery; for it seems to revive the theory that chemical action is not necessary in a galvanic apparatus to produce electricity. At all events it is of sufficient interest to merit the sound inquiry into its principles which physicists seem likely to make.

New Protecting Compound for Iron Ships. Dissolve thirty-four ounces of shellac in eighty ounces of wood alcohol, which is allowed to stand about twenty-four hours. Then add thirty ounces of Venetian red, and thirtyfive ounces of sulphate of lime, and thoroughly mix by passing it through a paint mill.

Attention was called to the process of Sigismund Beer, of New York city, which was considered to be an important one. It is certainly very simple, economical, and easily practiced. is supposed to neutralize the decomposition of the vegetable matters in the wood, which are afterwards washed out.
Mr. Von Truenfeld said that he had not been concerned with wooden posts in England, but he knew of tropical trees which would last, he should say, at least 200 years without
showing the slightest signs of decay. He had had occasion to take up poles which had been used in building, and

The paint is now ready for use, and is applied with a brush in the same way as ordinary paint, and will dry instantly, so after the paint has been applied to the bottom.
For vessels navigating fresh water, or both salt and fresh water, the proportions of the Venetian red and the sulphate of lime used may be diminished. This paint may also be used upon the inside of the iron work of the vessel. It is the invention of Samuel Williams, of New York city, recenty patented.

Condensed Milk Manufacture in Switzerland.
A factory for the production of condensed milk has recently been established at Cham, canton Zug, on the borders of the lake of the same name, in Switzerland. We find the following description of the process in the Bulletin de la Société d'Encouragement: The mili is furnished by peasants; and as soon as each person delivers his supply, a sample is taken from the pails, numbered, and allowed to remain quiet over night. The object of this is to judge of the quality of the milk for the rising of cream. Cases of fraud, however, are rare, as the peasantry are generally honest and the penalties imposed by law are extremely severe.
The first operation is to weigh the milk, which to this end is conducted into a copper basin supported by a balance. Its weight being obtained, the milk is allowed to escape into huge wooden reservoirs lined with zinc, and located in the cellar. Here a careful examination is made with the lactometer, and the fluid is drawn off into large cylindrical copper boilers which are placed in a vat furnished with a false bottom under which steam enters. The milk is thus slowly heated, but not boiled. For the latter purpose, it is ladled out into a separate boiler whence it is carried to another tank containing a a quantity of white sugar. In order to facilitate the solution of the latter, the liquid is repeatedly passed along a metal trough from one vase to another. When the operation is completed, it is another. When the operation into evaporating chambers. These receptacles resemble the similar apparatus used in sugar manufacture, and have double bottoms heated by steam. They are united to a column of condensa tion which communicates with air pumps. Under these conditions the milk boilsat $140^{\circ}$ Fab. Every little while the workman takes out a sample from which he judges according to its viscosity whether the condensation is sufficient.
When the latter point is reached, the liquid is led down into the cellar and into a tin receptacle which is surrounded by cold water. The milk is thoroughly agitated by hand for some time until completely cool, when it is carried to other reservoirs and thence drawn off into boxes and sealed. The daily product is about 8,000 boxes, each weighing about $13 \cdot 5$ ounces. The milk may be diluted with five times its weight of water.

The Fastest Steamer in the World.
Such is the title claimed by Messrs. Thornycroft for a boat they have just built to the order of the Government of India, for service in the Orissa canals. The dimensions of this vessel are: Length, 87 feet; beam, 12 feet; draft of water, 3 feet 9 inches. The speed contracted for was 20 statute miles per hour. The hull, the working parts of the engines, and the propeller-Thornycroft's patent-are of Besse mer steel, and the woodwork is of teak. The official trial of the boat was made on the 14th ultimo under the iuspection of Colonel Haig, R. E., chief engineer of the Bengal Irrigation Works, and the results were: With tide, 25.08 miles per hour; against tide, $24 \cdot 15$ miles per hour ; giving a mean speed of 24.61 miles per hour. In another officia trial it was shown that the boat could keep up a speed of 22 miles per hour without losing steam. These speeds are extraordinary enough in themselves, but when it is con sidered that they are attained by a boat only 87 feet lung they become absolutely wonderful. The value of swift steam launches as torpedo boats is acknowledged, and already various foreign governments have ordered boats from Messis. Thornycroft's yard, near London. If torpedo launches can be built to steam at the rate of 16 or 18 miles an hour in a moderately calm sea, the whole face of naval warfare may find itself changed in a very unexpected way.

## Novelty in Ship Building.

At East Boston, Mass., there has been built by N. Gibson, as an experiment, a three masted schooner without frame. The vessel is 138 feet long, $32 \frac{1}{y}$ feet beam, and 12 feet 2 is ches depth of hold. Long, sharp, large capacity and buoyancy The vessel is composed of square logs of spruce, one foo square, placed one upon the other, and secured together by iron bolts, three feet long and placed twelve inches apart The owner expects that this vessel will prove to be stronger, more capacious, and faster than vessels of the ordinary construction. In timber there is a saving of forty per cent. Twenty-six tuns of iron were used. The construction of vessels on this plan was illustrated by engravings in the Scientific American several years ago. In view of the marked revival of shipbuilding now going on in this country, there is an excellent opportunity for inventors to stady out new and useful improvements in maritime devices of every kind. Less attention has been given to this branch of industry by inventive cinds, than almost any other.

BURSTING OF A MOUNTAIN WATER RESERVOIR IN MASSACHUSETTS.---A TERRIBLE CALAMITY.
The beautiful valley of Mill river, a tributary of the Connecticut, near Northampton, Mass., was the scene of an awful calamity on the morning of the 16 th inst. At about 8 o'clock A.M. the dam of an immense water reservoir, located high up among the hills, above the village of Williamsburg, suddenly burst, and a tremendous flood poured down the river bed, overrunning the banks and sweeping away like chaff whatever stood in its path. Dwelling houses with families peacefully sitting at the breakfast table were instantly swept to destruction. Great factories, mills, bridges, stores, and property of all kinds disappeared in a moment; and upon the summit of the watery crest were to be seen the broken roofs of buildings, timbers, trees, wheels, pianos, and broken roofs of builaings, timbers, tre
The village of Williamsburg was first struck. One third part of the village was instantly plowed through, leaving a broad bed of shapeless disfigured ruins of stones and débris where cottages, flowers, and scenes of peaceful beauty had previously existed. Many of the principal dwellings, factories, and other buildings were taken off, and a large number of the inhabitants perished.
Haydenville seems to have been unfortunately situated between two river curves, and hence, at one end of the town, are to be seen the effects of the madly rushing torrent; in a sweep of highlands at the other, the effects of the dein a sweep of highlands at the other, the es it receded from vastating undercurrent of the backwater, as it receded from
and finally leaped over the lower bank. The great brass works of Hayden Gere \& Co. were first swept, by a wall of débris from fifteen to twenty feet high, and with the added momentum the flood went over the road bed, devastating lawns and porticos of houses, leaving a boiler 2,000 feet from its original position, and placing it on an elevated spot in front of a house, tearing out the stone sides of the river and placing the boulders in the bed of the channel or on the placing the boulders in the bed of the channel or on the
sidewalk, and sweeping men, women, and children into sidewalk, and sweeping men, women, and che woun in to come bounding
eternity. Wooden houses were seen to eternity. Wooden houses were seen to come bounding
alony like corks, and from the interior of more than one along like corks, and from the interior of more than one
were heard the ehrieks of wives and daughters, whom their were heard the shrieks of wives and daughters, whom their
husbands and fathers had left a few moments before in husbands and fathers had left a few moments before in
fancied security. It was a sight which paralyzed every beholder.
At Skinnersville, the most frightful havoc of all, as regards extent of damage to property, took place in Skinnersville, although fewer lives were lost there than elsewhere. Only three houses were left standing in the village.
On the main street and village green of Leeds only three buildings remain. The Nonotuck silk factory, a solid structure, together with its costly dam, quickly fell, then the Emery Wheel Co.'s premises, the engine house, church, Wagner's button factory, and all the other buildings in the vicini $y$.
Over one hundred and fifty lives were lost, and property destroyed to the amount of between one million and two millions of dollars.
This terrible calamity was due to the weakness and bad construction of the reservoir dam, built six years ago. Its condition has at all times be
the reservoir and dam
The reservoir was one of a system of dams and reservoirs wned by a corporation called the Mill River and Williamsburg Reservoir Company, which included all the manufacturing establishments on the line of Mill River from Wil liamsburg to Northampton. It was situated on the east branch of Mill River, about three miles from the village of Williamsburg, in the northeastern corner of Northampton. The stream which supplied it, after joining the west branch at the village of Williamsburg, forms Mill River proper, which flows through Haydenville and Florence, and empties into the Connecticut river at Northempton.
In building the dam a stone wall was first built, which was stipulated to rise from a width of eight feet at the base pan to two feet at the top, which latter was 42 feet above the bed of the stream. This wall was contracted to be laid in the best known cement, and the projectors claimed it would be as strong as a single shaft of granite. Enveloping this wall on either side was a mass of earth, which sloped down on the water side at an angle of $30^{\circ}$, and on the lower side at an angle of $45^{\circ}$; a lateral section of this earthen support measured about 120 feet at the base, the greater mass of which was on the water side. At the center of the stream, inclosed in a stone wall, running at right angles to the main wall of the reservoir, ran an iron tube of two feet in diamefew feet beyond this eastern wall, at both extremities of its base. This wall of earth, 120 feet wide at bottom, was 16 feet across at the top, covering the crest of the stone wall, two feet in depth, in order to prevent danger from frost and along its top furnished a good drive way. The water never rose quite to the crest of the dam, being kept about two feet below that line by means of a waste way at the western side. The reservoir covered an area of one hundred and eleven acres, and its average depth was twenty-four feet

## Is the Skunk's Bite Deadly?

While it is apparently difficult to add anything to the odium which is already attached to the common skunk, Rev. Horace C. Hovey finds a way of ao doing by bringing for ward proof that the animal is as dangerous as it is disagree able. In the American Journal of Science and Arts is a paper
by the above writer, in which he considers that a new disease has been discovered, which generally resembles rabies canina (of which hydrophobia is a symptom), while differing
from it specifically. To this he gives the name of rabies mephitica. It is transmitted by the bite of the skunk, and occurs when the glands which discharge its offensive fluid are inactive, so that it is possible that there may be a caasative connection between this inactivity and the generation of malignant virus in the glands of the mouth. Mr. Hovey gives a large number of instances of men and animals dying from this cause in fearful convulsions. The mephitic inoc ulation, he says, is sure death. From the diagnosis given of the resulting disease, it seems that the period of incuba tion is about the same as thal of rabies canina-from ten days to twelve months. The characteristic pustules of hy drophobia, which appear under the tongue and near the ori ficas of the submaxillary gland, are absent. So also is the abhorrence of water, catching of the breath, difficulty in swallowing, and various other symptoms of the rabies canina. There are, however, oscillations of the pupil, rapid alternate contraction and relaxation of the muscles, wiry radial pulse, and rapid action of the carotid, loss of perception, and deliri um. The struggles of Nature to eliminate the poison are less prolonged in the rabies mephitica, and may bo abridged by morphine, which has no narcotic effect in hydrophobia. In view of the great number of skunks in various portions of the coantry, it would appear that a further and more extend ed investigation into the nature and causation of this dis ease is of much importance. If the animal is so fearfully dangerous, its extermination should follow as relentlessly a that of the rattlesnake.

## A New District Telegraph Instrument.

We have recently seen a new telegraph instrument de signed by Mr. Hamilton E. Towle, and Mr. William Unger, of this city, to replace the apparatus now employed on the district telegraph lines. The device, like the ordinary in struments, gives three distinct calls, " police," " messenger," and "burglar alarm," and may be used for transmitting signals by sound. The notched wheels which break and lose the circuit at certain times, making a distinctive signal, in the ordinary apparatus, are replaced by vertical bar formed of metal and rubber, so arranged that the switch passing over them receives the current when touching the metal portions, which are placed at certain intervals apart, and transmits the same to the sounding device at the main office. The machine is set in motion by pressing a button, which removes a detent froni holding the clock work. A rod then rises from the top of the apparatus until the signal is completed, when it is pushed down, thus wind ing up the mechanism ready for another signal. The burglar alarm is so arranged that, by breaking a wire or connection, the current, which before preferably traversed that wire, passes to an electro-magnet, setting the device in action and transmitting a proper signal. We shall probably present
before long an illustrated description of this invention, un before long an illustrated description of this invention, un til which time further details are unnecessary.
How the Germans granp American Inventions.
Engineering recently devoted a page of its space to edito rially discussing the subject of breech-loading ordnance in general. and in particular the aystem invented by Mr. L. M. Broadwell, an American ongineer. Our cotemporary says that, with a few unimportant exceptions, all the breechloading guns exhibited at the Vienna Exposition were constructed after this plan. The specialty of the invention consists in the combination of a self-adjusting gas ring with an adjustable circular bearing plate, which together forms a per fectly gas-tight joint, and which can be repaired at an insigificant outlay of time and money. The history of the device, published in Engineering, is quite detailed, and it seems that the claims of the inventor have been fully recognized in rance, Russia, Austria, Turkey, Italy, and Switzerland, and that these countries have paid him large sums for his patent rights.
In Germany, however, the usual course of injustice has een followed. Krupp has adopted the improvement, is manufacturing it on a large scale, and declines payment thereor; while the government has refused the inventor a patent on a clearly absurd pretence. The story is perhaps too long to
find place in our columns, but it adds new corroboration to find place in our columns, but it adds new corroboration to
the facts which we have already published regarding the oppressive workings of the German patent laws as regards foreign inventors.

Unprofitablenesm of Government Telegraphs. Our British friends have no doubt become convinced that, a financial operation, government management of the teleraphs does not pay. With all the possible manipulation of the accounts and charging to the general post office expenses much that is properly chargeable to the telegraph service,there is a deficit, stated by the Railway Newos, of London, at $\$ 5,000$ per week, and which is constantly increasing. The private companies which were superseded by the government in the business, most of them, made the said business profitable to the stockholders, and the public was as well accommodated as it is now, to say the least.
Government telegraphy, as a remunerative branch of the postal service, is a failure; but having assumed the owner ship of the elephant, he must, of course, be retained and supported. If government telegraphy in a country like Great Britain, which is densely populated, and whose telegraph facilities are very generally used by the public, the circuits short and easily maintained, and the compensation of employees comparatively very small, cannot be made to pay, what the prospect in this country? The experience of Great Britain has probably aaved our own government and people from the loss, damage, and dissatisfaction inevitably attendent
upon government telegraphic administration; butit is well to upon government telegraphic administration; but it is well to
keep the facts before the public and Congress.- The Telegrapher.

Fish, Seale Ornaments. Huebner of Newark, who have invented certain new and useful mprovements in preparing fish scales for use in the arts, of which the following in a apecification :
The object of the invention is to utilize the scales of several varieties of fish, hitherto thrown away as useless, and prepare them for application in the arts, by producing articles of jewelry, artificial flowers, and similar objectu. This invention consists in the process of cleansing and purifying the scales till the clear, horny substance or core of the same is obtained, which produces a new article of manufacture, which may be tamped into various ornamental shapes and dyed in all colors, for use in the arts.
Large scales are the most advantageous, taken from fresh fish. Old scales cannot be used, as they lack elasticity and clearness. The fresh scales are exposed for twenty four hours to the action of pure salt water, for loosening and partially separating the outer layers of organic matter. They are then transferred to distilled water, being placed every two or three hoursin clean water and washed therein five, or six times, which renders the scales soft and clear. Each scale is then carefully ubbed with clean linen rags, then passed through a press having a linen lining so as to remove the moisture in the cales. The scales are finally placed for one hour in alcohol, and again rubbed and pressed, when they are dry and have a perfectly clear appearance, a mother-of-pearl-like hue, and great elasticity and durability.
The scales are used in this prepared state, or they may be dyed with aniline and other colors, in the usual manner, to be stamped into various kind of ornamental shapes, leaves, and flowers, and applied to the manufacture of jewelry and arti ficial flowers, for embroidering and inlaying wood, and othe uses in the arts.

The New Steam Hammer at Woolwich, England. To ary that it is the largest and most powerful in the world conveys but an inadequate idea of its magnitude and might. The weight of the falling portion is within a few pounds of 40 tuns, and the force of the falling weight is ac elerated many times by the use of steam to drive it down from the top. It is at least four times as powerful as Krupp's hammer. It is estimated that the use of top steam is equal to allowing the hammer to fall of its own weight 80 feet. It has been allowed a striking fall of 15 feet 3 inches, and nobody has yet determined what is the actua force of the blow which it will strike. The hammer is 45 feet in hight, and covers, with its supports, a base of about 120 feet square. Above the ground it weighs 500 tuns, and the iron in the foundations below weighs 665 tuns. It has cost altogether about $\$ 250,000$, the greater part of which has been paid to Messrs. Nasmyth, Wilson \& Co., the patentees and manufacturers.

Steam on the Erie Canal.
The Baxter steam canal boat City of New York left this city for Buffalo, with way freight, Saturday 9th inst., at 5:85 P. M. She discharged and received cargo at Utica and Syra cuse, and arrived at Buffalo Saturday morning, 16th inst., at 6 o'clock. Time, including all detentions, 6 days, 12 hours, and 25 minutes. She loaded to return on the same day. This seems to demonstrate the perfect practicability of using steam in canal navigation, as the usual time of horse boats i 12 to 14 days. The City of New York is the second boat of the line, and a number more are now being built.
Thallium burns in oxygen with a splendid green flame and its use has been suggested for fireworks in lieu of chlo rate of baryta. Thallium is a comparatively new metal. It was discovered in 1861, and has as yet few commercial ses. It resembles lead in appearance and many of its cha racteristics. Its weight is nearly the same as lead, but oxydizes much more rapidly than lead.

## Thernt ghmericau aud fortigu Fatruts.

## Machine for Matchin, Measaring, Singeing, Brashing, a Rolling Carpets.

James Short, New Branswick, N. J.-This Invention consists of an end
less belt, with divisions of its length corresponding with the distance from center to center of the ingure of the carpet or other woven goods to be matched; also mechanism in connection therewith for drawing the goods alongside of the belt in unison with its movement, and preferably over a table or a cylinder, by which the variation of each plece, in the distance
from center to center of the figures, if any, is shown in the aggregate at the from center to center of the figures, if any, is shown in the aggregate at the
end of each plece, where it can be accurately measured with a rule, to be end of each plece, where it can be accurately measured with a rule,
noted on the tag attached to the plece when rolled. The invention also consists in combining. with the mechanism employed for drawing the goods along the matching device and operating the latter, mechanism for mea-
suring, singelng, brushing, and rolling the goods at the same time they are matched, by whimh one movemelt of the goods at the same time these several operations. This machine is by the same inventor Who devised the very ingenlous loom for weaving carpets of any width, illustrated some amount of hand labor, and, it is belleved, will prove of great utillty in the wholesale trade.
Machinery for Burnishing Heels of Boots and Shoes.
Oliver G. Critchet, Belfast, Me.- Steam is introduced into a revolving $^{\text {in }}$. hamber through a plpe which passes through a stationary head whtch tightly packed. On the end of the chamber is a burnlobing disk. The chamber is given a rapidly revolving motion, and, beting heated by the steam the chamber, it produces the desired effect.

Improved Pipe Wrench and Catter.
Micks, Elmira, N. Y. $-A$ clamp-shap
Willam W. Micks, Elmira, N. T.-A clamp-shaped on the inner side, comes in contact with the pipe, and has a round screw-threaded stem that
passes through a block. provided with a griping tool and cutter. and enters passes through a block. provided with a griping tool and cutter, and enters
a handle which is bored and screw-threaded for the purpose. By turning the handle on the clamp stem the distance between the clamp and block may be altered to accommodate different sizes of pipe. The block is arranged to take a new hold on the pipe whenever the handle is vibrated for
that purpose. The tenon of tiecutting tool has that purpose. The tenon of the cutting tool has no play. When it is de
sired to attach one pipe section to another, or to disconnect the same the sired to attach one pipe section to another, or to disconnect the same, the
Jaw is used. When a plpe section is to be cut in two, the block is reversed and the catter inserted, the bandle beligg adjuated on the stem accordin to the alze of the plpe.



 It thrown out in such a manner that portlons of t are seen at greater, and
other portions at lesser. distances, permittligg, thereby, the approximate
 and avoldtng, to some extent, the danger of collistons or other accldents.
The invention consists, mallyy, in the construction of the front part of the algnal light with a number of lenses of different sizes, arranged with or ble designs of cilases, or the ar that a almilar graduation in the intenaty

Improved Compound for Coating Iron Shipg' Bottoms.
Samuet Willame, New York citty. This 18 an 1 mproved compond for the outside of fron vessels below the water Ine, formed of shenlac, wood alcohol, Venetian red, and sulphate of llme. The paint is applied with a brush in the ordinary way. and will dry instantiy, so that the vessel may
be lowered Into the water within an hour after the paint has been applied. Improved Bag Fastoner.
onville, Wis. U pon the edge of
Dantel Jones, Hortonville, Wis.- Upon the edge of an arc-shaped plate by finclines. To one loop ts plvoted the plate, and to another loop a lever, the loops belng jotinted torether and belng of such a length that the lever may be fastened on the hooks. The lever is so carved that its short loop
may be eaelly placed in a fulcrum notch, and will allow the long loop to be turned over at great addantage of leverage, draming the fastener tight around the bag. As soon as this is effected, the loops sllp back ont of the
notchef, over the tacline, and Into the concavity of the hook, where they are securely held.

## Improved Watel Chain Hook.

Henry T. Sallsbury, Pawtucket, R. I.-This 18 an Improved watch chatn hook, by which the watch chatn remains alwass securely attached to the
veat withont belng llable to detachment by aced dent or plckpockets. The vest without betng liable to detachment by acct dent or plekpockets. The
invention consista of a circular plvoted guard hook, which 1s locked to its stem by means of a central bolt silding in a tubular sleeve at the tinside of the stem. The sleeve is slotted for gulading a projecting rib of the cen.
tral bolt, which rib tis notched and locked by two or more annularbands or tral bolt, which rib tis notched and locked by two or more annularbands or
rings, and detached from the same when a notch of their 1 nner circumferrings, and detached from the same when a notch of therr tnner clrcumfer-
ence is brought in tine with the siot of the sleeve, so that the bolt may be ence Is brought in line with the sly
withdrawn and the hook opened.

Improved Reamer for Earth Borers.
John A. Chandier, Monticello. Iowa.. This Invention fis a reaming attrach-
ment to earth. ment to earth- $\begin{aligned} & \text { borfus } \\ & \text { stratum of gulck kand may be quickly enlarged or extended tor the }\end{aligned}$
 smalier auger till water is obtanined, a reaming attachment to the shaft to used, having adjustable galde plates and sllding cutters, for enlarghng the
narrower section of the well below the curb gradually, from the bottom
 bottom of the well, and produces thereby, after the earth has been re
moved, a well of equal width. moved, a well. of equal wlath.

Improved Saw Table.
Edward H . Hanna and Charies w. Hawna, Dover, Ky. -The pitch board
to supported on the bed by meana of two screws which are jotnted to the board, and work through stands, and are confned in any desired position by nuts. One of two aduasting bars is jointed to the pltch board. and the
other to the bed. These bars have each a serrated edke, and lap past each with each other, and con ined board rests on the bed st one end, and is made to stand at any desired
angle to the saw. The plank is lapped over the edge of the pitch board, angle to the sam. The plank 18 lapped over the edge of the pitch board,
and 18 sawed hy turning the pltch board and bed on the plvot bolt, the de. sired wind beling given by means of the finclination and position of the pttch board.

Improved Burglar Alarm
George A. Beaver, Rlchmond, Ind.-This invention consits of the
comblination of a serles of regiter keys, which are connected tin suitable manner to the windows, doors, etc.., with a spring match holder, which ughts the lamp, sets a clock traln and bell in motion, and discharges peroussion caps as soon as any one of the register keys releases the espring
holder from the catch plate. The change of position of the key indicates holder from the catch plate. Tre change
the room to whioh the alarm originated.

Improved Saw Tooth-Swage.
assignor to himself and George
 arbor, so that the saw will ran true; and it consiats of a slotted arm at lached to toe saw arbor extendng out beyond the eaw.
to it an adjuastable curved arm which carries the swage.

Improved Machine for Cutting Rabber Soles. rodnce for mann it in
 form or cottere or rtamps may be employed. $\Delta$ spring board attached in
front of stamps ratses the cloth silghtly above the stamp after each stroke. The pleces, after being cut, drop on an endless belt or apron, which carriee the same offr. The rabber cloth is fed from the cloth roller by rectprocat-
ing sildding feed blocks, which are operated by the driving saitt, their ex. tent of motion beling regulated by adjuatable gulce pleces. The feed blocks take Lold of the clcth atter each stroke, and feed the same to the stamp releasing it on the return motion by pasaing along inclined guldes, which
ratse the upper feed block.
Improved Rotary Engine.
lass of rotary steam enginesand pumps in which two ren relates to that re emploged in 8 ase meshing together to cut off the passage between them ; and it consists of the teet whereby pressare is balanced on the carting of teeth to better advantage than in the ordinary arrangements, and
water of condensed steam is allowed to escape at the starting of the engine.

Improved Carbareter.
 formity of llluminating power than usual, and in a more economical manner. The invention consists in an alr-supply governor that automatically maintains any defnite pressure and supply of air ; of means by which an over apply of carbon to the air may be prevented, and the relative pro portlons of oxygen and carbon accurately gaged ; in makking the carboret
terin sections held to jotint band by a cohestre that will aquckly melt during terin section held to jint band by a conestrive that will quilckiy melt during
a rie and enable the apparatus 10 be eastly handled and remored ; and
and nanlly in means for obrlatting the jerking movement of a dooble act
air pump, and causing it to move with great uniformity of motion.

Improved Portable Steamer for Potatoes, etc.
K . McDonald and John W. Dewees, Phlladelphat, Pa. - Tht improved device for outdoor and street trade, for steaming potatoes, eare of corn, oysters, \&c. It is made in the general form of a locomotive
engine, and ts mounted upon wheels. There is a dre chamber, the nue from which passes back beneath the boller. Steamers, which pass 1 in through the top of the shell of the latter, recelve wire baskets, In which the artlcles are placed to be steamed. In the rear end of the shell 18 formed
an cren. When the artulces are remored from the steamera they are placed an cren. When the articlee aro removed from the steamers they are piaced
in the oven to drive off the moltature, and are then placed in the upper compartment to be kept hot untll sold.
Willam D. Guproved Blowor for Fire Grates.
 means of a a nob prol
to the lever fulcrum.

Combined Table Castor and Fly Expelling Fan, Willam R. Fowler. Balttmore, Md. - Thas Anvention relatest to fans turned
by clock mechanism for the parpose of frightening alies from the fammy table at meals, and consists in connecting a fan. castor holder, and clock aslde when in the is ofer, and the castor employed in the usaal way, the appearanc.
tingency.

Improved Gin Saw Fillig Machlne.
Louls Monroe Abbill, Rldge, S. C.-This invention relates generally machines that are ased to facilltate the filling of gin asw teeth and to
sapersede the old means of pertorming the work by hand. The tmprovement consists in means for giving a variable adjuatment to the plie stroke without changing the position of the forward end or point of the flle.

## Improved Midalings Purifier. Brooklyn, N. $\mathbf{Y}$. There is

abe, of large alize Into which the middllings are fea, aler beng dusted, to be subjected to blast from the fan, for separating the lighter matters from the heavier by
carrylng them upward, while allowing the latter to fall to the discoarge apout. There is an offset in the upper partor the tabe, where it is design
 deconds worth saving, together with some ref use, shail
ducted Into another vertlcal tube, to be subjected to another blast from heman, by which the lighter matters are again to be separan ed and carrie the blast is turned to a horizontal course, so as to further facilltate th alling of whatever matters of value for four may yet be in the escapting current, and below 18 a wide laterally descending portion of the lower wa athe pasage, for recelving as much or the droppings as may be of value
and conducting them into a third upright tube, when they are again treate to a vertical blast, and the heazter matters let fall, nhlle the refnase is car rled of through a horizontal discharge spout. This apright tabe rececives abparate blast from the fan. The spoats may all return into one recepta together, as the object is not so mach to make different rrades, as it is to
 without waste.

Improved Dress Elevator.
Margaret H. Bergen, Brooklyn, N. ․ -This invention consists of a tape of proper length, having rings attached at proper Intervals to receetve a
cord, the middie of which 18 attached to the center of the back. The tape is sewed at the proper distance from the bottom, ollowing the curve o the dress. From the center of the tape the ends of the cord pass throug ine eyelets or rings in opposite directions, and are carried ap throngh silh
in the dress to the front, where they are passed triougha cord holde In the dress to the front, Fhere they are passed throug a cord holde tension for the proper sapport of the dress. The ends of the cord are then nedin a clasp, which hs hooked ap at one site of the dress.

Improved Fire Extinguisher
Yraac C. Audrews and Amzl S. Doda, New York city, asaignors to Home Ire Extingulsher Company, 解e place.-This invention has for its object thprove he costruction of are extingusters in sucha way tat chaige the acld, which cannot be tampered with without Indtcating th which willg tve warning ghould any one attempt to remove the head while the apparata.
time strong.
Fire Extinguishing Water Pipe Attachment for Buildings. Thomas Milier, Jersey City, N. J.-This Invention relates to otilizing the are extinguising water pipe attachments used to conduct the water to the bily, two plpes side by sile, or ore separated into two branches above the lower story, with rungs for a ladder crossing from one to the other and
connected to them. The rungs are made of tubes, for allowing the wate to circulate through them to keep them cool when exposed to are in the bullding, and thas form the ladder, avallable when it would not always be
with solld runge, which heat whea solld, so as to render the ladder aseless.
Improved Perch for Bird Cages.
Edward Hutchinson, New York clty.-This perch is com
rplece of wood and a cyllindrical plece the latter beting for the of a tubu of its length of the samestee as the former, but considerably longer, and haring a portion of about equal leng th of the tube reduced sufflciently to cyllnder will not quite meet together. The redaced portion of the cylin drical plece ts provided with small grooves, both longitudinal and circum Yerential, to aford htidng and nesting places for the small tisects which Infest brdis. By this means the Insects may be readill destroyed and
cleaned off from the perch by taktin it out of the cage from time to time? cleanging it in bolling water, and then separating the parts and remoring
plat planging it in
the 1 Insects.

Propelling Canal Boats.
H. B. E. Von Eliser, St. Louis, arrangement of slotted guides and ad justable collars with the paddie lev. ers for the parpose, respectively, of mantuatinng them in a vertical plane
While vibrating, and adjustug the leverage of the paddies, and also the
depth to which they shall work in the water.
Charies H. Gartrell, Paducah, E Y.--The object of this invention is to proace an improved gas burner and regulator, which feds the gas steadily
nd equally to the fame, and economizes its consumption. The invention and equally to the name, and economizes its consumption. The invention
consilats in forming the burner of dirferentchambers, to which the admlas. sion of the gas is regulated, and the fow steadied by means of a distribating cap plece, which spreads the gas and supplies it to the name.

Improved Circular Sawing Machine.
Oscar A. Dean, Bethel. Vt.-This Invention has for its object to improve
he construction of circular saw machines, so as to prevent the lumber and ilivers from beling thrown agalnat the operator, to prevent the operator's .and from betng cut while attending the saw, and to prevent the operator rom betng injured by the saw ifying into pleces when ranning rree and
nen saming thin lumber; and is an Improvement upon the patent granted O the rame inventor August 12, 1873. A circcular spreader enters the ker and opens the lumber, so that the same may not bear agalingt the sldes of the rear part of the saw. A gaard ats over the upper part of the saw. and
prevents anything from coming in contact with the upper part of the saw nd also prevents allvers from belng thrown by the saw agatinat the operator. It may be ratsed and lowered as the thickness of the lumber may re-
quire, and can be adjuated without disturbing the gage, while the gaze can be adjusted without disturbling the garard.

Improved Mincing Machine
Edward Cluney, New Bedford, and Charles Lepine, Boston, Mass.-This 10 an improved mincling machine for whalers, for mincting or sllicing bluo-
ber before putting it in the trying kettles. It consitat in a carrrer and self adjusting holding derice in combination with each other, for feeding the blabber forward to the knives, and in knives for sitcing or mincting the blubber as it is carrited forward by the carrier. The blades are curved, and ane twisted spirally, to correspond with the rapidity of feed, so that be Ing operated $u$ pon by the sald blades, 1 s carried forward. The shaft tis so of blubbernot quite off, enabling the blubber to be handied with forks.

## Catherne Tardy, Paterson, N. N. -This tis ang Corset.

 cise by morifg their limbe without creepling aboat the ioor. It conalits in an Improved buby.exerclating corset formed of two parts, connected in front by a cord or lace, and tin the rear by cords, atraps, or ribbons, and pro-


Amproved Carriage Cartain Fantener. nent in the class of carriage curtain fastentngs formed of an lmprove.
 onally), which engages with the head of the knob; also, tn proriding the annular plates with colncldent notches to adapt theum to recelive or at the shant of the button; and in a protentive covering applited to the Inner
matallic plate or ring, to prevent abrasion or wear of the carriage top bow.

## Improved Pipe Wrench.

Adam Collis, Altoona, Pa. -The head has a central hole, which allowa tit to be slipped over the stud which is to be turned. A projecting steel die ts
placed in one side of the hole, and passes entrely through the head. Its dges are designed to penetrate the stud and prevent the wrench from turn ing on it. The worksing lever works loosely in the head. Its end is ser rated, and profects tito the hole and engages with the bolt. The end or a
screw enters a slot in the lever, whlch allows it to play oack and forth. In gripping the bolt, a lip which works through a alde slot bears upon the alde of t.
talined.
Improved Furnace for Steam Boilers.
Dantel T. Casement, Patnesilile, oblo. This invention consists in a sya. em of Inclined tubes in the upper part of the furnace for sapporting metal
alla, to facllitate the combuation of the gases by thelr implining on ced hot sarfaces of the balls, in which heat ts atored up. The and tube are arranged in two series, extending from the top or near it on opposite Ides dlagonally across and downward, crosstng each other at the mplddle Yorming chambers for storing the balls. They are arranged in this way to raclltate the fastentng of them in the furnace walls; aliso, the cleaning of
them from time to time of the deposit that may result from the use of nam from time to
and
and

Improved Composition for Black boards.
Richard Sharp, PIttsburgh, Pa., ase8gcor to himself and Robert W. Hare umice stone, colored to the proper shade by trory blark or similar mate Tlai. The pamite stone thas colored 18 mixed with coach varnish and turpentIne in suffclent quantity to form an ad heslve plastc mass, with which
wood, stone, metal, or other material 1 s covered. The composition adheres Food, stone, metal, or other material is covered. The compoition adheres
armly and soon drles, leaving a hard, smooth surface, admirably adapted rmly and soon dries, learing a hard, smooth surface, admirably adapte Improvement in Converting Motion.
James Vivian and Henry s. Mackenzie, Falmouth, Englind.-Tus Inven he convententy rotated to the same or opposite directions. A sbaft igldyly at ached to the screw propelier, and a sleeve, on which ts made fact second propeller, is titelf loose on the shaft. There are two wheels, one ast on the Blath and the rist pins placed on their opposite faces, and each piroted in shding locks. The piston tion. In these boxes the wrist pin blocks silde from one end to the other at each half revolution of the shaft, golog back on the second half revolu In. If these blocks are on the same slde of the shaft when the platon 18
perated, the propellers will both move in the same direction, while 18

## Improvement in Preserving Beer and Wine.

Willam Lelst, Mllwaukee, Wis. -This is an improved vent attachment, to be used in connection with barrels contaliting fermented dlquors, by
which the back pressure of the llaulds in the caske and thetr commingling with the llquid in the seal cup are prevented, together with the drawtog.0. of the liquid of the seal cap tinto the cask, so that the uninterrupted and effective actlon of the vent cup is produced. The Invention consist in the arrangement of a liquld sealed vesel, provided with an open alr pppe and
fap valve at the bottom, with a secondary flap valve in the apper part thereof, so that the alr enters into the barrel without allowing the liguld

## Improved Eaves Trongh Hanger.

Lewis E. Gould, Nasina, N. H.- The object of this invention is to furnish an improved eaves trough sapport which is readlly applled to the wall below the roof, and admits of aduastment in horizontal and vertical direp.
tion for obtainng the exact position of the trough. The invention con.
 has adjusted thereon, tu horizontal and vertical direction, the upright arm with forked end, for supporting firmiy the trough. The connection of the orizontal and upright arms is made by a clampling screw.

## NEW BOOKS AND PUBLICATIONS

ariadne Florentina: Six Lectures on Wood and Metal Engraving. Given before the University of Oxford, by
John Ruskin, LL.D., Slade Professor of Fine Art. Price \$1. New York : John Wiley \& Son, 15 Astor Place. The subtle critclesm and ornate rhetoric or the eminent Oxford Profes
sor are well shown in these six lectures, which exhtht1, In every page, the解 clent and modern art. It 18
eespect worthy of the text.
My Visir to the Sun: or Critical Essays on Physics, Meta-
physics, and Ethics. Volume I: Physics. By Lawrence
S. Benson, Author of "Benson's Geometry." New York: S. Benson, Author of 14 Benson's G Geo
James S. Burnton, 149 rand street.

The author of this work confesses his " respect for the treasured wisdom
 tween the wisdom of phillosophers on the one hand, and trath and tncuitry on the other, 18 Implited throughout the book; but the anthor 18 not likely
to disturb the general belteo of educated people that the wisdom of Sclence io disturb the general belief human knowledge is not likely to strink from its own "wand," Which is that of truth. Certainly, if the accumulated knowiedge of the ages is eve
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facturers of Metals in the New England States. Boston, facturers of Metals in the New England States.
Mass.: Edward H. Adgms, 82 Washington street.
The information promised in the title of this book is fully given in it pages. by Charles A. Peverelly. $\$ 4$ per an
August Brentano, 33 Union Square.
This magazine malintains the excellicnt reputation it has in a short time acquired, and its pages will be read with interest by all lovers of the manly sports
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In our answer to H. S. H., H . 15 , current be substtuted for
log compression.
A. L. M. asks: What is the cost of a ma-
chine for making ice ? It a steam engine neceasary, and what amount of power does it require? How many
pounds will it produce per hour? How much would it eost per hundred pounds, exclualve of first cost? $\mathbf{A}$.
Your questlons are rather indefinte. A small ice ma. chnne, to make from one to two tuns a day, will cost
about three thousand dollars. The running expenses would be from tive to six dollars a day.
W. F. W. asks: Which gives the most
 minute by a good power of the endless fioor form? A.
rdinarlly, an engine of one harse power willdo more rordnarily, an engine of one harse power will do more
work tin the esme time than a horse, and the engine can kept at work much longer than the horse.
J. D. R. asks: Would it be practicable to
 5 tuns, and to ascend grades of 100 feet to the mile ? The
 oak, or maple? A. It would De better to have the ralls
neariy twice as broad, and to ft the wheels of the locomotive with rubber tires. We would recommen
R. M. R. says: 1 . I am building an engine the cylinder and bed plate. How large ought the bal.
ance wheel be, and what should be its welght? It 1 t to ance wheel be, and what should be its wetght ? It is to
take belt. A. About 10 Inches dlameter and 2 Inches
 ues forregulating the ponto o of cut-. on by means of the
governor. It would be dufflcult, however, to make such

 tubular, be large enough to run the eng:ne at at an revolu-
toons under 60 los.of stea ? tion, the engine would be about $\chi$ norse power it the
presure were 60 lbs. on the platon during full stroke. A. It will be large enough, if properly set.
J. T. S. asks: 1. What is the best cement
for filling millatones? II plaster of Paris and alum will do, how should it be prepared? A. Take baked plaster
of Paris, steep tin a saturated solution of alum, recalcine, and reduce to op owder. MII with water for use. edge of the eseat broken off; it lets trough so much
gteam that Icannot stop the engine without taking off
 than getting a new valve? A. Possibly
repalred, or a new seat can be fitted in.
S. A. T. asks: 1 . What is the modus operan-
di of plating by the galvanic bat ery? metal to adhere? Is the metal visible in the solution?
A. The metal 18 not visible it the solution. The attrac tion of the fine particles of the deposited metal for the
properly prepared conducting surface of the negative roperly prepared conductIng surface of the negative
pate cuaces its adherence. 2 . What tis the action of
 sing Its escape the pasase of the water 18 relleved and
allows another welghted valve whlco was closed before to open. Thls permitts the water to fow again, when its
presare once more closes one valve and opens another.
 $\{$ calctum nsed for? A. It 18 emplosed in many chemt. al processee. Its arldity for moisture 18 remarkable.
Coples of any of the patentsissued can be obtasined fro. this oflce.
B. R. asks: What is the most accurate rule
or inding the triction on the slide valve? A. It is

M. F. J. asks: 1. In your last issae of the pitton rod and cylinder head of oun engine were lined can I put on the tin so that bot lead when Fill run evenly overthe earface? A. Bulld a rim around the head. 2. Would copper be better th
can use $w t i c h e v e r$
18
most conventeat.
M. H. H. says: 1 . I and a few friends have a an argument as to which was horizontal motion.
Some ol us contended that a mill burr revolved horizon. Some of us contended that a mill barr revolved horizon-
ally, and others that the cylinder of a thresbing machine as an example of horizontal motion. We concluded o get your views. A. It is usual to speak of a vertical heel as one in which the shaft is vertical, and to callt horizontal wheel when theshaft is horizontal. 2. Why polar diameter? A. It is supposed to be due to the ac-
tof central forces, when the earth was in $a$ fuld e. central forces, when the earth was in a fluid
J. H. asks : 1. How are black lead crucibles made? Is the lead mixed with any other substance?
. It is mixed with from one third to half tis weight of
lay. 2. Could I use plaster of Paris molds for casting coppershould I use to make a good bo proportion of not gife sufflctent particulars. You will fla
tions frr journal bearigg in back numbers
W. E P. asks: 1. What would be the caacity in gallons per minute of a force pump 5 inches er minute, with 4 inches suction? Will gou give us the formula for the same? A. Multiply area of plston, in
Inches, by length of stroke and by number of strokes er mloute, and difide the product by 231. 2. For clean ng 100 ibs. of cotton waste, how mueh blsulphide of
arbon should be used? A. See p. 44, vol. 29. As to the blower, address the manufacturers.
A. P. B. says: We run our machinery by practicable and not expensive method of converting the urplus power into heat for warming the shops? What
would be the effect of using, say 10 horse, power in conWould be the effect of using, say 10 horse, power in con-
densing the atmosphere into strong radiators, to 100 lbs. to the inch? A. Some modification of your plan
would probably answer very well. So far as we know,
$\underset{\text { ur gage glasses kept breaking, and he could not get }}{\text { A. }}$ any to stand; upon enquiry we found that he often took
his glasses out and cleaned them with a plece of waste tled on to a plece of stout wire. Upon our tryling the
experiment with a plece of telegraph wire, by thrusting itin and out several times through the bore, the glass
broke into fragments in a few minutes. Can you explain roke into fragments in a few minutes. Can you explain
to If the discovery may be of service to engineers and others, in the way of caution, I hope that you will
give them the beneft of it. A. Most housekeepers know he fact that it will not do to use fron rods in cleaning lamp chimneys. The trouble is probably caused by the
unequal heating or coolling of the glass by contact with the ir
glass.

F. W. R. asks: Does the lateral pressure | the enlargement of the reservofr? $\begin{array}{l}\text { A. In some cases, } \\ \text { jes, and in others, no. Thae, if the depth remains con- }\end{array}$ |
| :--- |

C. E. T. says: The common rule among
echanics or tinding the apeed of a driven shatt, when the diameter of pulley on the shaft and the diameter
and speed of the pulley on the driving shaft is given, is to multiply the diameter of driving pulley by the number of its revolutions per minute, and divide by the di-
ameter of driven pulley. Some of those who should know ssy that unless one thickness of the belt is added the dlameter of each pulleg, the answer will not be to smaller pulley, the result of the calculation is a less number of revolutions than by the first rule, and rect method is to add the thickness of the belt. This may be explained as follows: The belt leaves the driving pulley in the direction of a tangent; and neglecting the
silpping, the ratio between the veloctites of the driviag nd driven pulleys is the same as would take place with of the belt in contact with the pulley, neglecting the slip, acts as if it were rigidly connected to the pulley, so that the line of connection between the driving and
driven pulleys must be in the axis of the wrapping con-
A. R. asks: 1. Are Britannia and white met

1. use for chucks for spinning? A. A close gralned,
C. H. C. asks: 1. What can I put on paper
ditase impervious to molature? f alum and $8 \%$ ozs. of white soap in 4 pints of water; pints of glue in 4 pints of water. Mix the two solutions and make the mixture hot. Immerse the paper in the minture and then hang it up to dry or pass it between
cyllnders. 2. What do $8 \mathrm{vo} . \mathrm{I}, 16 \mathrm{mo}$., 18mo., and 4to. mean? A. 4to. means quarto (4 to a sheet),
octavo (8 to a sheet), 12mo. means duodectmo ( 12 to a
heet) and so on. 3. Will the moon eclipse any stars or heet) and so on. s. Whin moon ecilipse any stars or
lanets next month? If so, which one? A. Consult the
H. S. asks: What ready method is there of precipitating antimony from solutions with ott er met-
als? A. There is no general method of separating anti. sme solution. If arsant, \#hd tin are a bsent. the easlest Fay is to precipitate with hydrosulphuric acid as sul-
phide of antimony. In answer to your other questions, phide of antimony. In answer to your other questions,
see our advertising columns for booksellers' addresses
C. N. M. asks : What is " red acaroid of re-
in," mentioned in a late number of your journal, as part of a recipe for imitating mahogany? A. It is the
resin of xanthorrhea hastilit, a liliaceous tree growing In New Holland; also called resin of Botany Bay. It has a yellow color, an agreeable odor, and 18 soluble in alco-
hol, ether, and caustic potash. Its potash solution, reated with hydrochloric acid, deposits benzotc and and so readily that this realn appears to be the best raw material for obtaining picric acid. By distillation, the
resin yields a light neutral oll, which appears to be a misture of benzol and clnnamol, and a beavy acid oill, tonsisting of hydrate of phenyl. mixed with smail quan-
titles of benzolc and cinnamic actis.
W. F. asks : 1. Will a single cell of a sul. phate
about
many
A.If c

of zing and leas, as described In the Science Record of
1874, would It take to make it work? A. About three Would copper wire, No. 28 , do for the wire to connee
 ting a horseshoe electromagnet, is coarse or fine wire the best ? A. Ase 22, 8llk covered. 6. How should It be
wound on, the same way on both poles or in oppostte mound on, the same way on both poles or in opposite
directions? A. Wind in the same direction. Connect irections? A. Wid In the same direction. Connect
both tinside and both outside wires. 7 . In making an Induction eotil, it it ne necessary to have the wire tnaulated? A. Yes. .8. How would it do to have one coll of
the primary tnefde, and then have 4 or 5 collis of the secOndary wire, then another coll of the primary wira,
hen 4 or 5 of the secondary, and so on through the in duction coll? A. There would be nothing gatined by so
dolng. 9. In the Sorestririo AMERITAN for April 4 , you
 many feet, and what stze of wire does it take to make Ired. Fachine, to give shocks ?
From No. 32 to 40 will answer
D.M. T. says: On p. 183 of Science Record ar
an you inform ment with 1odate of calclum are relarted. Iodide of calctum ts prepared by mixing a oolution of the todate of potassium with a solution of chloride of formed remains dissolved in the water ; the remainde crystal'zes out slowly. The todate of calctum is formed by melting lodide of potasilum in a cruclble, learing it ong cool till it becomes semifluld, and then gradually add
ing 1\% parts chlorate of potassium the mass becom. $\mathrm{ng} 11 / \mathrm{parts}$ chlorate of potassium the mass becom-
fuid, swells up, and solldifes to a spongy mass of fodate and chloride of potassium. It is dissolved in hot water the todate left to crystalize, the crystals redissolved in J. N. J. and J. B. ask : Is there a solder that
will solder aluminum? A. The largest dealers in and will solder aluminum? A. The largest dealers in and
manufacturers of aluminum say that there is no solder that willanswer. Try the pure metal.
J. F. A. says: In a factory there is a large
belt running over two pulleys. A person standing ander the belt with his hat off will have his halr lifted on end if he raises his hand above his head, a light of a violet
bluecolor will escape from the end of his fingers. What causes the electrictty? Can it be collected? If so, how?
A. The phenomena are those produced by frictional electrictty and are due to tha friction of the belts. The
electrictty could be collected bya series of brass needles electricity could be collected bya sertes of brass needles
placed at sultable points, and directed towards the belt placed at sultable points, and directed towards the belt
H. S. B. asks : 1. How can I purify solu-
tiens of sulphate of alumina from iron ? They have an acid reaction, and give blue and green precipitates with
the prusslates of potash. A. To the dilute solution add slight excess of solution of ferrocyantide of potassi m. Allow the prectpitate to settle and separate by de
cantation and flltration. 2. How can I separate naptha line from paraffn? I have a crude heavy coal oll whic contains both. A. We find no process for this opera
tlon. tion.
B. W. R. asks: 1. Has there been any sub Please give me the spectic gravity of the following
Oxygen, yidrogen nitrogen, chlorine, bonic acid. A. The specific gravity of hydrogen being bonic acid. A. The specific gravity or hydrogen belng
taken as unity, that of oxygen is 16, nitrogen 1814 , chlo-
rine is 855 carbonic actld is 44 . Arr being taken as unity rine is 355 . carbontc acid is 44. Alr belng taken as unity,
oxygen is 1 1056s, hydrogen is 0 .06926, nitrogen 0 971s7, chlorine $2 \cdot 47$, carbontc actd $1 \cdot 524$. 3. Please give me directions for making a waterproof glue. A. Add $\mathcal{y} / \mathrm{lb}$
of common glue or isinglass glue to 2 quarts of skimmed milk; and then evaporate to the thickness of glue. See
H. K. M. asks: 1. Which is the most suc-
cessful form of magnetic motor? How are the magnets arranged to give the motion? A. It is said that the bes periphery of a large double wheel, while the armature are fixed and arranged in such a manner that the accu-
mulative force is obtained.
$\begin{aligned} & \text { 2. What amount of force }\end{aligned}$ mulative force is obtained. 2. What amount of force
does it possess? $A$. One constructed on a large scale has driven a car, on an ordinary rail track, at the rate o
J. M. asks: 1. How can I make a solution
gold that can be used to plate small articies with by Daniell's battery? A. Dissolve one ounce of cyanide
it potassium in one quart of nearly boilling distilled wa. About half fill a porous cell with the solution, and stand it in the Vessel contaning the bulk of the solu-
tion. Attach a piece of sheet copper to the wire fesuing from the zinc of the battery and place it in the porous
cell. Put a plece of sheet gold, attached to the copper from. Put a plece of sheet gold, attached to the copper
cell.
of the battery by a wire, In the outer solution, and allow the whole to remain in action until the solution has ac qay be ascertained by weighing the gold before, and at ter immersion. The porous cell may now be removed
and its contents thrown away. The solution is now ready foruse, and should be worked at a temperature of about $130^{\circ}$ Fah. 2. How is a composition made. of not know the composition you mention. Try plaster of
W. F. G. says: 1 . I have a battery and all
the applances for allver plating, and succeed in getting good thick coating of silver on various articles, but smooth brilliant surface. What tools are otain a nic nish silver? A. Burnishing tools, which are made for the purpose and are of different patterns, are used.
They are rubbed smooth on a damp cloth, and the polThey are rubbed smooth on a damp cloth, and the pol-
tsh imparted by rubbing to and fro on the silver plated ish imparted by rubbing to and fro on the Biverplatin
surface with pressure. 2. Can you tell me what kind of chalk is used to mark on glass, and how it is made
A. By mixing powdered chalk and soap and drying the
H. L. C. asks : 1 . In making an electric en-
gine, is it best to use a $U$ shaped piece of iron or two separate pleces? Which is best, wire 1.32 of an inch in iy insulated? A. It is customary now to make the mag net in three pleces, the sides belng made of bar magnet frrewed into a crossplece, the whole being nearly in the
form of a square. Use No. 22 wire. 2. Does the pown form of a square. Use No. 22 wire. 2. Does the powe layers of wire with which it is wound ? A. To a certat point, but the size of the coll should not exceed an inch
A. B. asks: 1. What is the cause of musti-
ness in flour? ness in flour? A. A chemical change which tate
place in molst ilour. 2. What are the chemical properplace in moist flour. 2. What are the chemical proper-
ties of musty flour? $\mathbf{A}$. The glaten of the flour under goes a change of properties, in consequence of which
It slowly loses its soft, elasicic, Insoluble condition, and becomes converted into a subatance closely resembling
J. K. says: I have been running circular
aws for saming log for over 12 years, and bave not had samy too saws with teeth at a uniform distance appret.
It seems that tit has been demonstrated that a circular It seems that th has been demonstrated that a circular
saw ought to run ,opo feet of cutting edge per minute ; ilshedrule for the distance of the polnts of the teeth apart. Please inform me if there is any such rule, and state whether there are emvable tooth saws that can be
usfd with side set. We never have used that klnd, but very thectionable, $A$. of saws, the numerous varieties of timber to be esawn,
together with various capactites of milli sawing as
 fsct that soild toothed saws with side set require even
numbers of teeth, preclude the possibllty of establish Ing any deanite rule. There is no manufacturer of tin.
serted toothed saws who recommende a them; and the fact that Inserted toothed saws are fast
supersedlig the old style of solld saws,and are approved by many of our beest and most experienced sawyers and
lumbermen, who spread the teeth exclustrely for the set, seems to coalict with your idea of objectability.
J. W. C. asks: What are the following ar
ticles: Pulv. Frondesse Chizeta, Pulv. Milvani Rad. Pulv. Perino Alnifolla, Ext. Bertula Natura? A. A com petent authortty says that these names have been writ.
ten by one not unacqualnted with pharmaceutical and of things which do not actually exist.
S. A. G.asks: 1. How long does it take to
send a signal through the Atlantic cable? A. About
 speed of efectrond.
miles per second.
J. T. B. S. asks: How can I make a simple
mumfe fornace for tie porpose of enamelling photo


W. H. S. asks: 1. If a wheel were placed In a pertect vacuum, bo arranged that there woula be
no friction, and set in motion, would it contline to re volve for ever? A. Yee. 2. How 18 the gily certn com-
monly sold by drugglats manuactured? A. The mother iquor of the soap boller is irst concentrated by evapo ration, the salline matter which 18 thereby gradually
separated belig removed from time to time. When the nuld 18 sufficlently concentrated, ascertained by the

 sirup in a vacuum pan.
S. P. says, in answer to
fora formua for mixing show card painte:
V. The follow.
. tng will answerthe purpose: For black, asphaltum vart
nish 8 parts, dammar varnilgh 1 part, tube blick to zait temper with gplritt of turpentine. For fancy eolor,
with glose use any dealred shade (tube colors) mixed in with glosi, ase ay temper as above. These colors should dammar rarnish; temper as above. These
be used freely and as rapldy a
posible.
O. K. asks: How can I mend a broken band
 With two horse
$m \mathrm{~m}$
10 to 16 inche
 more work with the same power if 1 double the speed
with countershasting? $A$. That could only be declded
 plece of gearing you put in consumes some of the J. A. P. asks: Is there any comparatively
 aploy a windmill.
A. P. R. asks: Has a man, to get steam boat Where woola be the best place for a beginnier to go to to
get on? A. It to desirable that he should be, but we be. Heve it is not aboolutely essential, provided he can show that he has autle cent practical knowledge to make
ordinary repairs to engines and bonlers. It might be well for you to try and ge
L. F. L. asks: Are the hard spots in steel.
rendering the same diflcult to work, properly called kutas?
usage.
T.
G. Jr. asks: 1. For a 30 inch diameter be thicker than a wrought one $x$ Inch tht the ? A. It
could not be made as sate. 2. Can small fues be put Into a cast tron head in the usual manner and make a good Job? A. Not as well as in the case of a wrought tron
plate. a . How thick should a cast tron head 30 tinches plate. . How
dameter, without fues or stay bolts, be to tatand 1001 bs. per square tinch?
C. B. K. asks: 1 . Are the civil engineering
schools of Earope better than those of America? Thes are generally more thorough. 2. Whtch are the
beat In the Cnited States? A. We do not eel able to
ond neering schools in the country.
S. S. asks: Can you direct me to an analysis of the billers scale from sear-goting evesels that have no
condensers? A. An analysis of the scale foond in Freneh sea-goning steamers gives the follow ing results; Sulphate of lime es 2 per cent, carbonate of magnesta
245 per cent, free magneala 595 per cent, water 6.5 per
C.W. S.says: I have always been instructed to piace my valie with the preesare en top of the e esat.
Now an engliner of tys years expertence tells me this ti wrong; the biller pressare ought to be underneath the valve eat. I want to know which 19 right ? $A$. Your
method is most generalls adopted. still, there are a vocates of the other ystem, clalming as an advantage
the Possiblity of packing the stem with pressure in the W. P. B. asks: 1. What causes the lumpy or boggy formatlon 1 Io marshes and wet places? A. At
is caused by the accumulation of dirt and vegetable matter at certain polnta, whith are determined by local
causes. 2. What colors Ehall I mix to make brown madder? A. It 1. best to make an extract of the burnt
root of the madder plant. 8 . Can you tell me of a book On foosilis, and one on the preserration of birdd or other
animisis? A. Consalt Dana's "Geology," and Conet

H. J. H. Agks: 1. What is the exact differ he terms are ordinarily used, al low pressure engine has
condenser and alr pump, and a a high presaure engline a condenser and air pamp. and a hinh pressare engine
has not. 2 In your last week's paper you say the horse
pooer by the velocity of the piston in feet per minate divided by 33,000 . If a cyllinder is $4 \%$ tnches dameter $x$ inch
 $50943 ; 15 \cdot 90431 \times 60=954 \cdot 261 ; 954 \cdot 261 \times 250=238565 \cdot 25$
$83,00=7$ horse power. If the encine only made 80 rev $83,000=7$ horse power. If the engine only $m$ ade 80 rev
lutions per minute. what would be the correct result? A. The frat example ts right as far as you have carried it for the second, we sball have $\frac{954 \cdot 261 \times 80}{33,000}=2 \cdot 3+$ hors ower. 3. What ts meant by injection? I I m told that
timea as much water Is neceesary for injection in a 1 o motive boller sa is required for steam. A. Injectio
T. H. D. S. T. H. A. S. asks: 1. Has table rapping ever
been scentifcally explaned? $A$. Frequently. 2 . What Was the conclusion arrived at ? A. That the exper1-
menters were self-decelved as to the supernatural char jeter of the phenomena. 3. Dld not Profesesor Frarsady al Researches.
A. . D. asks: What articles are used with
lime to make biackboards for school purposes?
A. Mapufacturers of blackboards for school parposes
inform us that they do not use substances with llme. They prepare a sarface of hard plaster, and then pastin and a varnish which, when dry, will not crack. (What
dfflcultes have you found in making gelatin for molda? o you mean in making the gelatin, or in using it fo
thla purpose ?
A. O. says: 1. What cement is best for the A. Take whte lead 3 parte, and red lead 1 part. 2. Will
 ine, also the platon? A. Robber packing is mostly
H. A. F. asks: 1. What are the ingredients and is sugceptible of high polish? What ktnd of mold
hould I use to have the work come out very smooth . Pure copper iol parts by weigot, zinc 17 , magneeth
a , Bal ammonlac $3 \cdot 6$, quicklime 1180, tartar of commerc
The copper is Ifrst melted, then the magneala, ammonnac, IIme, and tartar in powder, IItte by Ilttle
 mall grains by throwing it on the surface and stirring
ntil it is entirely fued : the crucble is then
 be is then uncovered, akimmed carefully, and the alloy cast in a mold of damp sand or metal. The orolde meits a temperature low enough to allow its application to ll kinde of ornamentation; it has a fine grain, 18 mal-
leable, and capable of takling the most brillant pollish when, after a time, it becomes tarnished from oxida. lion, Its brilliancy may be reatored by a ilttie acldula.
led water. If the zinc is replaced by tin, the metal ee stll more brillant. s. Can I get the scraxtrino
 re mostiy ont of print
S. F. S. asks: How can I take perspiration
and grease stalas out of Panama hats
wlicout Injuring the straw? A. T.
or French chalk.
J. A. F. assss Is there a liquid preparation郎
A. H. T. asks: If a small vessel should be arge vessel, what would be the effect upon the air tin ne manler one? Would there be any pressure out.
hat Wards? A. II the vessela communicated, the air in the
tnine veseel would expand, and diftuese tiself until the
J. G. C. asks: 1. How many cells of the or

 ance the phenomenon of the voltalc arc ? A. From 20
to 030 cells, according to the atze of the arc required. 2. That number and isize of copeper wire is best for the e
 ary.
R. A. M. asks: In making a magneto-eleckilla human belng, what must be the poerer of then ermanent magnet? In other words, what welght must t be capable of litting? $\mathbf{A}$. The power does not depend upon the attractive force of the permanent magnet
alone, and the question 1 f foun ied on an erroneous idea of the princtple and mode of constructlon on euch ma. for medical purposes, and are they generally driven oy springs? A. They are goting out of use, and lecectro-ms

G. F. S. asks: Why does the point of the

C. C. H. asks: How can I make a glass box
io
hold a sointion of nitrate of silver? I think I could
 bber will do
R. S. asks: What would be the cost of a malls switt-ealling gteam lanch, length of hunl 15 or 2
feet? A. About one thousand dollare. 2. What rate or speed per hour would she have? A. SIs miles an hour.
2. What would be the power of the engline? A. From Tour to five hore poper. 4. H.
she carry? A. About 1,000 ibs.
W. E. F. asks: How can I make a cheap han a tuln glase candy lar, Ilined inelde and ontalde with tin foll such as 18 used to wrap chewing tobacco in. Stick the foll on with macllage, varnish, or foour paste.
 ter, so that the water, both outside and Inside, shall be on the same level.
J. B. H. asks: 1. Which t'me of the year is nn what shall I Io to make them grow gain? A. See
p. 180 , vol 28. 2. How can $I$ make puty or a brig ght yel. low that will stand when
putty with chrome yellow.
$\underset{\text { wound wilh }}{\text { W. . A. ingalated copper wire } 100 \text { feet long }}$ roduce as much magnetism as two wires 50 feet long
 B. A. R. says: 1. Is it injurious to inhale lous in small ganantites. 2. What canese minluthda
 the surrounding air into a rarened atmosphere, pro.
duced by the ristig of vast bodies of air, overa heated anced by the rising of vast bodtes of alr, overa heated
area. S , I have noticed several times this spring the moke fromadwelling gathering around a new bar situated about one hundred yard from the dwelling,
about 15 feet below the level of the house. What 18 the cause of it? A. It nnds about the barn a stratum of If of density simlilar to that in whtch the smoke itsel struction which it ofters prevent the emoke belig car X. a aks: Why is it that the storm glasses
old in shops are hermettcally sealed?
Do they not all

T. A. C. Bays: The lightning rod on my enters the ground to the depth of 10 feet on each side
ranches of the rod sre corinected and extesa several

.1s tnis a good way to arrange a 11 ghtnnng rod $\%$ A.You irrangement of rod is good so far as the bullating 18 con.
 the rod and the water conductors? The latter are tin
and extend entrely around the bouse, but do nut reach le ground by 3 or 4 feet. A. It adds to the safety to connect the water conductors and roor with the rod
3. What would be the effect of a pile of acrap tro around the rod where t $t$ enters the earth? A. The fffect of scrap iron or fron ore placed around the base of the
red would be to increase the secerrity. The best way rd would be to Increase the securtty. The best may
would be to dig trench three feet deep, leading away rrom the house. Bend the lower end of the rod to run In the trench, and lay your scrap tron along the bottom
of the trench. Let tue extremitr of the rod communtof the trench. Let the extremity of the rod communt-
cate with the iron. The larger the auantity of fron and cate with the iron. The larger the quantity of iron and ittle value anlesis tiat portlon which enters the ground
nen sextensive or is placedin connection with a large mass of conducting material, such as iron, iron ore, coke or
J. M. says. 1 . I have a scroll chuck to a
foot latite walch will not run true on the esplndle. How
 2. What wages do machinitata get during apprenticeship A. About fifty cents a day. s. Can a machtnitst become mechanical engineer by scadying during the time al. tow have the necessary perseeverance. 4. On p. 316 , vol 9, you give an engraving and descriptlon of an Induc
Hon coll. How can I make one? A . See ${ }^{\mathrm{p}} \mathrm{p}$. 264, vol. 25 , You should consult some good work on the subject,such
as Noad's "Text-book of Electrictry." The esetch te oot sufflelently complete to enable one to buill the cot tery changed in quantity or In intensity by making the
acld solution weaker? A. All the qualtites are aftected relatively. 6 . Can I melt brass in a cast iron crucible tin charcoal ire, with a hand
S. F. R. asks: 1. How can I braze cast iron
 an case-arden wrought iron? A. Pace the aruclee barcoal, and exposose the box to to low red heat for a few sorteuedfor engraver's s ngen by teel? A. Steel plate 1 box with a well closed lld, with hali an thch depth of
pure ron allong overevery part of lt. The ides of the box most te at least three quarters of an tich in thlck nees. Expp
white heat.
T. C. H. asks: 1. Is litmus paper reliable in
testing for a minute quantlty of nutric actd in
s solution of nitrate of ellver in water? A.Lltmuspaper, properly scriberes printed on the marging of newspapers? $A$. With stamplng machines, made for the purposee. 3. How Io relectrotypling? A. By rubbing the black lead upon with a brash. 4. I have attempted to make smail
stereotype plates by pouring type metal into shallo catesof type. पut cound not get a sharp cast, what tis the
reason? A . You should sink your molds tnto a deep vessel full of molten metal, so as to get a pressure o the cast. 5. What is the beest reatment of steel Instru-
ments, guns, etc., to prevent ruastng? thave heard that opodeldoc rubbed over them was better than oll

 rall way in back num bers of the Sciextipic ankricans.
A. W. says. in reply to J. A. McC. Jr., who
and which is compressed by belng driven through the tube suddenly expand on lisulng between the dass, and
ruanting put in all directlons carries with it part of the
 and the presesure of the air upon the surface of the up.
per card 18 greater than that pelo $1 t$ t. consequently the card 18 for
away.
ars.
J. W. C. says that O. O. W. H. Jr. may fasten
cloth to iron by ioaking it in a dilute sointion of galla, squeezing out the superfinous moisture, and applying
the cloth, still damp, to the surface of the iron, wich has been previoasly heated and coated with strong glue
The cloth should be kept frmly pressed apon the from until the glue has dried.
H. B. says, in reply to J. A. McC., who in-
quiree or the explanation of the experiment described
 of a certan pressure, in a state of rest, the pressure on same. This, however, 1s no longer the case when the in-
quid or gas is in a state of motion. Where the stream or liquuta or gas has to contract by reason of the dimi nutlon of the section of the pipe, and consequently has
to Increase its motion, the presaure tncreasea. In the hydrauld ram, the section of the stream is suddenly re duced to zero, and hence the fincreased pressure. At placess where the section of the pipe widens and the ve loctty of the liquild has to diminisb, the actual pressur
will decerease. In the experiment in question, the alr escape from the center in a radial direction between the pasteboard and the paper dilsk; and as the
section of this current of alr 18 raplaly tincreasing , tts section of this current of alr 18 rapilly Increasing, 1ts pressure is diminished to a degree somewhat below tha pressure on the back slde of the paper disk balances the enter.
Cho asi for the method of photographnging from tr clings on vellum : The negative is made on paper, on Which the lines show whte on a brown ground. This

 With gre
used.
H. M. says, in answer to P. J. F., who asks: What is the proper charge of powder for a 12 callber
shot gun? $A . s=3$ scruples, but you might ase double $\underset{\text { asked }}{\text { M. }}$ W. T. Ther poymder of a coarse gratin Bhoots more strongly than one of a Ane graln: When powder of a
ane gratin ts usea, only a part of $t$, nearest the polnt of igntion, 18 exploded; the rest is thrown out before has time to explode. This may be seen by noticing the
non-exploded powder inside of a gun which has been fred with fine gratned powder. With a coarserpowde thee explosion 18 nearly complete., and consequentlly the
force is ticreased. If blasting powder were uned tin a gun, the forcee would be blasting peowder were used in much space between the gralns as to glve the gabes an
opportunty to expand easill. Coarse esportung powder is the best for shot guns.
 I Clean all diamonds and prectoons stones by washing them with goap and water with a orft brush, adding a
little ammona in the water, and then dry in ine boxwood aawdust. If E. C.B. will put a little pot or pearl
H. M. says, in answer to M. F. B.'s query
(1) as to which will shoot the greater distance, or maz muzile loading gun: A. If the charge it the same
there will not be the least difference. 2 . Is 30 inches ong enough for a 10 gage barrel? A. Yee, for any ga What tre would not hurt 11 it were a ilttie longe
 rrel.
O. P. K. says, in reply to B., who asks what
the proper aliope in left-handed pen manalp: $\because I$ have written with elther hand for over twenty years; and penmananlp. $I$ am anturally left. handeded, but at ound th to beot uells. ound It to be of utillty. I also use both hands in me
chantcal work, which Is a a aving of time., pondent's letter is written parlly with one hand and partly with the other, and it is not po
difterence in the penmanship.-EDs.]
Minerals, fTC.-Specimens have been re ceived from the following correspondents, and examined with the results stated
C. R. M.-Your specimen appears to be a mass of J. H. S.-It is an old Dutch gold coin, and has no par cular value as a curlosity
E. P. F.-It is a twen
mina garnet, of the form known to mineralogitsta D.
D. s.f.-Yne spech

## COMMUNICATIONS RECEIVED.

The Editor of the Scientific Ammbican acknowledges, with much pleasure, the repon the following subjects
On Measuring the Width of a Stream. By N. M.

On Matter and Intellect. By J. E. E
On the Mensuration of the Circle. By I. E. A.
C. H .

Also enquiries and answers from the follow ing:
P. H. B.-V.-J. M.-S. V.P.-W. S. s

Correspondents whose inquirles fall to appear should Cepea, for good reasona, the Editor dey may conclude ddress of the writer should always be given.
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Letters Patent of the United State April 28, 1874 nd each bearing that datr.

Air compressor, W. H. Fauntleroy
Alarm and Indicator, B. Howard...
Alarm, carding machine, F. Wagner Alarm, till, M. L. Morga
 Bale tie, A. B. Hagaman....
Bale tie, cotton, J. H. Lane
Bell, door, J. P. Connell... Bill flle, J. D. Geesaman.
Billard table top, W. Boats, detaching, W. R. Douglas.
Botler, domestic, E. B. Beaumont Boots, lasting, F. D. Ballou...................
Boot soles, finishing edges of, J. W. Dodge Boring tool, metal, A. H. Slegfried
Bottle, self-corking, Bottle, lock extractor for, F. De Gress. Rridge, F. E. Josel
Bridge, Bridge, Iron truss, Hammond \& Abbott Brueh, soot, c. Kacserowsky.

Buckle, J. Spruce
Buckle for driving belts, E. B. Schnabel
Buoy and safe, life, O. C. Retd.................... Can for paint, etc., C. Meyer.
Can, milk, J. C. Mulligan ( r )
Can, milk, L. A. Sunderland
Can, oill, w. Kelley.........
Car axle, rallway, C. E. B Bave
Car buffer, $\Phi$. W. Bark
Car bumper, R. Lloyd.
Car coupling, J. Enos ..........
Car coupling, J. A. B. Patter
Car coupling, Stevens \& Ca
Car starter, Ransom \& Doyle Car ventllator or screen, I. A. Salmon
Car window, sash holder, R. L. Walker. Cars, ctc., propulsion of, R. N. Wetheri
Carpet stretcher, w. W. Potts........... Carrlage, chlld's, J. H. Wygart Carriages, hold back for, C.................. Caster, J.E. E. Bucklingham...
Chatr, fold Chimney top, J. L. Willison. Coffins, zinc molding for, G. S. Ez
Cooking apparatus, G. W. Root. Corn cutter, green, H. B. Kelley Corn sheller, A. Sherwood. Curtain ixture, P. W. Phillip Cutlery, table, H. C. Whlicox... Dredging bucket, T. Symond Engine governor, W. L. Collamore Engine governor, E. A. Sutcllffe.
Engine locomotive steam, w. Engine. rotary, C. H. Palmer. Fan, automatic, W. Fay. Felted fabric, J. E. Pollard Fence Pabrtabace F. Elliott.............
Fire arm, breech loading, E.T.Starr.. Fire arms, lock for, A. Nudd......
Fish for food, menhaden, G. K. Osborn Fiue cleaner, M. E. Welle Fruit dryer, H. E. Bldwell.................. Furuace. steel-melting, A. C. Lew/s
Gate, farm, E. L. Brooks.
Gratn drill, J. H. Landls.
Grain drill, D. E. McSherr Grainlng tool, J. N.
Guitar, G.D. lieed...
Hair swich stock Wister,S. H. Flage Hammer, nall, B. F. Ro Serts. Harvester cutter, 0 . A. HillmaHay loader, C. O. Benton. Heater, feed water, D. Sullivan Heater, wat

Heating arum, Catlin \& Harmon.
Hoboy horse, Andere on \& Foss.. Hoop shaver, J. Douglass..
Horse collar, C. F. H. Huff. Hose and sprinkler, E. Tomiln
Hose patch, O. E. Phillps...
ninant's creeping robe, Kiln, brick, A. W. Duty.
Knife sharpener, H. P. Leather, dubbing for, E. F. Dieterichs. ink motion starting bar, F. We.
Liquors, preserving, J. Clark.... Lock, seal, J. H. Oliver... Loom pattern chain, v.Jagg1 Lubricating compound, D.A. Bradford Match sticks, making, K. H. Schäfer. Measure, graduated, A. M. Osmun. edical compound, W. N. Brewater itering machine, Ber
Mitten, Clute \& Durfee..........
Mitten. J. L. \& J. H. Whitten.
old winger, J. F. White
Music stand and walking cane, A. Iske.
Nalls out of kegs, taking, w. H. Demos
eedie setter, H. H. V. Lilley
Nat
Organ, reed, T. H. Pollock
ven, baker's A. Crumble
aint vessel and package, J. W. Masury
aper box, F. W. Smith (r)
eat machine, D. Alknan
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Photographic reflector, Caristman \& Win
Picture holder, E. L. Sherman.
Pipe elbow blank, G. Lupton
pe core cement, A. Leverty

ranter and fertilizer, seed, L. B. Smith
Plow, M. D. Walish..........................
Plows, moldboard for, I. T. Dyer (r)...
Plumbago etc., pulverizing, R. Anderson
ocket book, G. Jaomagy
Pot, coffee, W. P. St. J
ress, hay and chay, Windley \& Crais
Prohling machine, E. G
Pulley, atop, J. Polltt..
ump, J. Horsley...
Purifier, middilngs, J. E. Gardner.
uicksilver from sulphur, J. P. Slevekin
Railroad signal, electric. J. M Good. Jr...
Rake,
Regulator for flutds, pressure, Young et al..
Rolling machine, metal, M. H. Brookbbank.
afe, milk, H. Babcock.
Saw set, W. A. Hearn.........
Saws, tempering, w. Clemsen
screw cutting die, J. B. Doolittie..............
Screw-forming machlne, P. H. Howell....
crew tap, C. H. Morgan....
Sewing machine castor, J. H. strong
Sewing machine motor, W. Fay...........
Sewing machine motor and fan, w. Fay.
Shaft coupling, E. G. Shortt.
sifter, ash, M. P. Nichols.......
Slate catling machine, c.
Slate frame, H. V. Faries.
Sled, 1 . . Foster........
oda water fountain, etc., F. W. Wiesebrock (
oldering irons, tool for dressing. A. Brengle.
ooling maines, gulde for, L . Leig
Spring chp plate, N. C. Dean....
Square attachment, C. H. McKee.
Stamping fabrics, J. McNaught........................ 150,177
Stone, artinclal, etc., T. Millen .........

rable ges, cap 1or glass, P. F.
Table, folding, Lamble \& Munde
Ticket clasp, E. M. Mitchell
oy pistols, arrow for,
abe-welding mandrel, S. P. M. Tasker
ype-settingregulator, J.
alve motion, N. Wright
Vehtcle axle sand band, s. ............ seey
ehtcle sprtng
Vencie top joint, F. A. Bradiey.........
Vise, E. L. Morris..
Washboard, A. Frike
s. Colton
Washing machine, C. D. Routzahin.
Wedge for tool handles, J. Yerkes
Welding linke, die for, J. B. Baugh.
Wheel fastener, J. F. Pray..............
Whimetree coupling, Beach \& Rogers.
Whimetree hook, ¿. H. Jones.

Willow peeler, U. s. Wolf...............
Winding machine, quill, w. P. Uhinger Windmill, Baker \& Snashall Window frame, A. C. Jenkins Whadow samh frame, E. J. Stearns.
Wood grinder, C. W. W. Wood grinder, c. W. W
Wrench, F. L. Delfer... Wrench, F. L. Delfer..
Yoke, neck, H. Latshaw

APPLICATION FOR EXTENSION
Applications have been duly fled and are now pending for the extension of the following Letters Patent. Hear
ings upon the respective applications are appointed for 29,490.-GBAIN AND APPLE MILL.-C.B.Hutchinson. July 22.

EXTENSIONS GRANTED.
28,100.-Fbeit Basiset.-J. K. Park.
28,122.-Hoist MACHIERYY.- R. A. Wilder. 28,130.-BAERE's OVEN.-D. McKenzle. DISCLAIMER.
28,133.-Knitting Macine.-E. Tiffany
DESIGNS PATENTED.
7,994 to 7,996.-CARprts.-H. S. Kerr, Philadelphia, Pa,

7,403.-BILL FILE PLATE.-F. R. Seidensticker, Meriden,
Coni. 7,404.-PEN RAC
7,404.- Pen Rack
den, Conn.
7,405.-Door Hinge.-E. J. Steele, New Haven, Conn.
7,406 and 7,407.-Rvoris.-A.A.Rockwell,New York city.
7,408.-Stove.-W. A. Splcer, Providence, R. I.
i,409.-Bottle Stopper.-R. D. Young, Brooklyn, N. Y.
7,410.-TEA SET.-H. G. Reed, Taunton, Mass.
TRADE MARKS REGISTERED.
1,797.-Pale Ale.-Bass \& Co., Burton, England.
1,738.-Nerdles, mtc.-Cooley et al., New York city
1,738.-NREDLEs, ETc.-Cooley et al., New York city.
1,739.-Grain BaGs.-EE. Detrick, San Franclico, Cal.
 1,741.-OIL FINIBE.- B. R. Hetsier, Wilmington, Del.
1, $142 .-$ LARD. -V . W. Macfarlane \& Co., New York eity. 1,743.-Buttons.-N. C. Newell, Springild, Mass.
1,744.-HAIr Restorative.-L. \& Ph. Prase, N. Y.city. 1,744.-Hair Restorative.-L. \& Ph. Prass, N. Y.clty
1,745.-SAWs.-E. C. Atkine \& Co., Indianapolis, Ind.
1,746.-BURTON AlE.-Bass \& Co., Burton, England.
1,748.-Carbolio Soap.-J.Buchan \& Co. ,New York city.
1,799.-Fumigatina Waren.-Colgate \& Co., N. Y. city.
1,750.-W Wiscry. -Dunville \& Co., Belfast, Ireland, and
New York clty.
1,751.-HAMS, ETC.-P. T. George \& Co., Baltimore, Md
Higganum, Conn.
1,754 and 1,755.-Cotron Bıtrisa.-F. R. Josselyn, New
York city.
1,756.-Corto WARP.-F. R. Jobselyn, New York city. 1,757.-Cootron Batring.-F. R. Josselyn, New York city
1,758.-Cotton Wanf.-F. R. Jobselyn, New York city. 1,759.-Iron Cooring UTENsiL.-St.Louis Stampling Co.

SCHEDUL
SCHEDULE OF PATENT FEES
On illing each application for a Patent (17 years). 815
On lasuing each original Patent...
On appeal to Examiners-in-Chtef..
On appeal to Commlisioner of Patenta.
On application for Retsene...
On application for Exteniton of Patent.
Ongranting the Extension On Ailng a Disclaime
On application for Deilgn 77 y earrs)....................... 818
On applicatlon for Design (14 years)........... 83
CANADIAN PATENTS.
Ligt of Patents Granted in Canada,
APRIL 29 to May 1, 1874.
3,sTr.-_J.Goodwin, Lennoxillle, Sherbrooke county,P.Q. Improvements on invaldds' bedsteads, ca
win's Invalid Bedstead." Aprll 29,1874 .
3,378.-J.Goodwin,Lennoxville, Sherbrooke county,P. Improvements on charns, called "Good win's Improved Rotary Reverible Churn." April 29, 1874.
3,379.- E. Balnes, Toronto, York county, Ont. Improve-
ments on valve motion for steam hammers, called "Baines' Improved Valve Motion for Steam Hammers.". Apr11 $80,1274$.
i, $380 .-$ D. Judd, Hinda Improvements on a machine for excavating earth,
called "Judd's Rotary Excavator called "Judd's Rotary Excavator." April 30, 1874.
3,881.-J. s. Garner, Galena, Jo Daviess county, Ill. Improvemento on washboards, called "Garner'simproved Washboard." April 30, 1874.
, W8se.-J. Sanderson, Jr., Lindasy, Victoria county, Ont. Improvements on washing ma
son's Washer." Aprll so, 1874 .
son's Washer." April so, 1874.
Bers.-T. Fetherston, Fitzroy, Carleton county. Improvements on wlindow bynda, called "Fetherston's
Window Blind." April so, 1874. 3,ss4.-Willam Gowen, Wausau, Marathon county, Wis. $\underset{\text { Castor." Aprll so, } 1874 .}{\text { B, } 885 .-J \text {. Ollver, South B }}$
Impro Plow."ments in pl.
April 30, 1874.
,986-J. Wood and R. Wood, Letth, scotland. Im. provements on apparatas $\begin{aligned} & \text { "Wood's Palpitating Pulp Machine." Aprli 30, } 1874 \text {. }\end{aligned}$ 3,887.-H. M. Baker, W. F. Stone, and J. H. Vermillya,
Washington, U. S. Extension of No. $\mathbf{3}, \mathbf{0 5 4}$ for "HunWashington, U. S. Extension of No. 3,004 for "Hun-
ter's Sewing Machine." April 30, 1874. ter's Sewing Machae. Apr, Leeds county, assignee
3, sof -D.F. Jones, Gunanogue,
of J. L. Shaw, Grand Rapids, Kent countr, Mich. Improvement on shovel handles, called "Jones' Shovel Handle." $\Delta$ prill 30, 1874.
,ss9.-I. A. Kley, Chicago, Cook county, III., U. S. Im-
provements on chemical fire extiog provements on chemical ire extingulshers, called
"The Improved Babcock Fire Extinguisher.' April 30 , 1,974. ments in cullivators, called "Mallaby's Improved Cult1vator." April 30, 1874.
3,991.-P. K. Dederick, Alb
Improvements on hay pres ses , Albany county, N. Y. Improvements on hay pres ses, called
Perpetual Baling Press." May 1,1874 .
,992.-A. Swingle and F. A. Huntington, San Francisco, Cal. Improvement on ire arms, called "Swingle
Huntington's Improved Fire Arma." May 18 . Huntington's Improved Fire Arra." May 1, 1874.
s,s98.-T. H. Cobley, Turin, Italy. Improvemente
proceseen for
and other sulpharetted copper ores which contain
fron, called "Cobley's Improved Process for fron, called "Cobley's Improved Process for Treating
Copper Pyrtes, Copper Blendes, and other Sulohuret. ted Copper Ores which contalu Iron." May 1874 s94.-D. W. Dake, Belott, Rock county, WII. Improve-
ment on a machine for working butter, called "Dake's ment on a machine for working butter, called "Dake's
Victorla Butter Worker." May 1,1844 , Victorla Butter Worker." May 1, 1874.
ments on a prccess for preparing a coloring matter
mor, butter ments on a process for preparing a coloring matter
for,butter, called "Dake's None-Such Butter Coloring." $\underset{\text { May 1, 1874. }}{\substack{\text {,996- J. T. Fe }}}$
a.s96.- J. T. Fewkes, Phlladelphia, Phlladelphla county,
Pa. Improvements on anchors, called "Fewke's Pa. Improvements on anchors, called "Fewke's Rell-
ance Anchor." May 1, 1874. 3,397.-H. Whiteside, Jr., Ottawa, Carleton county, Ont.
Improvements on spring beds, belng an Improvement on Whiteside's patent spring bed, called "Whiteside's Improved Folding Bed." May 1, 1874 .
,998.-L.W. Boynton, Hartford, Hartford county,Conn.,
U. S. Extenslon of a New Brunswlek patent for "An Improved Machine for Pointing and Counting Skew ers." May 1,1874 .

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We accomplished this with the blast from ONE OF YOUR NO． 8 PRESSURE BLOWERS，and did not increase its speed any over that at which it has been running in our works for several years past．
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Yours truly，
ROBERT W．HUNT，supt．Bessemer works，





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