
a Weekly journal of practical information, art, science, mechanics, chemistry, and manufactures.
$\qquad$
[NEW SERIES.1 ${ }^{4 .}$
NEW YORK, JULY 27, 1872.
$\left[\begin{array}{c}83 \text { per Annumu. } \\ \text { IN AUVANCL. }\end{array}\right.$
THE PRALL AUTOMATIC STEAM VACUUM PUMP.
We have pleasure in laying before our readers some ac count of the above pump, the performance of which we have lately witnessed. It is ingeniously and yet simply constructed, and appears to be very effective in operation. It admits of various forms of construction without essential alterations of principle, and can thus be ren tered applicald
to raising or forcing water, or both, under a variety of corditions. Its capabilities will best be understood from a description of its mode of action, which we will now give from the pump in its simplest form.'
Figs. 2 and 3 give views of the single cylinder pump, the latter being a vertical section which shows all its working parts. A is the cylinder or body of the pump, which is made of cast iron and has its sides lined with wood. B is the aection or supply pipe, and C is the discharge pipe. Each of these pipes is furnished with a check valve, as shown, to prevent the backward flow of the water. At the top of the pump is shown the steam pipe, which is con nected with a suitable boiler. The passage of the steam is regulated by the valve, D , which gulated by the valve, D, which
is connected by a rod with a is connected by a rod with a
rubber diaphragm, shown at E . rubber diaphragm, shown at E.
This diaphragm', upon the acThis diaphragm, upon the action of which the movements
of the valve, $D$, depend, is of the valve, D , depend, is
placed between two disks which are slightly hollowed out on their inner sides so as to allow between them an upward or downward movement of the center of the diaphragm equal to the extent of the movement required in the valve. The space below the diaphragm is connected, by the pipe shown, with the water supply pipe, B, and to the upper side of the dia phragm air is freely admitted through the upper disk. In the operation of the pump thus constructed, when the cylinde dial diaphragm causes it to rise in the middle, and, by means of the connecting rod, to raise the valve, $D$. The effect of this is to admit steam, which, on entering the cylinder, is diffised

by coming in contact with the plate shown at F. The water contained in the cylinder is then driven out through the discharge pipe, C , with a force commensurate with the pressure of the steam. When the steam has descended low enough to come in contact with the cold iron bottom of the cylinder and to enter the mouths of the water pipe, a partial conden-
sation ensues, which reduces the pressure sufficiently to cause the diaphragm to fall and thereby shut off the steam; at the same time, and by the same cause, the valve of the injo ction pipe, at, is raised, and sufficient water drawn from it into the cylinder to complete the condensation of the contained steam. The vacuum thus produced is immediately supplied by water entering through the supply pipe, B, and as soon as the cylinder is filled the diaphragm is again raised as before described, and the entire operation is repeated. This continues so long as steam is supplied from the boiler. A small pet cock, shown near the top of the cylinder in Fig. 2, admits sufficient air, while it is filling to prevent the water rising
bly connecting with it the supply pipe of the pump, and the inventor statesthat the vacuum formed is so perfect that the cylinder is filled when its top is placed twenty-five feet or more above the water level by the pressure of the atmo sphere.
The pump may be operated by steam at a very low press ure where it is employed to raise water by atmospheric pressure alone. In this case the delivery pipe is placed beSmall pylinder, so that gravity may assist the discharge. small pumps of this form are constructed specially for the use of farmers in raising water for their stock, and are also well adapted for purposes of irrigation.

The invention, which has ,een in practical use for the ast ten months, was patented n this country July 4, 1871, ind has been subsequently patnted in Europe. Further in:ormation may be obtained by iddressing the Prall Steam ?ump Company, Indianapolis, nd., where they are at present nanufactured, or P.O. Box No. :413 New York; or Messrs. tray \& Noyes, Washington, D. ., who manufacture for the Bouthern States.

A Great Flow of Gas. A freak of an oil well near Citusville, Pa., is thus recordd in a recent number of the Citusville Courier: The well lad been sunk for about tweny days, but continually poured orth such a volume of gas that $t$ was found impossible to pump $t$, as the valves would not vork. The tubing was pulled nd the well was cased, in orler to let the gas blow off, so hat it might bepumped. After he casing was putin, the sand ump was lowered for the pur. ose of agitating the well, when he gas raised a column of waer, throwing a solid streaminto er, air a hundred feet. The uoise was terrific, and could be heard for a distance of more than two miles. The noise was above the plate, F ; this allows of the diffusion of the steam $/$ something like the loud roar of thunder, and when the over the water surface without agitation of the latter. The action of the check valves in the water pipes during the operation will readily be understood without explanation. It will with face plates which admit of easy removal, so that the valves may be inspected and repaired without difficulty. The action of the single cylinder pump is intermittent, but by using two cylinders, which force and condense alternately, the pump is made to throw a continuous stream. The double action pump is shown in operation in Fig. 1, together with a boiler of proportionate size for running it. In this firm the to the cylinders alternately, and the sides of the diaphragm are connected, each with one of the cylinders, in such a way that it is noved upward by the pressure of water in one and downward by the pressure in the other. Thus a constant flow of water is kept up through the main discharge pips.
The inventor claims that in this pump the steam is utilized to the fullest possible extent; it is made to perform a double duty-to expel the water by its pressure and to create a vacuum by its condensation. The absence of the working parts of ordinary'pumps, such as pistons, levers, cams, cranks, etc., gives great advantages to this device, which he thus enumerates: 1st. Having no piston it is not affected by mud, sand salt, or grit of any kind. 2d. Being frictionless, it requires no lubrication at any point. 3d Having no moving rarts but the volve there is nothing (but them) to breat down or quire repar, the wath fows quire repar, tind and the pump out of the cylinder, and the pump may be run for years with out special attention other than, perhaps, an occasional re placement of the check valves.
The single cylinder pump is adapted for service in filling railroad tanks, etc., where the water is to be lifted forty feet or more in large quantities. The double pump will perform the same duty, and is also adapted for use as a ship's pump, a fire engine, or for any purpose requiring water to be forced tank, river, well, or any other available reservoir by suita-
column burst at the top it threw the water each way for fifteen rods from the well. The water was exhausted in about twenty-five minutes, and then a column of gas fol-

Tig. 3

lowed, rising with tremendous force fifty feet above the derrick. The outpouring of the gas makes a roaring noise that can be distinctly heard for two miles from the well. No toolsc can be put into the well. As soon as the attempt is made, with such force does the gas come out that the tools are carried into the air. The stream of gas shows
no sign of diminishing, and its loud and continuous roar can be heard for miles around.

## Progress of the Great Tunnels under the East Rive

 at Hell Gate.The work which is to culminate in the removal of the Hell Gate obstructions may now be considered as more than half accomplished. It is thought that about fifteen or eighteen months will yet be required to complete it, but this cannot be done unless Congress makes addi ional appropriations The subject will be pressed at the opening of the next ses sion, and it is not believed that a work of so much importance will be allowed to stop. The work is a wonderful piece of engineering.
Viewed from the head of the stairway, it reminds one of a railroad engine house, being semicircular in form, and having ten embrasures, with tracks leading back to the terminus of the tunnels. A turning table in the center of the shaft makes the simile all the more complete. Only ten tunnels are visible from the outside, but there are sixteen all told six commencing in the interior of the work. Four galleries or intersacting tunnels are now completed, and the fifth has been commenced, thus leaving the rock above, which is about ten feet thick, resting on solid columns. Some of these col umus have already been pierced for the reception of nitroglycerin. The main tunnels are numbered and named as fol lows: Farragut, Madison, Humphrey, Hoffman, Sherman Jefferson, Grant, McClellan, Franklin and Jackson. As usual General Grant is ahead, the tunnel bearing his name being 230 feet long. The aggregate length of these excavation exceeds 3,000 feet. The depth of the shaft is 34 feet.
Visitors to the works should by no means go in their best lothes. The leakage from above is so great that the pumps re kept constantly going, and even with the use of an um his clothes considerably the worse for the journey. Supplied his clothes considerably the worse for the journey. Supplied
with a candle, the visitor gropes his way through the dark, with a candle, the visitor gropes his way through the dark,
sometimes deacending at an angle of forty-five degrees until he reaches the dim light at the end of the tunnel. Here the workmen are found, some drilling and others shovelling up the loose stones. If he is fortunate enough to get into the gallery where the diamond drill is in operation, he will be well paid for his trouble, although it does deafen him with noise. There are two drills of this kind here, but one is now undergoing repair. The bore made by this machine is an inch and a half in diameter, and the cores, sometimes fou eet in length, can be had of the miners. The which three times a day, and is now done altogether with nitroglycerin. When powder is used, the stones are so large that the use of the hammer is necessary, whereas the glycerin breaks them into fine pieces.
When the charges are to be exploded, a gong is sounded, the workmen retreat to a place of safety previously indicated, and an electric battery does the work of explosion. The
thundering, smothered sound of the successive charges for cibly reminds the visitor of a battery of forty pounders in full play. When the volumes of smoke have disappeared the workmen return, and the operations of drilling and removing the débris are resumed. Specimens of stone can be procured from the miners, or from the piles of rock on the shore. Garnets, mica and quartz abound.
The apprehensions of danger when the general explosion takes place, are entirely groundless. Su confident is Mr. Reitheimer, the general superintendent of the work, of this fact hat he intends to remain in his office, about 300 feet from the shaft, when the final charge is exploded. On completion of the work of excavation, with the nitro glycerin ready, the coffer dam will be cut, and, as it is easier to raise a weigh under water than abova it, the shaft and mine will be flooded and with the discharge of the electric spark the dangers of Hell Gate will no longer exist, But should the explosion by any accident not prove successful, or, indeed, if it should never take place, there will still be sufficient room for the largest ocean steamers to pass through the shaft after the coffer-dam shall have been cut.

Relative Mrerits of Rubber and Leather for Belts.
Rubber will not last one fourth as long as leather. When once it begins to give out, it is next to impossible to repair it ; while wide bands cannot be used for or cut up into narrow ones, as leather ones can be.
Leather belts may be used over and over again, and, when of no further value for belts, can be sold for other purposes. A rubber band, costing hundreds of dollars, may be spoiled in a few moments by the lacing giving out, and the band be ing run off into the gearing, or by being caught in any man her so as to damage the edge, or by stoppage of either the driving or driven pulley. A few moments of quick motion or friction will roll off the gum from the canvas in such quantities as to spoil the band, while leather belts may be torn or damaged, yet are easily repaired.
Should a rubber or gum belt begin to tear by being caught in the machinery, if the rentstrikes the seam, it is most certain to follow it, even the entire length, if the machinery is not stopped. It would be impossible to tear leather in like manner.
Oil in contact with rubber belting will soften the gum; and rubber, gutta percha, and canvas belts will continue to stretch as long as in use, rendering it necessary to shorten them continually.
During freezing weather, if moisture or water finds its way into the seams, or between the different layers of canvas composing these bands, and becomes frozen, the layers are torn apart, and the band is spoiled; or if a pulley becomes frosty, the parts of bands in contact with it will be
torn off from the canvas and left on the pulley. Also, gum torn off from the canvas and left on the pulley. Also, gum
belts will not answer for cross or half cross belts, for shifting belts will not answer for cross or half cross belts, for shifting
belts, cone pulleys, or for any place where belts are liable to belts, cone pulleys, or for any
slip, as friction destroys them
A well made leather band, if properly looked after-the width and pulley surface proportional to the amount of work to be done-will last twelve, fifteen, or twenty years, and ye be of value to work over into narrow belts.

## THE HANDS OF THE NATION.

According to the returns of the census up to June 1st, 1870 the United States contain $12,505,923$ working people. The number of inhabitants in the country is $38,558,371$, so that he active workers constitute very nearly one third of the entire population, the ratio having considerably increased since the census of 1860, at which time it barely exceeded one quarter.
$10,669,436$ are males, and $1,836,487$, females. Between the ges of ten and fifteen years, the males outnumber the fe males in a ratio of nearly three to one; between sixteen and ifty-nine years, the ratio increases to nearly six to one; while at ages above sixty years there are more than twelve times as many men at work as there are women. These fig ures apply to the men and women in actual outside employ ment. It will be noticed that as the women grow older their numbers in proportion to the men decrease. This is accounted for by their marrying, abandoning their employments, and settling down to the drudgery of the household Now, the population of the country may be estimated to be ivided into $8,000,000$ families, each of which has a woman or one of its heads. She is not considered as a worker in he foregoing calculations as given by the census, and here we consider a mistake has been made. The poor man's wife has far more labor to perform than her unmarried sister who works her ten hours a day. The cares of housekeeping and the rearing of children are the heaviest of burdens, and the woman that conscientiously fulfils her perpetual round of wifely duties ought surely to be classed first on the list of hose who earn their bread by hard work. In at least seven million families, the lot of the wife and mother is no sine cure; so that in reality we find that the working women and he working men are not only nearly equal in point of num bers, but there is a balance on the side of the women in the hape of unending labor, the most monotonous and thank ess in existence.
Out of the number of working people above mentioned ,802,038 were born in the United States; 949,164 in Ireland 36,502 in Germany ; 301,779 in England and Wales; 189,30 in British America; 109,681 in Sweden, Norway, and Den mark; 71,993 in Scotland; 58,197 in France, and 46,300 in China and Japan. There are therefore from three to fou imes more Americans engaged in useful labor than foreign ers.
Regarding occupation, 5,992,471 are devoted to agriculture; ,707,421 to manufactures, mining, and mechanical pursuits ,684,793 are rendering professional and personal services and 119,238 are engaged in trade and transportation. Com paring the different callings of the inhabitants of foreign na tivities, we find that of the Germans the largest numbers are engaged in manufactures and the least in domestic service Of the Irish, the laborers and servants nearly equal numeri ally all the other occupations together. The English Welsh, Scotch, and British Americans have a majority in manufacturiny pursuits, and the least numbers in trade an ransportation. Among the Swedes, Danes, and Norwegians hose devoted to agriculture constitute much the larger por ion, while those following trades are considerably in the minority. The Japanese and Chinese are principally engaged in manufacture. Many of these nations enter domestic ser vice, but a small portion devoting themselves to agriculture r trade.
The largest part of the population engaged in any single ccupation are the planters and farmers, numbering 2,982, 573. The farm laborers are nearly as numerous, reaching 2,880,045.
In manufacturing and mechanical occupations, the carpen ers take the lead, numbering 344,596 . Next in order come the boot and shoe makers, tailors, miners, and blacksmiths, anging in numbers between 171,000 and 141,000 . Then the milliners, bricis and stone masons, and painters, each trade veraging between 92,000 and 85,000 . Then follow the ma chinists, nearly 55,000 , and next the saw mill hands, butchers, cabinet makers, carriage makers, coopers, and millers, each
branch ranging in numbers between 50,000 and 40,000 . The printers, harness makers, and tinners average between 40,000 and 30,000 , and the tanners, cigar makers, bakers, fishmen, brick and tile makers, marble and stone cutters, plasterers, nd wheelwrights between 30,000 and 20,000 .
The number of manufacturers returned is 42,905 . In the arious factories throughout the country, there are 111,60 peratives in cotton mills, 81,000 in iron works, 58,836 in ooolen mills, 41,619 in works not spec'fied, 11,985 in tobacc of clerks, salesmen, bookkeepers, and commercial travellers 275,086 , more than that of any trade except the carpenters. The railroads throughout the country furnish employmen or 1,902 officials and 161,401 clerks and employees. Th express cnmpanies require the services of 75 officials and
9,321 clerks and employees, and the various street car lines, 9,321 clerks and employees, and
88 officials and 5,103 employees.
Of those gaining their living afloat there are 56,063 sailors ,338 canal men, and 7975 steamboat employees. The hack men, teamsters, and draymen number 120,975.
There are 62,383 physicians and surgeons or an averag f one to look out for the health of every 618 people. The
clergymen number 43,874 , or one to take charge of the spiritual welfare of every 879 souls, and finally there are 40.736 awyers, or one to adjust or foment quarrels among every 946 of the population. Education is instilled into the mind of youth by 136,570 teachers, and the washing of the entir nation is done by 60,906 launderers and laundresses. The laborers number $1,031,066$, and the domestic servants 971,043 Our great hotels and restaurants furnish employment to
94.170 people, and the livery stables to 26,090 more. The 94,170 people, and the livery stables to 26,090 more. The office holders, national, state, and municipal, outnumber the ruembers of any of the liberal professions, there being 67,912 . It takes 23,935 barbers to shave the male portion of the population, and 15,667 nurses to attend the sick. 12,785 board inghouse keepers offer the "comforts of refined homes" to he unsuspecting public. 6,019 musicians make up the tota er burious orchesh there are 6,432 periodicals published This discrepancy can only be explained under the supposition that the census takers did not consider the individuals who, while engaged in other callings, edit country newspa pers by means of scissors and paste, as belonging to the pro pers by means of scissors and paste, as belonging to the pro-
fession. Finally, the officers of the army and navy are nufession. Finally, the officers of the army and navy are nu-
merically the least, there being but 2,286 in both arms of he service.

## Another Boiler Explosion.

Another instance of a large loss of property and the severe injury of several persons through gross carelessness and in competence took place recently at the Lafayette Iron Works in Titusville, Pa. A boiler exploded, overturning walls, tearing out floors and windows, and scalding and burning, though providentially not killing, six or seven men. The boiler was a "twelve horse power Washington," resting on brick foundation, and supposed to be capable of withstand ing a pressure of 150 pounds.
The cause of the disaster is abundantly explained by the testimony of the engineer. He'says that he never tested his term gage, and had no means of knowing whether it was orrect or not; that he did not know what the safety valve tood at, and had never tried to find out. He did not know whether the boiler contained any scale or sediment or not He knew there was a leak under the fire box. but was not ware whether it would discharge two cocks in twenty min utes or not. Believed that one of his gage cocks was in a damaged condition; was certain that he had thirty-five pounds of steam in the boiler a short time before the explosion, but had not noticed whether the steam had risen in the interval or not.
Any one who can run a boiler even for a week and not know at what pressure his safety valve blows off, or whether his steam gage is in working order, is certainly utterly in ompetent to fulfil the duties of an engineer. Whether the explosion, in the present instance, took place from the wate scaping from the leak before mentioned, or whether, as wa most probably the case, the steam pressure was allowed to get too high, it is plain that there was the most deliberate ig norance and negligence, not only on the part of the engineer but also on that of his employers, who, by retaining him in his important position, jeopardized the lives of the entire es tablishment.

## The New Erie Railroad President.

Peter H. Watson, formerly an examiner in the Patent Office subsequently a patent lawyer, and who, for $t$ wo years during he war, served as assistant Secretary of War with extraordi ary ability and success, has just been elected President of he Erie Railroad
Mr. Watson is a gentleman of strict integrity and possesse great energy and talent. We congratulate the Erie Railway on its fortunate selection of so capable an officer, and Mr. Watson on his appointment to so important a trust. If the Erie stockholders fail to receive dividends, it will not be wing to the squandering of its receipts while the present in cumbent holds the office of President.

## Lightning Freaks.

At the village of Marlboro, Ulster County, N. Y., recently wo terrific thunderstorms went over the place. Thre bolts from the consolidated storm descended into the village, triking three houses occupying, with regard to each other's ituation, the three angles of a triangle and about five hun red feet apart
The chimneys of the three houses were struck and demol ished from roof to cellar, but only one person was injured This man, James Terwilliger, was struck and thrown down, his boots torn off and his body scorched. But his injuries were not serious.
The people of Marlboro are of the opinion that they had lightning enough for one day, and that, if " lightning never rikes twice in the same place," it sometimes strikes thre imes in places quite close to each other.

Chemistry of the Cotton Plant Root.-The root of the cotton plant, which is employed as a medicine, has $b=e n$ ubjected to careful chemical analysis by Professor E. S Wayne. He obtained from the root a dark red resinous moss, insoluble in alcohol, ammonia, chloroform, and ether, but sol ble in caustic solutions of soda and potassa. It contains no alkaloid principle. He concludes that it is an acid resin, and suggests for it the name of gossypic acid.

Two diamonds have lately been found near Placerville, Cal., one weighing almost three carats, the other nearly one carat. It is supposed that more in nearly all gold produc ing countries

## Lightning rods.

"Lightning Rods and How to Construct them" is the title of a convenient little handbook by Professor John Phin, issued by the Handicraft Publication Company, 37 Park Row, N. Y. Price 25 cents. It contains much sound and useful information upon the subject, and ought to have a very wide circulation. The following selections will give some idea of the excellent character of the book:
Are Lightning Rods Really a Protection?-There are many instances on record where buildings protected by rods have been struck and injured. But this is not to be wondered at when we reflect that fully one half-nay, perhaps three fourths-of all the rods now actually erected violate the fundamental principles upon which their efficiency depends. Besides serious errors in regard to arrangement and continuity, it will in general be found that it is only by the merest accident that a good ground connection is ever secured. This point will be more fully discussed in a subsequent paragraph. Meanwhile, the following facts prove irrefragably the great value of well constructed rods. The Cathedral of St. Peter, in Geneva, although so elevated as to be above all other buildings in the neighborhood, has for three centuries enjoyed perfect immunity from damage by lightning; while the tower of St. Gervaise, although much lower, has been frequently struck. This doubtless arises from the fact that all the towers of St. Peter are accidentally furnished with per fect conductors. The great column of London known as the
Monument, erected in 1677 in commemoration of the great Monument, erected in 1677 in commemoration of the great
fire, although over two hundred feet in hight, has never been fire, although over two hundred feet in hight, has never been
struck; while much lower buildings in the vicinity have not struck; while much lower buildings in the vicinity have not
escaped. The Monument, however, is protected by a most escaped. The Monument, however, is protected by a most
perfect conductor, the upper end terminating in a vase frem which proceed numerous metal plates designed to imitate the appearance of tongues of flame. The vase communicates by means of stout bars of iron with the metal staircase, which descends through the middle of the column and terminates in the ground. A still more striking instance of the value of lightning rods is a church on the estate of Count Orsini, in Carinthia. This building was placed upon an eminence and $h a d$ been so often struck by lightning In 1730, a single stroke of lightning destroyed the entire steeple; after it had been rebuilt, it was struck on an aver age four or five times a year, without counting extraordi nary storms, during which it was struck from five to ten times in a single day. In 1778, the building was reconstruc-
ted and furnished with a conductor ; and, according to Lichtenberg, up to 1783 -that is to say, during the space of five years-the steeple had been struck only once, and this stroke had fallen upon the metallic point without producing any damage. For two or three years after its erection, the
church of St. Michael in Charlestown had been frequently church of St. Michael in Charlestown had been frequently damaged by lightning; a conductor was attached to it, and during the following fourteen years it had not been injured. The steeple of St. Mark's, in Venice, has a hight of 340 feet and was frequently struck by lightning until a proper light ning rod was applied to it, since which time it has not been
injured. These facts leave no room for doubt in regard to injured. These facts leave no ro
the great value of lightning rods.

The Best Form for the Rod.-If we examine the rods ordinarily found in market, and puffed by those who have in vented them, we shall find that, instead of being solid bars of a square, round, or merely flattened form, they are tubes twisted ribbons, or bars whose cross section has the form of a star. And if we ask why these complicated and expensive
forms have been adopted, we shall be told that it is for the purpose of obtaining the greatest amount of surface with the least amount of metal, and this is done because electricity always resides on the surface. Those who reason in this way, however, prove clearly that they have never studied the subject, else they would be aware of the fact that whild static electricity, as it is called-that is, electricity at restalways disposes itself on the surface of bodies charged with it, electricity in motion pervades the entire substance of th bar through which it passes, and consequently the powe of such a bar to convey electricity is measured by the quan face that it presents. Pouillet showed this in a very clear and decisive manner. He measured the conducting power of a fine wire of cylindrical form-the form that present the least possible surface in proportion to its cubic content -and then, having flattened and annealed it, he tested it again. Its surface was enormously increased, büt its power to conduct electricity was lessened rather than otherwise this diminution being probably due to the fact that the wire was increased in length, and, consequently, its cross section and perhaps somewhat more easily performed, is at the com mand of every one who has access to a small electrical ma chine and a two quart Leyden jar. Take a fine gold wire, say one fiftieth of an inch in diameter. This wire will presen nearly the same surface as a ribbon of metal $1-32$ of an inch wide. The wire will carry off, without being in
jured, any charge tr at can be imparted to the jar. If, however, we pass the charge through a strip of gold leaf having several times the surface of the wire, it will be completely burned up and dissipated.
Arrangement of the Rod.-It is very obvious that the most perfect, though not the most economical, arrangement would be to cover the entire building with a sheet of metal. Then it would be impossible for the lightning to strike any
point without falling upon a good conductor. But such an arrangement being obviously inadmissible, we must so arrange matters that the most exposed points shall be the con ductor and its connections. The French Academy recom.
mended the use of rods elevated nine to twelve feet above the building, and, after a good deal of experiment and observation, came to the conclusion that a rod was capable of
protecting efficiently a space covered by a radius equal to twice the hight of the rod, abore the most elevated part of the building. For ourselves, a very careful examination, o the conditions which arise during a thunderstorm, leads us to place no confidence whatever in elevated rods, and to depend wholly upon so arranging the conductor that every part of the building shall bo protected.
It is obvious that the rod should be carried from the roof to the ground by the shortest possible way. Some have even recommended that it be carried down the chimney-a plan in which there is nothing obj
the most convenien
Attaching Lightning Rods to Buildings.-It is a very prev lent opinion that lightning rods should be carefully insuladrom the buildings to which they are attached, and hence most rods are made to pass through glass tubes or insulators, the avowed object being to prevent the electricity from pass-
ing into the building. The extreme worthlessness of such arrangements ought to be obvious to any person who ever observed a flash of lightning. The discharge from a powerful Rhumkorff coil will pierce through five inches of solid glass, so that, if a lightning rod were entirely cased in a glass tube, an artificial flash of lightning can be produced which will pass through it as easily as a spark from one of the old machines would pierce a card! And if such a result can with safety be produced by artificial means, in a room filled with people, what would be the limit to the effects produced by natural means where thousands of acres of cloud surface are engaged? Insulators do very well to talk about, but as a s curity against Heaven's artillery they are powerless.
Lightning rods should be connected with all large masses metal which may exist in or upon the house, such as me tallic roofs, tin or iron gutters or pipes, iron railings, etc. In the second place, the rod should be attached to the house in the neatest and least obtrusive method possible. If the rod be flat, it may be pierced with small holes and tacked directy to the building; but a better way, both for round, square, and flat rods, is to employ properly shaped staples of stout wire. These staples may be driven into the studding of wooden houses or into the joints of brick walls, and, when roperly painted, will not present an unsightly appearance. Termination in the Ground.-Upon the perfection of the round termination mainly depends the value of the light ing rod. If this be defective, no other good features can possibly make up for it. And yet, so little is it understood, hat a careful examination of a very large number of rods eads us to believe that fully one half the lightning rods in xistence are defective in this respect, and, consequently, furnish but an insufficient protection.
Iron conducts better than water, but water conducts better than dry earth. And just as we are able, by increasing its size, to make an iron rod conduct as freely as a copper one, so, by increasing the volume of water or soil employed to carry off the electricity, we can make it almost as efficient as the metallic conductor. These facts lead us to the following conclusions: 1. The end of the rod ought to be made to terminate in a layer of soil that is permanently wet; and 2. The end of the rod ought to expose to this soil as large a urface as possible.
Permanently moist earth is to be attained only at considerble depths-say at the level of the water in the wells in the icinity. Unless we reach this point, we can never be sure hat our rod does not terminate in dry or but slightly moist oil ; consequently no effort should be spared in sinking the od to a sufficient depth. This is most easily accomplished at the time when the foundations are laid; and we would
advise all builders to sink the lightning rod termination when advise all builders to sink the lightning rod termination when
they sink the foundation. A short portion of the stem may be allowed to rise above the ground, and the conductor may be arranged and attached at a subsequent period.
It is a common practice among lightning rod men to form the earth termination by simply driving a crow bar into the earth, and inserting the end of the rod in the hole thus formed. No reliance can be placed on an earth connection made in this manner. The crow bar may have been driven into perfectly dry sand; and, in any event, the amount of urface exposed by the rod, and the consequent section of arth brought into action, is altogether too small.

## How to Preserve to Prints the Beauty which they have in the washing.

Every photographer must have observed how beautiful rints sometimes look in the washing water, and how much hey lose of their vigor and beauty on drying. This is es pecially true of fully toned prints, which, although they how a warm tint of black in the water, dry sometimes of cold inky tint, besides becoming mealy. It seems important exhibition, or which the artist desires to keep for himself as choice specimens and the best which the negatives will yield hould be so printed as to lose none of the beauty which they exhibit in the water-none of the rich warm tint, the transparency in the shadows, the clearness of the detail, the
perfection of surface produced by the water acting as the varnish. But the only way to preserve all these excellencies is to substituteglass for water, and so to mount the print against the back of a glass plate as that when viewed through the lass it may appearexactly as it does under water, that is to while still wet against the glass plate. The problem, then is to substitute for the water some kind of varnish which when perfectly dry, will not produce any change in the ap pearance of the print. Imagine for an instant the problem
solved and the thing done; what would be easier than to mount all such prints as weintended to be framed and glazed against the glass of the frame instead of upon a card board which is placed more or less loosely behind it? or to moun all such prints as an artist might desire to keep for his own use upon plate glasses, to be pressed in a plate box like nega ives or glass transparencies?
The problem is a very old one, and it has been already solved by means of collodion and gelatin. M. Davanne has recently described the process at a meeting of the French Photographic Society. It is as follows:
Coat the glass plate to which the face of the print is to be applied with plain collodion, and immerse it immediately in a bath of cold water in order to wash out the ether and al cohol, as in the common wet process with the nitrate bath. Then pour over the film a solution of white gelatin, strength about eighty grains to the ounce of water. It must be suffi ciently hot to flow freely, and care must be taken to avoid dust and air bubbles. Tilt the plate so as to let the exces of gelatin run off into another vessel, and then place it upon horizontal support. The film of gelatin will thus be very a horizontal support. The film of gelatin will thus be very thin. Before waiting until it is quite dry, lay the face of
the print down upon it just as it comes wet from the wash the print down upon it just as it comes wet from the wash ing water, and press it into close contact with the glass
When viewed through the glass it will, of course, look ust as it does in water, and this beautiful appearance it will not lose on becoming dry. With respect to the white back ground, or one of any other color, this may consist of a shee of paper applied to the whole of the glass plate behind the print. Or if the negative be masked with black paper for a sufficient breadth round its edges, the print will have a white margin and need not then be trimmed. In subjects which are vignetted, this will, of course, be the plan to pursue.
As soon as the print has become dry against the glass, it may be put into a frame with a thin board behind it. Several prints may be mounted together upon the same glass. The only objection to the plan is that if the glass should be The only objection to the plan is that if the glass should be
broken the print would be destroyed; but this objection is broken the print would be destroyed; but this objection is
greatly outweighed by the increased beauty of the result. By using a rather thick plate of glass, the risk of breakage would become very small indeed. The perfect optical con. tact between the surface of a print and that of so splendid and smooth a varnish as a sheet of glass is an advantage not to be underrated or despised. There is no loss of detail, no change of color, none of the mealiness produced by drying, and none of the vulgarity of albumen. The result is not only techoically but artistically finer than when any other method of enamelling and mounting is employed. If, when the print is dry, it be brushed over on the back with plain collodion, the pores of the paper would be so filled with air and waterproof material that greater permarency would, no doubt, be secured.

## Pear Tree Blight.

Some interesting experiments are being prosecuted by Mr. William Saunders, superintendent of the Department of Agriculture grounds, at Washington, in relation to pear tree blight, particularly during the last two years. A pear tree which was badly blighted on its main trunk was made the subject of special experiment. Nearly all of the bark was blighted within three feet of the ground, only about an inch and a half in width being left to connect the upper part of the tree with the unblighted bark at the base. The affected part was removed and the sap wood left quite exposed to view; but to prevent injury from the air it was at once coated with a composition of carbolic acid, sulphur, and lime, largely diluted with water. After the lapse of two years, the tree has wholly recovered and the denuded part is again covered with new and healthy bark. The tree in all respects presents a healthy appearance. Many other trees much affected with blight were coated heavily with the sulphur compositions and have evinced marked signs of im provement. It is intended to continue these experiments on a larger scale, until sufficiently numerous and well estab lished facts attest the best mode of treatment. The Department grounds consist of a heavy, compact, partially undrained soil, lying low; they are therefore unfavoratle for the highest development of pear tree culture. It has been only by persistent effort that the fruit trees on the Depart ment grounds have been brought to tneir present highly improved state.
Barry says that "blight has never been known to originate on the dry, sandy loam of Long Island, not even with heavy manuring, the drought of midsummer always ripen ing the shoots so completely that the leaves drop off long before frost commences." The true source of blight seem to have its origin principally in the action of frost on unripe wood, which may arise from a combination of causes.

## Marvels of the insect World

The Spectator, in its notice of M. Touchet's work, "The Universe," says: "Man generally flatters himself that his anatomy is about the highest effort of Divine skill; yet that of the insect is far more complicated. No portion of our or ganism can compare with the proboscis of the common fly Man can boast 270 muscles. Lyonet, who spent his whole life in watching a single specifs of caterpillar, discovered in t 4,000 . The common fly has 8,000 eyes, and certain butter fies 25,000 . M Touchet treats it as an established fact that so fine are the sensory organs of ants that they converse by means of their antenvæ. Consequently the strength and activity of insects far surpass ours in proportion. In the whole field of natural science there is nothing more astounding than "the number of times a fly can flap its wings in a second; it must in that point of time vibrate its wings five or six hundred times. But in rapid flight we are required to believe that 3,600 is a moderate estimate."

## NEW STEAM DREDGING BOATS.

Our illustration shows a novel type of dredger, constructed by Messrs Simons \& Co., of Scotland, for the Government of Canada. Our a Co., of Scotland, for the Government of ferent in its aspect. It has six blades instead of three, and stituted. The forward screw performs two offices, namely, Canada. Our engraving is from the Engineer. The dredger looks like a big whirligig. The screw, like the one at the that of impelling the vessel through the water by a drawing combines in herself the properties of a powerful dredger, a other end, is made of brass; its diameter is the same, and it on process, and digging in the mud and sand. It is worked hopper barge, and a screw steamer. She is intended to be employed at the mouths of harbors and rivers in Canada, to keep them clear of silting and other obstructions, at a cost below what would be practicable under the old system of a fleet, including dredgers, barges, and tug steamers-the work of all which is managed under the new system in " one bottom."

It will be seen that the novelty consists in the fact that barges are dispensed with, and we cannot better explain how than by stating what the dredger did a few weeks since on her first trial; the vessel was moored a little below Dalmuir, on the Clyde, at about 11 A. M., and the machinery started for operation in 18 feet water. In about two hours, the hopper cavity was filled with some 200 tuns of stuff-sand, gravel, mud, etc. dredged from the bottom of the channel. The dredging machinery was then disconnected, and the screw propeller put in motion; and the moorings having been loosened, the Canada proceeded down he river under easy steam, at the rate of about eight miles anhour, to the Kilcreggan shore, where the trapped bottom of her hopper cavity was opened, and the 200 tuns of dredged stuff above mentioned allowed to slide into the sea
Her dimensions are: Length 131 feet, breadth 21 feet, depth $10 \frac{1}{2}$ feet; the hopper compartment is 20 feet in length, 16 feet wide, and 12 feet deep, containing when filled about 200 tuns spoil; the hopper doors are formed of hinged iron plates lined with elm, having strong hinges fixed to center keelson, the door chains being carried over side pulleys to the hopper crabs. The vessel is propelled and the dredging rearing driven by and the dredging gearing driven by pair of inverted cylinder direct acting condensing engines of 35 nominal horse power, having starting gear on deck an also in the engine room. Disconnecting clutches and levers are placed at the fore and aft ends of the crank shaft, arranged so that the dredging gearing or the pro peller can be worked independently or together, as required. The engines make eighty revolutions per minute when pro pelling the vessel about eight miles per hour, and sixty revolutions when dis charging about twenty buckets per min ute. The inclined shaft that drives the pper tumbler is fitted with a friction ph to and preve wheel to slip and prever on when un is the gearing The boiler is of the multitubular kind with two furnaces, working steam press ure 25 lbs. per square inch. A hand lever is placed on deck for controlling the dredging ladder and securing that the buckets shall cut to the proper depth when dredging. There are twenty-four buckets on the chain, each containing when full, nearly four cubic feet; the cutting lips, pins, and eyes of the buckets are of steel. Triple geared steam crabs are fitted at bow and stern, each having three independent barrels, ar ranged to work and control the head and ranged to work and cond stern or the side line, as required, and to work together or separately. When the vessel has filled her own hopper, the bucket ladder is raised by steam, the propeller is then at once put in gear and connected, the mooring chains unshackled • and dropped with a buoy and line at tached; the vessel then proceeds to the required place of deposit, drops her cargo, and returns; the buoys and lines are picked up, and the chains hove in by the crabs to bring the vessel up to the cutting face of the soil.
united states government dredger.
It may be of interest to state, in this connection, that a novel dredging boat, working on a very different principle from the foregoing, has lately been built at New York, for the United States Gov. ernment, intended for operation at the mouth of the Mississippi river, in open water.
The length of this vessel is 151 feet 8 inches, depth of hold 20 feet, and about 23 feet beam. She has a screw at both
 by two oscillating engines, 40 inch bore by four feet stroke, and will perform 65 to 90 revolutions per minute with thirty pounds of steam.
The three bladed propeller is driven by a single oscillating engine, the same size and power with the others. Beside the six-bladed screw for digging, there is also a large scoop or drag, in the shape of a half cylinder, made of three eighth inch boiler iron, with heavy wrought iro rims and pinions. It is 12 feet deep, 20 feet concave linear measure, and will rag away fifteen tuns of mud or sand a load. The scoop is suspended from wo strong davits overhanging the dig ging end of the boat, and is mana means of a pair of powerful hoisting en gines forward. The boat is first driven light, as far up on the bar or bank orible Then the acoopor drak ossible. Then the scoopor drag, which on the on ons its grat weight carrie far into the mud. Then the big sixbladed screw is set in motion, and at the same time the propeller at the other end commences whirling, to pull the boat off he six-bladed propeller loosens up the mud, and adds greatly to the impelling power, which, when both are working is tremendous, dragging the great scoop, with its freight of fifteen tuns of mud out to sea. As the mud is worked away, the sinking tanks are gradually filled the boat settles deeper in tually flled, the digging apparatus works in deeper - mud. The boat is built in the most stanch manner, and is perfectly sea worthy. She is brig-rigged. Her bottom is of solid oak, 18 inches thick, and will stand any strain to which it is liable to be subjected. When at sea she will work both propellers, one pulling and one pushing, and it is supposed that her fy speed will be 18 miles per hour.

## Beet Sugar.

The problem of furnishing sugar to supply the large and constantly increasing demand for it throughout the civilized world is daily augmenting in impor tance. Sugar, in some of its forms, is widely distributed throughout the vegetable world, and though it is seldom found in chemical combination with other substances, yet it is generally so mixed with a number of other proximate principles that its separation in a crystalliza ble form is very difficult.
When it is ascertained that the juice of the sugar beet contains from 10 to 13 per cent of crystallizable sugar, and that the beet can be produced in unlimited quantities, most persons will sup. pose that the sugar problem is solved. But beet juice, in addition to sugar, holds in solution pectose, gum, albumen, asparagin, betain, oxalic acid, citric acid, phosphoric acid, sulphuric acid, chlorine, and silica. Besides these there are variable proportions of potassa, soda, lime, iron, magnesia, rubidium, and manganese, from all, or the greater portion of which, the sugar must be separated before it is fit for domestic purposes. Most of these substances, as compared with the sugar, are present in very minute proportions, yet these and their chemical derivations defeat all attempts to procure the sugar by evaporation merely. The efforts to manufacture sugar from beets or sorghum in this country have failed just at this point; and even in Europe, where the beet sugar enterprise has been most successful, this question of defeca tion is far from being satisfactorily settled.
In the most successful establishments in Europe, 75 per cent of the sugar actually contained in the beet is rarely obtained in a crystallizable form.
In the very interesting experiments of Professor Goessmann, of the Massachusetts Agricultural College, we have an attempt to obviate most of these difficulties on purely scientific principles; and, we are happy to say, with results which bid fair to lead to ultimate and complete success. Fifty pounds of the freshly expressed juice of the electoral
beet was brought rapidly up to a temperature near the boil ing point ( $80^{\circ} \mathrm{C}$., ) when the source of heat was withdrawn and one half of 1 per cent ( 4 ounces) of caustic lime, re duced to the condition of milk of lime, was stirred into the juice. The heat was then raised fully to the boiling point, when it was again removed, and after standing fifteen minutes, the clear juice was drawn off by means of a siphon Several advantages are gained by heating the juice before adding the lime; the chief of which are the more perfect coagulation of the albumen and the consequent separation of the organic substances which it carries with it: the more perfect neutralization of the citric, oxalic, and phosphoric acids, and the precipitation of the insoluble salts thu formed. The asparagin present in the juice is rapidly converted, by the action of caustic lime, into asparaganic acid and ammonia. The acid combines with the lime and is thu disposed of, and the ammonia escapes in the gaseous form being insoluble in hot water. These are importantadvantage gained by hot defecation.
After this the clear juice was concentrated by evaporation to $30^{\circ}$ Brinx, and when cooled to $125^{\circ}$ F. ( $50^{\circ}$ C.) it was treated with carbonic acid, which had the effect to liberate the lime from its combination with sugar, and precipitate it as calcic carbonate. The clear juice, heated to near the boil ing point, was passed through a filter of bone black, and by careful evaporation was crystallized. By the use of carbonic acid the greater portion of the sugar which has entered into combination with lime, potassa, and soda may be recovered
By this process from 8 to $9 \cdot 4$ per cent of crystallized sugar was obtained from juice holding in solution not exceeding 13 per cent. These results are certainly very encouraging.
These successful experiments are the first fruits of ou ystem of agricultural colleges, and indicate very clearly a important feature in their mission.

## IMPROVED BUNG

Our engraving illustrates an improved bung which is so constructed as to be easily extracted from the cask by the operation of the lever and key, represented in connectio therewith in Fig. 1. In this figure, the bung is shown in sec ion in its place in the cask, and in Fig. 2 a perspective view is given.
The essential parts of the invention are a bung proper made of wood or other suitable fibrous material, shown at A, and a cast metal plate, B, which has a shank which passe through A, and through the washer, C, beneath which it is fastened with a pin. The shank of the plate, B, is hollow or some depth, and is provided with internally projecting shoulders, in such a manner that the key, D , may be inserted between them and made to engage with them on turning it a quarter round. This locking of the key with the shoulder

f the plate, which will be readily understood from the cuts enables a direct perpendicular pull to be made on the bung, by which it may be withdrawn from the cask. To facilitate the operation, the lever, E , is brought into play and hooked into the key, D, as shown. This lever is made of steel and s about 18 inches in length; the wheels, the axletree of which forms its fulcrum, are placed far enough apart to clear the bung while the fulcrum and key are brought very close together. Part of one wheel in the cut is broken awa o show the bung. In this way, very powerful leverage is sow hur the bung easily extracted, without subjectin an the liability injury, which it al ways has to he cask to the liabil. ain when the bung is being hammered loose by the old ethod of extraction
The invention, as described, was recently patented through the Scientific American Patent Agency, since which a furthe mprovement has been made in the bung, which consists in the addition of a self.acting valve which operates as a vent whenever liquid is drawn from the cask. The construction of this valve will be understood on reference to Fig. 1. A shallow groove is formed round the outside of the hollow shank, and a small hole is made connecting the interior with he groove. An india rubber ring is stretched round the groove and covers the hole air tight. Upon drawing off the liquid contents of the cask, the air raises, by its pressure,the
ubber ring, and finds its way into the cask between the hank and the washer, which fit loosely.
Mr. Alfred Marsh, of 339 Fifth street, Detroit, Mich., is the inventor of the foregoing improvements, and further infor mation can be obtained from him

## BRIDLE BIT THAT IS SOMETHING MORE, AND AN IMPROVED STOCKING FOR HORSES

Mr. Albert Van Auken, of Ludlowville, N. Y., has invent ed a bridle bit, which may be made the means of aiding in the cure of various diseases to which the throats and mouth of horses are liable.


He makes the bit hollow, with minute perforations alon the side. Into the hollow bit he pours, while melted, a med cament prepared with some bland substance, like lard, oil of heobroma, or other substance which melts at a low tempera ure, simply as a vehicle or which may be itself of service an emollient. The warmth of the horse's mouth, when the bit is applied, melts the medicament, which then exudes and mingles with the saliva which flows to and over the dis ased parts, which are thus reached for treatment, even when he animal is at work. How efficient this will prove in prac tice, we leave for veterinary surgeons to decide. In an vent, the effort to ameliorate the condition of the horse humane and commendable one, and will receive the ap proval of the horsp's friend par excellence, Mr. Bergh.

Mr. William Lewis, of As
toria, N. Y., has also been considering how he might contribuie to the comfort, and in one sense, to the suppor of horses, and to this end he has devised the improved stocking which figures in the accompanying engrav ing; it consists in a snug fit ting elastic anklet of india rubber, molded to fit the horse's leg, and ribbed and re inforced to prevent sagging and slipping down at the top It is also perforated to allow free exit for perspiration, and is laced in front as shown. Theobjectof theinventionisto provide a support, not alway of thelength shown, butlonger or shorter as may be necessa ry for sustaining and protect ing the tendons, ankles, knee joints, etc., of trotting and racing orses and horses in general, so as to prevent injuries from er bending or straining in stepping upon stones or rut holes, etc.

## New Grasshopper

Mr. Townsend Glover, Entomologist of the Department of Agriculture at Washington, says that two full grown speci mens, a male and a female, of a very singular and appar ently new orthopterous insect, resembling Conocephalus en siger, or conical sword bearer of Harris, were taken alive in he greenhouse of the Department of Agriculture, last sea son, by Mr. J. H. Brummel. A short time previous, two hal grown larvæ were found, but died soon after being captured and the remains of a fifth full grown imago were found when cleaning out the flower pots in the winter
These insects injured the leaves of the coffee plants, rose apples, and bananas, in the greenhouse, much in the same manner as is done by our native katydids, by eating holes in he leaves and gnawing away the edges. Their jaws were emarkably strong and sharp, and when the insects were in cautiously handled they bit so severely as to draw blood. The male was about 1.75 inch in length, from the tip of the cone or horn on its forehead to the end of its wing covers hen closed. The female measured 3.05 inches to the end th ovito which itgelf was at least 1.25 inch in length The general color of both male and female was a light pea reen, and the wings were delicately veined with distinct


號, resembling the venation of leaves. A very marked hours
eature in this insect, when alive, is that the labrum and clypeus ars bright yellow, contrasting strongly with the jet on the mandibles, which, together with the ane or ance. This cone or horn, which is placed obliquely upward on the top of the forehead, forming a line with the face, is
ellow beneath, black at the tip, and ends in an acute point which is somewhat bent downward at its summit. No in ect resembling it having hitherto been found in this neigh orhood, there is but little doubt but that it has lately been mported with or on some foreign plants sent from South merica or the West Indies; and as many exotic plants hav eeen received from Balize, British Honduras, it is probable hat this .grasshopper came in the egg state on some of the plants from that locality, and was hatched out last summe ine greenhouse. This fact alone admonishes us how care ul we should be when importing new and valuable plants from abroad, for if a large insect, nearly two inches in length and fully the size of a katydid, can be so easily introduced, how much more readily the small and inconspicuous noxious insects hidden under the bark would be likely to escape no ice until they had perpetuated their species, so as to become partially naturalized and injurious to our plants. There is no danger, however, that this grasshopper will spread, and as it is apparently very tender and accustomed to a tropical climate, most probably it would not be able to withstand the ine, proll or caught as soon as seen in the greenhouse, there is very lit or caught as soon as seen in the greenhouse, there is very
tle probability of any being left to perpetuate their race,

## ARMORED CAN

The sheet metal cans used to contain oils, varnishes and ther liquids for transportation, have usually to be enclosed a wooden box in order to afford them the requisite pro tection from accidental injury. It is the object of the invention we illustrate to economize in the cost of this wooden protection or armor, and at the same time to provide a covering of the needful strength. This is done by soldering small metal clamp plates to the angles of the metal can, and by fastening the armor, which consists of boards of the proper size, to the can by bending over it the projecting ends of the clamp plates. The entire arrangement will readily be understood from our cut, which represents the metal can enclosed in the improved armor. The boards for the top and
ean bottom are first put on and clamped, and the four side boards re attached afterwards. In constructing the can, one top corner is sloped off and the nozzle inserted therein so that it does not rise above the top of the can, as shown in the cut in this position, it is protected by the armoring of the top and djacent sides and is conveniently placed for pouring out the iquid. It may be stopped in any manner required
It is the design of the inventor to armor a five gallon can with wood of one fourth inch thickness at the sides, and one half inch at the top and bottom. The material, he says, can be furnished in shooks, cut to any size and ready for use, by eastern and western lumber merchants very cheaply. He claims that the expense of boxmaking is saved by this claims that the expense of boxmaking is saved by this method and that less lumber is required, while the cost of abor. The armor being lighter than the box affords greate

facility for handling the can, while its strength is amply suf cient for all practical purposes.
A patent was obtained for the inventor of the device, Mr William F. Thompson, through the Scientific American Patent Agency, May 7, 1872
Address for further information, Wm. F. Thompson o Edwin Jacoby, Toledo, 0.

## English Fast Train.

The Great Northern Railway Company is now running a ast train between London and Edinburgh, 395 miles, in 9 hours, which is at the rate of about 42 miles an hour If we had good first class railways in this country, be tween our important cities, capable of the above speed passengers might ride from New York to New Haven 74 miles, in $18 \frac{8}{4}$ hours instead of three hours as at presen required; to Boston 234 miles in $5 \frac{1}{2}$ hours instead of 9 hours; to Washington 228 miles in $5 \frac{1}{2}$ hours instead of 9 hours; to Chicago 835 miles in 20 hours instead of 34 hours; to St. Lou's 1000 miles in 24 hours, instead of 48
$\qquad$ Tea Growing in India.-The experimont of growing tea India is proving quite successful. In 1862 the crop was estimated at $1,000,000$ pounds; in $18 \% 1$, at something over $20,000,000$. It is claimed that India can now compete with China in producing teas of the best quality.

## Gurxespondemte.

The Editors
spondents.

## To the Editor of the Scientific American:

The article under the above caption, reprinted from the Chemist end Druggist on page 392, Volume XXVI. of the ScIEntific American, treating on the effect of faulty vision in painting, conveys the impression that the artist with astigmatized eyes attaches the stigma to his picture when painting from Nature. This impression, I think, is erroneous.
Turner and all who seek to faithfully copy Nature try to make their pictures produce upon their own eyes the effect of Nature, and since like effects proceed from like causes, the effect of Nature can only be produced by the reproduction on the canvas or picture of the forms, proportions, and qualities of Nature. And this is true whether the artist's eye be correct or incorrect, since the same eye observes both Nature and the copy; and differences can be detected and remedied as readily by the incorrect, as by the correct, eye, and neither eye can be satisfied until such differences are eliminated. I am, therefore, compelled to deny that "astigmatism" tends to error in copying directly from nature; or to vitiate the criticism which is based upon observation of Nature made at the time of such criticism
'The writer of the article under consideration says: " Turner painted from Nature exactly as Nature appeared to him, but not as it appeared to him when his sight was truthful."
It is readily seen, if the above reasoning be sound, that the last clause of this statement cannot be true; and the first clause can only be correct on the supposition that Turner's eye was truthful. For if we suppose his eye to have been incorrect, he would still produce the forms and proportions of Nature in order that his eye might be satisfied. Thus he would see wrongly, but draw correctly.

Similarly, I am compelled to dissent from the opinion, expressed or inferred in the same article, that yellowness in the pressed or inferred in the same article, that yellowness in the
lens of the eye of Mulready led to untruthfulness of color in lens of the eye of Mulready led to untruthfulness of color in
his paintings made directly from Nature; because the color his paintings made directly from Nature; because the color
in his eye was spread over Nature and picture allke, as he in his eye was spread over Nature and picture alike, as he
observed them. And I believe that if he, with colored lens, observed them. And I believe that if he, with colored 1 lens,
truly sought to make his picture app sar to himself like the truly sought to make his picture app sar to himself like the
Nature he painted (not as he saw, but correctly) the stigma was not painted, but was, to him apparently but not really, added to the work by his diseased or incorrect eye. But a source of error in a representation of Nature might be found in the case of an artist who has observed Nature with correct eyes, and afterwards has become astigmatized, and in the latter state has painted or sought to record on canvas the knowledge gained by his previous observations. In this case the error in the piccure will be the opposite of the stigmatization. This accords with the case of Mulready as stated in the article considered.
C. Stebbins.

## How to bestroy Mosquitoes.

To the Editor of the Scientific American
The process for destroying mosquitoes may be condensed into a few words. The strongest crystallized carbolic acid should be placed in a bottle, and covered with the same quantity of strong red codliver oil; shake the bottle thoroughly untila whitish colored foam appears; if such foam does not arise, however, a small quantity of powdered lime should be added, with a little water. Pour the mixture into a dish or cther convenient article, and place directly unde the op

In my humble opinion, the effcct should be explained in this manner: The moment the mosquito enters, it loses the scent of blood; for, as the combined odor of the oil and acid is much more powerful than that of blood, it follows, as a consequence, that the mosquito becomes suddenly perplexed. The consequence is, that after scrambling and skirmishing about in the dark, the mosquito is led, as it were, instinctive ly into the mixture, where it is either drowned in the oil or burned to death by the acid.
Formerly I was accustomed to smear my face, arms, and breast with the strong oil alone, but I frequently arose in the morning smelling so terribly that, though it protected me from mosquito bites, I was happy to lay it aside. I have slaughtered more mosquitoes with the article explained above than ever I could have done with my fists or any other dan gerous weapons.
E. S. G.

Piiladel phia, Pa

## A Machinist's Query.

## Wo the Editor of the Scientific American:

On page 20 of your current volume, is an article from a young machinist which looks very young indeed. He says he has learued a trade; "jes' so." I'll guarantee he was one of those chaps who spend a good share of their time dogging boeses, and if he is getting $\$ 350$, per day it is only because he in a new country where workmen are scarce.
If he is such an encyclopedia of knowledge, he had better try to fill some poor wretch's position, as good men are alway in demand. He will probably find some thorns in that bed f roses.
It is not necessary for me to enter intoall the comparisons between the two occupations: but I will state some or the qualifications necessary before becoming a member of the rocherhood of locomotive engineers. He must be sober moral, truthful, and inclined to deal justly with all men, ever ready and reliable, of good judgment (one of the most necessary qualifications) as he will have from two to three hundred thousand dollars worth of property day after day
besides hundreds of precious lives, entrusted to his care. Does a machinist ever have one tenth the responsibility? Is he in danger of his life by land slides, rocks, trees in storms on tracks, or wrong switches? Not that I know of. The majority of engineers are men who commenced young and fired for from 2 to seven years, from 12 to 20 hours a day, sleep iog on boxes, tops of cabs, wood piles, soft sides of hemlock planks, etc., generally too tired to wash up and go to bed to sleep only three or four hours; while a machinist generally gets plenty of sleep. I intend nothing derogatory to the profession. These are a few of the nice attractions incident to the route to the position of a locomotive engineer. Lastly, the young machinist ought to know that we are getting but $\$ 4.00$ per day.
Hornellsville, N. Y.
S. E. Sturdevant.

Engineer.

## The Young Machinist Again

To the Editor of the Scientific American:
I find, on page 20 of the present volume, "A Machinist's Query," wherein the young machinist says he is sorry he has earned a trade; that it is hard to know that, after serving four years apprenticeship, he only gets $\$ 3.50$ per day for building and repairing an engine; whereas the engineer, who is entirely ignorant of the working of the engine, gets $\$ 4.50$ per day for running it.
Now I am personally acquainted with machinists who are first class workmen and command the highest wages, and who build and repair engines, but are not capable of taking charge as engineer, because they do not understand the principles upon which the engine works, and they are theoretically as ignorant as they can be. A man may be a practical machinist, good at a lathe, planer, or vise; but if he does not machinist, good at a lathe, planer, or vise; but if he does not
acquire the theory as well as the practice, but goes by a betacquire the theory as well as the practice, but goes by a be
ter man's drawings, he is nothing but a first class laborer. ter man's drawings, he is nothing but a first class laborer.
Practice without theory and theory without practice are Practice without theory and theory without practice are
So I say, give me an engineer who can make his own calculations, in regard to the engine and boiler and the use of team, rather than a man who is a practical machinist, who as served four years at the laboring part of the business, and knows nothing of the first principles of what he makes repairs.
an Engineer.
Philadelphia, Pa .

## Laws of Electricity.

To the Editor of the Scientific American:
In your issue of June 22d last, a short article concerning electricity, its connection with the earth, and its probable obedience to the laws of gravitation, reminded me of some cogitations on the same subject which may, or may not, be sufficiently interesting to be worthy of notice. A year or two ago, your paper gave an interesting account of the generation of electricity by certain portions of swiftly revolving tion of electricity by certain portions of swiftly revolving
machinery in factories; it was an easy and natural transimachinery in factories; it was an easy and natural transi-
tion of the mind to infer that the electricity with which the tion of the mind to infer that the electricity with which the
earth is charged is produced by virtue of its own swift revolutions; or, if not exactly produced, at least intensified. Each world, or star, would thus draw to itself its own share ac cording to the speed of its revolution, from an unlimited ocean of attenuated electricity in which, they and we, all foat. Electricity seems to be, humanly speaking, the source of vegetable and animal life, and indeed lies hid in all forms of organic or inorganic substances, only awaiting study to bring it to light
J. DeWalden Churchill.

## Extinguishing Fires.

To the Editor of the Scientific American:
Allow me to make a suggestion to parties who purpose uilding large warerooms or business blocks. In some part of the cellar, build a tank that will hold enough acid and marble dust to generate, when mixed, gas enough to fill the building. Let the stop-off arrangements extend to the oute part of the building; and when a fire occurs and gets be yond the control of the portable extinguisher, turn on the large one. In warerooms, the gas could ascend through hatchways; in other buildings, flues in the walls connecting with different floors would be necessary.
G. W. D.

## Iron Shipbuilding in Pittsburgh

To the Editor of the Scientific American:
In September, 1839, I was in Pittsburgh, and there saw the hull of the first iron steamer ever built, I believe, west of the Alleghanies. She was called the Duquesne, and was intend ed for a freight boat. The hull was on the ways and the mechanics at work on it. What became of her-whether suc delphia papers of her departure from Pittsburgh on her first delphia papers of her departure from Pittsburgh on her first
trip. As iron will probably replace wood on the Western trip. As iron will probably replace wood on the
rivers, I think this reminiscence might be interesting.
M.

## Do Snakes Charm Birds?

the Editor of the Scientific American:
H. L. Edis makes this enquiry in the June 22 issue of the Scientific American, and also relates a very interesting in cident which he witnessed. Mr. Edis does not commit him self in any way to the belief that the snake has any power
to charm, and the article would imply that he is not one of to charm, and the article would imply that he is not one of that superstitious class who believe that the serpent is more made. Many other beasts show far more cunning than the erpent; the fox, for example, the bear, or even the cat in Ever subtle manner of capturing her game, especially birds
for the capture of the fly, shows more subtlety than ever the serpent did. Some snakes are hostile enemies to birds when hatching or rearing their young. The hen, when sitting or rearing a brood of chickens, will fight an elephant or crocodile; so the small bird, with the same instinctive parental defensive nature, will fight anything so also the mother; posessed with the same rash parental instincts, will rush to the lion's jaws to save her infant child. I once heard a gentleman relate an experimental test he made in that direction The men in his field had killedia very large specimen of the black snake and dragged it to the house for exhibition. The gentleman had the curiosity to stretch it on the ground, with uplifted head and mouth wide open, directly under the eaves of hisbarn where the swallows are hatching and nestling their young; then he stood off and watched the result. Presently the monster was spied and the air filled with swallows, diving in the most frantic manner at the supposed enemy, until, in a few moments, as every plunge brought them nearer and nearer to the object of their fury, one struck the onate seem that every swallow would pour its fury upon the dead reptile, knocking it in every conceivable manner. Soon the excitement was over, the supposed adversary conquered, and one by one the swallows retired to their nests. No doubt the snake may make use of this means in ordet to capture the bird or other game.
J. E. E.

## The Right Kind of Windmill.

To the Editor of the Scientific American:
I notice the remarks of your correspondent C. B., of Memphis, on page 261, volume XXVI., headed " The Right Kind of Windmill." Many of his ideas are undoubtedly correct; indeed, such is the importance of this power that any suggestions calculated to throw light on the subject are welcome. The style he speaks of would certainly do a great deal of work while it lasts; but is it not a question whether so very cheap an arrangement as he speaks of is the cheapest after all? The writer has known several large millsburned down by the friction of violent running, and the noise attending a very rapid motion would sometimes be very objectionable. For example: Upon the building in which I write is a self regulating windmill, used to elevate the Croton water to the four or five stories whither its own pressure is not sufficient to carry it. Its maximum velocity is some fifty or sixty revolutions per minute; but if it should be allowed to run 200 or even 150, the clatter (of the pump rod) would be intolerable, the pump valves would not have time to close properly, and the war and tear upon the pump or other machinery would soon be destructive. (In this connection, see page 340 volume XXIV. of the Scientific American).
It would seem impossible almost for any windmill to accomplish what " Novice" there describes, and I dare say only the Continental or some of the high priced self regulating windmills would accomplish it. A windmill, to meet the wants of the times, must be strong and ornamental, well made and self regulating, so as to set and furl its own sails in all weathers.
If your correspondent "C. B." will send me his full address, will forward him the fullest mathematical calculations. 61 Park Place, New York city.
A. P. Brown.

## SAVING OF TIME.--A SERIOUS CHARGE AGAINST THE SCIENTIFIC AMERICAN.

The life of a man is at the very best too short. When it is all utilized, the ten thousand daily duties and obligations consume so large a share of it as to leave very little time for its main purposes. I assume that they are these: Mental culture; the development of our powers; the advance of civilization; the increase of the sum of human happiness; the solution of Nature's mysteries; and the exalting the spirit for its new sphere of exercise in the other life.
Of the three score years, to which men of good health live, twenty years are consumed in reaching manhood and getting ready for duty. Of the forty years remaining, about thirteen years are spent in sleep, and this is a total loss, ne cessary for recuperating from our physical and mental ex haustion. To this we must add two years for the time consumed in taking our food, and twelve years in earning food sumed in taking our food, and twelve years in earning food
and clothing, and three years in ill health and its exactions. Of all things mentionable, Time is the most precious!
The writer has himself reached almost to the three score and is a very miser of time; and he would gladly rival that proverbial thief, Procrastination, in stealing it from every source. I have robbed sleep of two years, and I think used most of it well, thank God, who (be it reverently spoken) will not be hard on my class of thieves.
I have flanked and evaded disease, and saved nearly my whole three years by avoiding tobacco, liquor, and dissipation in all their forms; and I am grateful in saying that this has enabled me to exalt my moral nature by devoting at least one of those years to the relief of others less fortunate or less prudent than myself.
In many ways I cannot name (and would not if I could), I have economized, utilized, saved and stolen moments and
minutes to the amount of four years more; and I shall, I minutes to the amount of four years more; and I shall, I
think, count twenty years, instead of ten, spent in a rational manner. But they are gone into the past, and I have done so little and have so much to do; that I am not at all ready to leave my work on this side the river.
My mania for saving time is paramount, and this brings me to the main object of this communication.
You, Mr. Scientific American, have consumed and are still consuming a portion of my time, enough for a miser to notice; and your brethren, or class, are still consuming it in

## subscribers.

bscribers. perusal. This is not reckless, if at all chargeable; you do perusal. This is not reckless, if at all chargeable; you do
your best to send us the best and most instructive of reading your best to send us the best and most instructive of reading
matter, or I for one would not touch you. Life is too short. matter, or I for one would not touch you. Life is too short.
But you do not cut your paper; you compel us, the 50,000 , each But you do not cut your paper; you compel us, the 50,000, each
to cut his own! You have this day robbed me of five minutes precious time in cutting your paper, and the 50,000 each of five minutes! This would make about 520 days of the popular eight hour kind. Suppose it reached a year or half year of our most inestimable time; by machinery you could cut the whole edition for 25 dollars. Can you excuse yourself? Can all the slovenly publishers of books, periodicals, and newspapers furnish any sort of apology for this wasting of priceless time, amounting to some hundreds of times your own culpability? Why, Harper's Monthly has just cost me thirteen minutes, worth to me twice the price of the maga zine!

What! 100 years or 500 years of human labor wasted weekly on cutting the leaves of your papers, when a few dollars worth of work by machinery would do it greatly bet ter, and keep your papers and books neat, genteel, and dura ble! Shame on your whole fraternity!

I am not done. If you will give me room, after such a scolding, I wish you to help me to show in much shorter ar ticles, how we can easily save time enough to build and maintain all our asylums and schools, and a large share of our railroads and telegraphs.
New Orleans, La.

## SCIENTIFIC AND PRACTICAL INFORMATION.

SULPHURETTED HYDROGEN IN BLOWPIPE ANALYSIS.
If a metallic oxide or salt be mixed with hyposulphite o soda $\left(\mathrm{Na}_{2} \mathrm{~S}_{2} \mathrm{O}_{3}\right)$, and the mixture dissolved in a borax bead in the inner blowpipe flame, the hyposulphite is decomposed and the sulphur combines with the metals to form the well known sulphides, most of which are distinguished by their characteristic colors. To prevent volatilization of arsenic and mercury, however, the precaution should be taken to heat the mixture of the substance and hyposulphite in a glass tube.

## safety fulminate

A constant correspondent, Mr. E. H. Hoskin, Lowell, Mass, writes as follows:
" ln the course of my investigations, I have formed a new fulminate for charging shells for exploding nitro-glycerin, dynamite, and dualin; this preparation is equally effective for the purpose as that now in use, and has this importan advantage: The shells will not explode with ordinary fric tion, nor even if struck with a hammer or by means of a ba of iron of 10 pounds weight, allowed to fall and so thor oughly to flatten them out. This being so, they become quite safe for a careless man to handle, and quite safe to transpor as freight; they are entirely free from danger to life and limb till they come in contact with fire, when they will ex plode with terrific force."

## FRENCH PUTTY.

Ruban, of Paris, has invented a putty made by boiling lbs. of brown umber for two hours in 7 lbs. linseed oil, stir ring in 62 grammes of finely chopped wax. It is then re moved from the fire and $5 \frac{1}{2}$ lbs. chalk paste and 11 lbs . white lead are incorporated in the mass.

## curculio.

A correspondent, Mr. J. H. Parsons, of Franklin, N. Y., denies the value of the method of preservingplum trees from the attacks of curculio, described on page 321 of our volume
XXVI. He assert 3 that the bug will attack ripe fruit in XXVI. He asserts that the bug will attack ripe fruit in
preference to anything else; and that, as the curculio can fly, tarring the trunks of the trees is useless.

## paris green and potato bugs.

Mr. E. Wolff writes to point out that Paris green is a compound of two substances, arsenic and copper, both of which are poisonous in all their combinations. He disregards the often repeated argument that poisonous matter, strewn upon of the plant, and asserts that it is impossible to divest the potatoes from the substance which is spread over the whole soil. Mr. Wolff also states that repeated applications wil render the soil so obnoxious that all vegetation will be injured In commenting on this letter, we must say that it has not yet been observed, by any one of the thousands of farmers who have used Paris green as a bug destroyer, that any evil consequences to vegetation have followed the most iberal inhabitants of the soil is likely to be of the greatest service to the crops.
Mr. Wolff,
Mr. Wolff, however, sends us a suggestion which has the merit of novelty. He says: "Lay a piece of sheet iron, with the edges bent upwards, under the vines on each side of the
row; and then, by beating the vines with a flat broom, shifting the iron pans along and emptying them occasionally into a pail of water, sufficient bugs and eggs may be destroyed." Mr. Wolff further asserts that the use of Paris green for painting purposes is to be deprecated. The color is inhar monious to the hue of foliage, the wood so painted will ulti mately be burned, possibly in a baker's oven, and so the ar senical compound will get into the bread. We trust these warnings will be sufficient to deter our readers from the use may all be protected from eating bread baked in an oven heated with a fire lighted with a wood colored with a paint mixed with any arseniate of copper.

TO PRESERVE PENCIL AND INDIAN INK SKETCHES, To a solution of collodion of the consistency used by photographers, add 2 per cent of stearin from a good stearin can-
dle. The drawing to be protected is then spread on a board dle. The drawing to be protected is then spread on a board or plate of glass and the collodion poured over it as in photography. It dries in 10 to 20 minutes perfectly white, and so thoroughly protects the drawing that it may be washed without fear of injury.

## HAIR DYES, HURTFUL AND HARMLESS

Whatever we may think of the taste which leads people to desire their wrinkles and furrows to be surmounted by raven locks or auburn curls, the practice of using hair dyes seems steadily on the increase. Dr. Shandler's fearless exposure of the poisonous character of all the hair dyes in the market, and a knowledge that their long continued use will inevitably cause death, will not deterall the old fops and fools from using them. Perhaps we may rejoice it is so, for, like tight lacing, the use of poisons never remove from earth any sensible, well informed person whose life is really worth saving. Our duty seems to end when we have impressed upon their minds the dangers they incur, and we might leave them to choose for themselves between health and disease, between life and death. But we see too plainly every day that people are willing to take any risk for fashion's sake. We knew a lady recently who died from the effects of using Hall's Vegetable (?) Sicilian hair dye, and yet we have not known one of her friends to abandon the use of dyes equal. ly dangerous. Since, then, people insist on obliterating the marks time bestows on their tresses, it is the best we can do to seek some substitute, less injurious than the salts of lead and silver row so generally used, in order that these people may choose the less of two evils. While we do not wish to assert that any dye is uninjurious, yet we should prefer a mild vegetable poison to an insidious, cumulative mineral like salt of lead. Among organic dyes which can be prepared by any one is that obtained from the green walnut burr, the epicarp of the fruit of the juglans regia. For this purpose he burrs are soaked in water and pressed. The liquid hus obtained is then evaporated and the dye precipitated as black powder, which can be used in any convenient form of hair dressing. Dr. Kurtz says that large quantities are used in Greece, and are also exported thence for this purpose The Greeks also make a dye by adding alum to the expressed juice, and use this to give a dark and marketable color to the cattle exported to Marseilles and other places where light colored stock is at a discount.
production of glycerin by synthesis.
Another most interesting discovery in the compounding of organic matters has recently been made by Friedel and Silva. Propylen or tritylen is a gas eliminated from a compound il in a red hat tube. and it can be more easily obtained by the action of biniodide of phosphorus $\left(\mathrm{PI}_{2}\right)$ upon glycerin The new discovery is the production of glycerin from the chloride of prop̂́ylen prepared by methods in which no gly cerin is employed.
embalming fluid
Busaline uses carbolic acid and camphor, dissolved in a sufcient quantity of petroleum,colored flesh color by vermilion preserving microscopic preparations.
A nearly concentrated solution of acetate of potash is found to be the best means of preserving microscopic prepa rations.

The Hartford Steam Boiler Inspection and In-
The Hartford Steam Boiler Inspection and Insurance Company makes the following report of its inspections for the month of May, 1872:
During the month, 1,150 visits of inspection were made and 2,188 boilers examined-2,071 externally and 516 inter nally-while 216 were tested by hydraulic pressure. The defects in all discovered were 828 , of which 201 were re. garded as dangerous. The defects in detail are as follows: Furnaces out of shape, 49-7 dangerous; fractures, 85-39 dangerous; burned plates, $37-16$ dangerous; blisterec plates, 109-11 dangerous; cases of sediment and deposit 42-21 dangerous; cases of incrustation and scale, 142-1 angerous ; cases of external corrosion, 72-11 dangerous internal corrosion, 27 dangerous; internal grooviag, $21-$
4 dangerous; water gages defective, $48-6$ dangerois; blow 4 dangerous; water gages defective, 48-6 dangerous; blow
out defective, $31-10$ dangerous; safety valves overloaded and out of order, 19--14 dangerous; pressure gages defective 123- 20 dangerous; boilers without gages, 149 ; cases of de ficiency of water, $10-3$ dangerous; cases of broken brace and stays, 24-10 dangerous; boilers condemned, 14.
When a safety valve spindle becomes oxidized and moves with difficulty through the guides, it should be scraped or rubbed clean, and all oxide removed. But to pour oil on to a salety valve for the purpose of lubricating the spindle, eat, or guides, is pernicious. The more volatile portions of he oil evaporate almost immediately, and that which re mately becoming little better than glue. Where parts of machinery are moving one on the other or in bearings, oil is essential as a lubricator; but, for safety valves, it is not the hing. We call attention to this, because we have recently een indan where this practice had rendered nearly inoperative, and was a source of danger.

The nineteenth annual exhibition of the Iowa State Agri cultural Society will take place at Cedar Rapids on Septem ber $9,1872$.

Deterioration of Cotton and Sugar Cane.

## by the commisssioner of agrioulture.

The conclusion is inevitable that both cotton and sugar have diminished in the quantity of production, but that neither has depreciated to any extent in quality, and the cause of failure is most unerringly traceable to the planter himself.
The seed is promiscuously taken from the gin, carelessly hrown upon a heap, where it remains until planting time, and, withou regard to any selection of good or indifferent, is again committed to the earth to make its bad or indifferent product.
lndifferent seed produces an infirm and sickly plant, and a consequent dimunition of cotton. Practice sanctions the use of from two to eight bushels of seed to plant an acre of ground, and the planter consoles himself with the idea that it is not lost; but this is only partially true, for this wasteful mode of converting seed into manure is not justified by the benefits derived. It would be far more profitable to subject the seed, as it accumulates at the gin, to an application of plaster of Paris and muck from a swamp, or pine shucks or leaves and earth from the woods, and thus convert the re fuse cotton seeds into a compost which will tell with ten fold the effect upon the crop of cotton to which it is applied, One bushel of well and carefully selected seed will be quite sufficient to plant an acre of ground in hills, twenty inches apart and in rows four feet apart. But, after all, the planter must be convinced that a rotation of crop is absolutely in dispensable to any operation for a series of years. If the plantation contains 200 acres let 50 of them be in cotton, 50 in corn, 50 in peas or beans, and 50 in grass, and let the crops alternate; and it cannot be doubted that if this process be pursued for a series of years, the 50 acres will have grown more cotton than 100 under other circumstances. The use lime, if it can be procured at any reasonable expense, will always insure the growth of grass.
With respect to the cultivation of the sugar cane, the same principles which it has been endeavored to enforce with regard to cotton planting are equally applicable.

## Effect of Rum on Chickens

A French doctor has recently been making some curious experiments as to the effect of alcohol on fowls. The birds took to dram drinking with evident delight, and many an old cock consumed his bottle of wine a day, so that it became neressary to limit the allowance. They all-lost flesh rapidly, more especially those which drank absinthe. Two months of absinthe drinking was found sufficient to kill the strongest cock or hen. The fowls which indulged in brandy alone lasted, however, four months and a half; while the wine bibbers survived for ten months. Their crests also swelled of four times the original size, and became unnaturally red The Pull Mall Gazette, doubts whether man is justified in trying experiments with the dumb creation with the view of ascertaining how far he may himself venture to get drunk with impunity; but having proceeded thus far, he may as well go a step further, and by the introduction of the tea pot into the hen house find out whether there is any ground for the suspicion entertained in some quarters as to the innocent properties of tea. A few experiments in late hours might be made with advantage at the same time. A party of carefully selected cocks and hens might be allowed to mingle in the festivities of the London season, returning to their roosts at the hour when they usually commence to cackle and crow. It would possibly be found that one week of political reunions, concerts, balls, and crushes would be as disastrous in its effects as two months of absinthe drinking

## Plaster as a Protection from Fire.

After the conflagration in Paris, it was generally found that, with good plaster work over them, beams and columns of wood were entirely protected from the fire. In cases where limestone walls had been utterly ruined on the outside by the flames passing through the window openings, the same walls, internally, escaped almost unscathed, owing to thei being coated with plaster.
On many such plastered walls the distemper decorations were still to be made out. The iron roofs rendered good ser ice, and the party walls of each house were carried up right hrough the roof-a most important precaution, for other wise nothing could have prevented the disastrous conflagra tion from leing more extensive than it was. It was also found that good woodwork in beams and posts, good wood floors well pugged, and good wooden staircases, were safer and more to be depended upon than cast iron columns and stone taircases, landings, and floors. Stone staircases well pro tected by plaster were fireproof, although not so safe as wood in case of heavy débris falling upon them.

AN inclined railway is now in course of construction up he side of Mount Kohlenberg, near Vienna, Austria. It is o be completed by the time the Exposition opens next year Mr. Francis Felbinger, late of the Pittsburgh, Fort Wayne and Chicago Railroad, is the constructing engineer. The track is to be 6 feet wide. The cars are to carry 100 passengers each, and are to be drawn up by means of wire ropes,
drums, and stationary engines, similar to the P ennsylvania oal railway inclines. Two engines each of 100 horse powe will be employed.

Magnetic sand is found in immense quantities on the sides of the volcano of Mount Eina. The spe ific gravity of this sand is $2 \cdot 813$. Acids have little effect apon it. An alysis gives silica $52 \cdot 71$, magnetic oxide of iron $19 \cdot 44$, alum ina $19 \cdot 09$, lime $6 \cdot 61$, magnesia 1.85

## SEWING MACHINE

In the invention which we here illustrate, a wide step ap pears to have been made towards perfecting the construction of the sewing machine. Mr. G. L. Du Laney, the inventor has devoted the past fifteen years to the study of this branch of mechanics, and during that time has made many valuable improvements, the net results of which he has embodied in the present machine. Some of these rosults we will now proceed to lay before our readers, and a mention of one of the most prominent will at once take us into the heart of ou subject.
In lieu of shuttle or bobbin, on which the lower thread is ordinarily wound, Mr. Du Laney takes the spool of thread, just as it comes from the manufacturer's $h$ ands, and incloses in a case of hard rubber, through a hole i the upper side of which the end of the thread is drawn. The hard rubber case is partially of cylindrical form, and is somewhat pointed at its front end and rounded at its rear. It is confined, loosely, in the machine in a sort of holder which consists of side barriers, in such a manner that a loop formed by the upper thread may be easily drawn over its smooth exterior within the barriers. It is by the pas sage of such a loop over the spool case, and by afterwards drawing it up tight, that the upper thread is made to loop with the lowe one and the stitch formed. The mechanism employed to effect this, is shown in detail in io 2 , which gives an enlarged view, while open, of the box seen closed in Fig. 1. The open, of the box seen closed in Fig. 1. The and at $B$ is one of the side barriers before al luded to, which form the holder for the same is a rotating hook of novel construction to which motion is impsrted by the pin and re volving disk shown in the figure. The needle, with its operating mechanism, we shall speak of more particularly hereafter. The operatio is as follows: The upper thread, the end of which is held by the operator, is carried down through the fabric by the needle, which on it return stroke causes the slack thread to form a loop. This loop is immediately caught up, pulled out, and carried along by the revolving hook (which has, at the same time, been mov ing upward and across from left to right) unti ing upward and across from left to right) until it reaches the position shown in the figure. It
is here opened out by the point of the spool case, and is afterwards, by the continued mo tion of the hook, made to glide along the smooth surface of the case until it has passed completel over it, when the hook releases the loop. It now lies loosely

on the top of the spool case and incloses within it the lower thread. The hook returns in time to catch up a second loop which has been formed by a second passage of the needle and carries it along as it did the first. As the second loop is enlarged by the movement of the hook and by its passage over the spool case, the necessary additional length of thread is supplied by the slack of the first, and the whole of this slack is thus taken up. The effect of pulling the first loop tight is the formation of a double loop where it engages with the lower inclosed thread, and, also, the carrying upinto the center of the fabric of this double loop. By these means the well known lock stitch is produced. The friction caused by its unwinding of the spool in its case is sufficient to produce the requisite tension in the lower thread. In its passage from left to right, the hook carries the loop as shown in the figure, but when passing under, from right to left, a barb, seen at the end of the hook, engages with the loop and hold it upward untilits upward motion releases it.

The needle, which has the advantagep of being straigh pat very short, is recuxad in it place by a small cam devised
for the purpose, and its speed, during the upward and down ward strokes, is regulated by a novel and very ingenious con trivance for producing variable motion, which is shown in Fig. 3. Here D represents a slotted disk which is attached to the driving shaft. E is a shaft through which motion is mparted to the needle, and which has its center placed lower than the center of the disk, $D$, it is connected with the disk by means of a crank and a crank pin, which engages with the slot. When the disk is rotated, the path described by he crank pin is as indicated by the dotted lines, and it is obvious, therefrom, that the nearer the crank pin approaches the periphery of the disk, $D$, the bigher must be the speed


DU LANEY'S IMPROVED SEWING MACHINE.
earlings, and two year olds. A party selling 1,000 stock attle would furnish 250 of each of the above classes, and charge a uniform price for the whole. The present price is $\$ 5$ per head in specie. Three year old steers or four year olds generally bring from $\$ 10$ to $\$ 12$ per head. This class furnishes the staple of the Kansas trade. Four year olds in good condition for shipment to New Orleans, bring $\$ 15$ per head. The term beeves is applied only to animals four years old and upward. In good condition, they will net 500 pounds of beef per head.

## HOSE COUPLING

The improved coupling represented in our ngraving is the invention of Mr. L. J. Rob erts, of Meadville, Pa. It was designed by him with the view of securing quickness and ease in coupling or uncoupling hose pipes, and of protecting the screw threads of the couplings from injury; which objects he ha attained in a simple and effective manner.
The coupling, which is shown in perspec tive in Fig. 1, and in section in Fig. 2, con sists essentially of three parts-the hose end A, the nut, B, and the hose end, C. The nut, $B$, screws on the end of the hose end, $A$, and s kept in working position by a screw pin shown in the engraving. On each side of this nut is a projection and slot, shown o this nut is a projection and slot, shown a D , and on each side of the loose collar of the hose end, C, is a pin, shown at E. Thes pins and slots are made to engage by bring ing the collar of the hose end, C, and th nut, B, together, face to face, and turning the collar round until the pins fall into the slots. The nut, $B$, is then screwed round until it brings the end of A, which is provided with a washer, tight up against the end of C. The button, F, is put on for the purpose of keeping the pins in the slots in case the nut should be jarred loose. It is provided with a rubber spring, which causes it to fall into a cleft in the nut, $B$, when th pins are made to engage with the slots. At taching $B$ and $C$ in the manner described ef taching B anding; the uncoupling is accom fectiod by plished by unscrewing the nut, B , and press ing back the button, F , when a slight circu lar motion given to C causes the pins to fal out of the slots.
The hose end, A, is similar to that used with the old coupling, and the old hose end may, therefore, be used in conjunction with
of the shaft, E, which will decrease as the pin draws neare the center. By the employment of two devices of this nature the needle is withdrawn by an accelerated motion from the fabric before the loop is pulled tight, and the motion of the rotating hook is, at the same time, retarded so as to allow of the withdrawal of the needle before it catches up the loop. In this way the chafing of the thread against the needle, which would otherwise occur, is entirely prevented.
Another improvement in this machine consists in providing the pitman with ball and socket joints, by which means it the pitman with ball and socket joints,
We have hitherto spoken of the lock stitch only, but two We have hitherto spoken of the lock stitch only, but two
other stitches can be made by the machine. An ornamenta cable stitch is made by removing a shield wire, which may be seen in Fig. 2; this allows of the loop being caught in nick (instead of being passed directly over the spool case) and held while the needle passes through it. The result is the formation of a loop in the upper thread in addition to the locked loop; both loops are pulled tight at once by the hook The ordinary chain stitch is produced by the action of the hook on the upper thread alone, after the lower thread ha been cut off, or the spool and its case removed from the ma chine.
The three forms of stitches are shown in Fig. 4, where F is the lock stitch, $G$ the cadble, and $H$ the chain stitch. A sur face view of the cable stitch is given; the other two are shown in section.
The machine works easily and noiselessly, and the motion is rapid. The general neatness of the design can be see from our engraving.
Patented July 3, 1866, and May 2, 1871. Further informa tion may be obtained of Mr. G. L. Du Laney, 89 John street Brooklyn (Blees' sewing machine factory).

## The Cattle Business in Texas.

Among the noticeable changes made in the cattle business, since the close of the late civil war, is its concentration in fewer hands. The smaller owners found their stocks de reasing, and hence their profits did not meet their expenses They have generally sold out, either to the larger proprietors to the tallow and hide dealers. But few men now in the usiness have less than 1,000 , branding about 250 calves The herds range as high as 50,000 , the numbers of calves
branded being from 20 to 25 per cent of that number. On branded being from 20 to 25 per cent of that number. On
these larger ranches are maintained from 2,000 to 3,000 horses, in order to supply the army of vaqueros with re mounts. Large numbers of the cattle are killed for their hides and tallow. Some of these dealers sell to purchasers on the spot, while others ship direct to New Orleans or drive to Kansas. Several leading stock raisers are mentioned as wintering from 2,000 to 3,000 each on the line of the Eansas Pacific Railroad.
The term etools cattle, in Texas, includem cows, calves,
the parts, B and C, alone, to form a coup-
ling on the improved principle
On locomotive engines, also, the same two parts only are needed to make up a complete coupling.
The invention was patented through the Scientific Amori can Patent Agency, Oct. 8, 1867.


Further information can be obtained of Mr. Roberts at the foregoing address.

New Tests for Some Organic Fluids, by J. A. Wank yn. The author has found that the differential action of potassic hydrate and potassium permanganate may serve as method to discinguish between various animal fluids When these are evaporated down with excess of potassa so ution, and then maintained for some time at $150^{\circ}$, a certain fixed proportion of ammonia is evolved, and if the residue e now boiled with an alkaline solution of potassium per manganate, a further definite quantity of ammonia is given off; the relative amount of ammonia evolved by these two actions being constant for the same animal fluid. The autho has examined by this method wine, milk, blood, white of eggs, and gelatin, the latter of which gives but a mere trace of mmonia by treatment with caustic potash, the quantitative results being given in a table. It would be possible by this process to distinguish between a spot of milk and one of Thite of egg on a cambric handerehief.

# Sixntifir Gmpriam. 

MUNN \& CO., Editors and Proprietors. published weerly at
NO. 37 PARK ROW, NEW YORK
O. D. MUNN. A. E. BEACH.

部 copy, ons<br>One copy, one year One copy, six months<br><br>TO BE HAD AT ALL THE NEWS DEPOTS.

VOL. XXVII., No. 4 [New Series.] Twenty-seventh Year

NEW YORK, SATURDAY, JULY 27, 1872.

| Contents:(Illustrated articles are marked |  |
| :---: | :---: |
| Iow of Gas............. 4 ITNew Method for In |  |
|  |  |
| Answers to Correspondents...... | \% |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Exylish Fast Tran. |  |
| How to destroy Mosdiitoses...... |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Marvels of the Insect it worid |  |
|  |  |
|  |  |
|  |  |

## THE TWO OCEANS

Our solid earth's crust is surrounded by two oceans; one the fluid ocean, filling up the deepest bollows, and of which the surface is considered as giving the true measure of ou earth's size; the other a gaseous ocean covering the former
and those parts of the earth's crust not covered by the fluid and those parts of the earth's crust not coverel by the fluid
ocean.
The first, or ocean properly so called, is usually considered
The first, or ocean properly so called, is usually considered to consist of water and common salt; the second ocean, com proportions of nitrogen, oxygen, and carbonic acid, with a variable quantity of watery vapors. Both these conceptions for the the air.
The sea contains, besides common salt, the chlorides of magnesium, calcium and potassium, the sulphates of soda magnesia and lime, the carbonates of alumina, lime, iron and manganese, phosphate of lime, bromide of magnesium, and iodide of magnesium and of sodium; also several compounds of fluorineand the salts of most of the ordinary metals, in minute quantities; even the presence of silver has been proved
in such quantity that, when the amount in the whole ocean is computed, it exceeds in value a hundred thousand million dollars.
It is comparatively easy to analyze the constituents of the liquid ocean, but when we have to do with the gaseous ocean or atmosphere, we meet with the great difficulties inherent to the analysis of gases. It has been only during the last few years that we have been able to trace the presence of many gases and vapors in the atmosphere, and their condensation on the surface of solid and liquid bodies exposed to the same We know now that the substances contained in our atmos phere, additional to those mentioned before, vary greatly in different localities; so in regions surrounding manufacturing owns, we find carbonic oxide, hydrocarbon vapors, and even ften solid carbon, very finely divided, floating in the atmosphere. In the neighborhood of the ocean, common salt and hydrochloric acid are found, while Chatin found iodine in the air of France, Switzerland, Northern Italy, Germany, Holland, etc. After every thunderstorm, large quantities of ammonia compounds and nitrates are found in the air. They are formed by the electric discharges, causing the nitrogen to combine with the hydrogen and oxygen, respectively, of the watery vapors. These substances, with several others, are washed down by the rains during thunderstorms, and are then easil ound in the rain water. So Barral found, besidesnitric acid and ammonia (nitrate of ammonia), sulphate of lime, oxide f iron (n) and pounds in rain water, while in almost the whole of England and all countries where large metallurgical operations are going on, free sulphuric acid is always present in the atmos phere and washed down with every rain. Sulphuretted and phosphoretted hydrogen are almost always found over swamps or places where matter is decaying, and even in and around the abodes of men. Who has not noticed the tarnishing of silver ware when exposed to the air in our houses? It is due to the formation of a coat of sulphide of silver, easily washed off by a solution of hyposulphite of soda, in preference to the customary polishing by friction, which removes also portions of the pure metallic silver, involving an unnecessary loss. These tests have last winter been brought to a degree of ex quisite refinement by W. F. Barret in England. He made a flame of pure hydrogen gas, which is so faint that it is utterly invisible in even weak daylight. In order to prove that, when this flame becomes visible end colored, it is due to
the minutest traces of foreign substances, he placed the $50,000 \mathrm{th}$ part of a grain of milk of sulphur on clean platinum foil; and a blue flame shot forth from it on his bringing the burning hydrogen jet into contact with the foil. If the reader asks the way to obtain the 50,000 part of a grain of any substance, we simply refer him to the homeopathic method of mixing ingredients with one another. In this case it was precipitated silica, which does not color the hydrogen flame, either does pure platinum, nor pure water
If, however, a platinum surface, porcelain plate, or block of marble has remained exposed to the ordinary atmosphere, and then a burning jet of hydrogen is directed against it, there instantly appears at the point of contact a deep blue and glowing image of the hollow flame; if the flame is kept for a long time at the same spot, the color and glow become fainter and will finally disappear. If, however, the flame is directed against an adjoining portion, the blue color will instantly reappear. If, in order to prove that this blue color is due to sulphur, collected by the platinum or porcelain during its long exposure to the air, the spectroscope be resorted to the characteristic blue and green bands of sulphur are readily detected. When the jet was directed downward on the surface of water, this blue color showed itself when the merest trace of sulphur was present, while on the surface of sulphuric acid, the phenomenon was especially brilliant
Barret finely applied this method of directing a pure jet of hydrogen against solid surfaces, to detect the slightest traces of different gases, vapors and dust, deposited on the same from the atmosphere. Even breathing against this flame produced a pale lilac tinge; the same was observed when the air contained one per cent of carbonic acid. It appeara that the one fifteenth of one per cent of this substance, normally present in the air, is too small a quantity to affect the color the hydrogen flame.

## NARROW AND CHEAP RAILWAYS.

A convention was recently held in St. Louis, Mo., in the interest of narrow gage railways. About fifty gentlemen including engineers, contractors, car and engine builders, and managers, all well known throughout the country in connec tion with railroading, attended and interchanged their differ ont views relative to the comparative merits of the narrow age or broad gage systems. After discussion, the conclu on, reached through the report of a committee, was that the narrow gage road is not only the most advantageous, both in onstruction and operation, but that it is by far the bes means for a general and quick development of the nationa

During the progress of the proceedings, information was iven concerning the system in question by gentlemen con nected with roads on which the same had been adopted This, however, is somewhat meager and unsatisfactory. The ines referred to as now in operation have been but recently pened, and, besides, extend over but short distances, so that the experience gained by their practical working ough hardly to be considered as having so much weight, in the de ermination of the superiority of narrow gage, as is ascribed to it by the gentlemen advocating the adoption of the to it by
The Denver and Rio Grande Railroad has 117 miles of oad completed. Colonel W.H. Greenwood, its general man ger, stated that as much business can be done thereon as on ineteen twentieths of the broad gage roads. As to speed, an average of $t$ wenty-five miles an hour has been made, although the usual rate of travel, including stoppages, is fifteen, which is considered sufficiently fast. The speaker preferred narrow age passenger coaches to those of broad gage. The cost of he road could not be considerel any criterion, as it was built ver a very rough country at the foot of the Rocky Mountains. On the entire line, the saving effected by the use of the narrow gage is estimated at $\$ 199,500$, or, with equal disances, its cost would amount to 64 per cent of that of the broad gage.
There is little question, in our minds, but that a narrow age is the most suitable for a rough or mountainous coun ry, where speed is necessarily subordinate to other require ments. There is no doubt but that the system is much les costly to construct in such localities, and is perhaps mor generally advantageous than the broad gage; but in refer nce to the railroad above referred to, we can hardly coincide in the opinion that 15 miles per hour is a proper average rate f speed. Twelve miles per hour was the time made by the old fashioned English stage coach, to return to which would be much better economy rather than to lay railroads at an verage cost of $\$ 10,000$ a mile, to gain an advantage of but wenty-five per cent in increased rapidity of travel.
The preference for close and crowded narrow gage coaches evidently not shared by the general public, as is amply proved by the long trains of spacious drawing room car which daily leave our depots, and the willingness with which people pay increased fares in order to avail themselves of heir accommodations.
Mr. Edmund Wragge, chief engineer of the Toronto, Grey nd Bruce Railroad in Canada, gave a sketch of the 3 ft .6 in ystem built under his supervision. He stated that 88 mile of the road were in operation, and that it required a 20 tun ocomotive, heavier than those ordinarily used on narrow gage roads, to draw a train containing 600 passengers over grade of 165 feet to the mile.
The remarks of Mr. Thomas M. Millington, chief enginee of the Memphis and Knoxville Railr sad, also show the advan n his the narrow gage in rough or mountainous sec n his road, a saving was effected by it of 41 per cent.
developing the resources of the South, of the system repre particularly in
of a five feet road. Iron and coal abound, and can be readily produced and manufactured if narrow gage roads can be uilt in convenient localities
The report of the special committee of eleven deals with he subject in considerable detail. It recommends that the 3 feet gage be adopted as the standard, and states that its cost f construction over mountainous districts would not be over one fifth of that of such roads as the Erie, Pennsylvania Central, and Baltimore and Ohio. In broken or rolling country, the saving will be about one half, and on plains, three fifths, of the present cost of the broad gage. Referring to the comparative expense of operating the two systems, a hypo thetical case is taken of a narrow gage coach weighing 12,000 pounds, which is claimed to carry, when full, 36 pas sengers with a dead weight of 12,000 : divided by $36=333 \mathrm{lbs}$. per passenger; while a broad gage coach, capacity 56 passengers, weighs on average 19 tuns, giving a dead weight of 38,000 divided by $56=678 \mathrm{lbs}$., or a difference of 345 lbs per head in favor of a narrow gage. This argument, it trikes us, is somewhat lame-particularly in reference to the complement of passengers. An ordinary street car weighs a tun and a half, and is often packed with sixty pas sengers, the dead weight to each being reduced to a mini mum, whereas the same sixty people, if wishing to trave comfortably, would fill three large and heavy drawing room cars.

Narrow gage locomotives, it is asserted, can be constructed of sufficient power and speed to answer all general requira ments, in proof of which the Denver and Rio Grande Railroad is again appealed to for results. A 17 tun freight locomotive on that road has hauled a train of 24 cars with ease, up a grade seven miles long averaging 40 feet to the mile-four miles of the same having a grade of 75 feet to the mile. The total weight of cars, load, and locomotive was 157 tuils. A 12 total weight of cars, load, and locomotive was 157 tuus. A 12
tun locomotive has hauled cars and load amounting to 55 tun locomotive has hauled cars and load amounting to 55
tuns up the same grades at schedule time, namely, 15 miles per hour. A remarkable performance was that of a passenge locomotive which ran 181 miles with only 2,340 pounds o coal, hauling the usual train of one baggage car and two coaches. Of this distance, 102 miles were run up an averag grade of 40 feet per mile, and 8 miles at 75 feet per mile.
As regards cars, the report states that they furnish every requisite called for by a first class coach and that they will eventually become as popular with the public as the latter a fact which, we must add, is merely an assertion and re mains to be satisfactorily demonstrated by experic nce. In saving of dead weight, the narrow gage is claimed to have the advantage in all cases, and examples are cited in proof of the same. With reference to transportation, fares, etc., it is b lieved that they will be lowered in proportion to the cheap ess of the first cost of the road, machinery, rolling stock, etc or the transportation of cotton, it is stated that 10,000 miles of narrow gage road have been constructed by the East India lanters, who control a labor market, the cheapest in th world. It is considered, in view of these facts, a seriou question whether, with the dear labor and high rates of trans portation in this country, we can maintain our supremacy in the production of cotton. The reports of the Festiniog line in Wales and of other short roads in Norway are also quoted in support of the theory that the narrow gage system ha mple capacity for any business of any line on this continent The committee sum up the advantages of the system a llows: It costs only about one half as much as broad gage tis within the reach of all sections to build and hence wil nable them to avail themselves of railway facilities, with which they would otherwise be obliged to dispense. Its smal ost, light expenses, etc., will make it a paying investment will supply cheap transportation and so develop dorman terests. Its general adoption through sections unprovided with railway facilities will enhance the value of property Penetrating new sections, it will bring a large increase of business to the broad gage roads; and finally, a failure to adop the narrow gage in the sections referred to will necessarily defer the construction of railways until the time when thei means will admit of the more costly broad gage with its con equent high rates.

## OXYHYDROGEN STREET LAMPS.

Within the past few weeks, the New York Oxygen Ga Company has extended pipes from their works in Elevent venue, corner of 41st street, to and through 23d street to the plaza formed by the intersection of Broadway, Fifth avenue 23d and 24th streets, where they have erected large and beautiful chandeliers for the display of their new and splendid oxyhydrogen lights. The exhibition is a most gratifying uccess. The whole square is magnificently illuminated at ight. The plaza is an excellent locality for showing the avention, as it is one of the most prominent places in the ty, crowded at nearly all times with pedestrians and vehi cles.
The light is presented in the form of intense white tufts of flame, which burn very steadily and yield mos brilliant illumination, imparting a cheerful radiance to every object in the neighborhood, bringing out the natura colors almost like sun light. The company is now in readiness, we understand, to contract for the lighting of all the streets by this method. We need hardly say that its genera introduction for this purpose would be a great public im provement. Our streets, thus lighted, would be rendered attractive and safe. Men who love darkness because their deeds are evil would have to emigrate to places where oxy gen lights were unknown. A single jet of the new light i alleged to be equal in illuminating power to sixteen of the rdinary street gas jets. When the two lights are placed side by side, the common gas flame looks exceedingly poo and dingy.

The ordinary oxyhydrogen light is produced by directing a combined jet of oxygen and hydrogen against a block of lime, which latter is raised to a white heat. Each ligh requires constant special superintendence for the purpose of therefore unsuitable for ordinary street uses.
The improved light is produced by the simple union in one burner of a jet of oxygen and a jet of common street gas, no lime or special attendance being required. The street gas supplies the hydrogen and carboniferous matter requisite for illumination.
The company make the oxygen gas by the manganese process, discovered by the distinguished French chemist Tessié du Môtay, consisting, substantially, in subjecting a quantity of manganese, placed in a retort, to a heat of $850^{\circ}$ Fah., in combination with a steam jet, whereby the oxygen is liberated and carried into the gasometer for use. The manganates are regenerated, and are used over and over, without loss, by condensing the steam and directing upon them currents of stmospheric air. Oxygen is thus very rapidly and cheaply produced. This process will be found fully described in Volume XVIII.
One of the earliest exhibitions of the improved light in this city was at the premises of the Pneumatic Railway under Broadway, at Warren street, where the underground waiting room and also the pneumatic passenger car were for
some time by it lighted. The oxygen was condensed in some time by it lighted. The oxygen was condensed in cylinders and carried upon the car.
In addition to the uses of oxygen gas for illuminating purposes, it is becoming extensively employed in this city as a medical agent. It is administered to patients suffering with asthma, pneumonia, croup, etc., either by charging the apartment with the gas, or by mouth piece and bag. The vivifying effects of oxygen upon the human system are well known.

## end of the eight hour strike.

The great uprising which has been agitating the city of New York for the past ten weeks has at length reached its termination. Toward its close, it has been gradually but surely weakening. One by one the different trade organiza tions withdrew their support and returned to labor under the old system until, with the exception of the iron and meta workers, none of the great leagues, which in the beginning their own powers, were left in existence. It was reserved for the above mentioned Society to give the finishing stroke to the movement, which it did by declaring by vote in solemn conclave that the strike was at an end. At the same time this colossal association which but lately threatened, through the aid of English gold and its emissaries sent throughout the country, to revolutionize the entire relations of capital and labor, decided to disband, leaving its members to follow their own inclinations in the matter of returning to work at old hours and former wages.
The men from Singer's sewing machine factory, numbering one thousand, followed the example set by the iron workers, and, dissolving their organizations, res umed their labor under the ten hour system, thus still further decimating the numbers of adherents to the movement. As we go to press, the marble workers, a few stone cutters, upholsterers, barbers and furriers, together with a small remnant of the once gigan-
tic German League, are all that remain of the army of eighty thousand men which a few weeks since believed itself un conquerable.
The unfortunate results of the strike are too plainly before the public to require any special demonstration from us. The losses to the employers, from their works being left in idle ness and their consequent inability to meet their contracts, mate yet published. It is only necessary to walk through the manufacturing portions of this city to prove the truth of this assertion. Factories have been closed by the score buildings innumerable have remained unfinished, while the operatives leaving their labor have congregated in the halls and saloons where their meetings have been held. To the workmen, the effects of their ill advised action have been even
more baneful. Apart from the pecuniary expense to which they have been put in order to maintain themselves for the past ten weeks, they have broughtincalculable suffering upon their wives and children, and at the same time have opened a breach between themselves and their employers which will not readily be closed. During the heat of the controversy, little heed was given to what its after effects would be; fuil gained their point through taking advantage of their employ ers while the latter were hampered and powerless seemed to turn the heads of the entire working population of the city Although the mechanics and laborers in the building trades at the time succeeded in obtaining a satisfactory compliance with their demand, it is now considered extremely doubtfu whether the employers will stand by their con
The movement has turned out a general failure.
The past strike, like all similar uprisings h
The past strike, like all similar uprisings heretofore, has tended but to prove that the workmen have yet to learn how to conduct such affairs with success. In the beginning the men used up all their available money, and then, being out of work and unable to earn anything, turned to outside unions for assistance. With the funds thus obtained, they were en abled to exist a little longer; but these exhausted, as a natu men will discover that they have gained nothing, earned nothing, and are indebted to other organizations for amounts loaned for the repayment of which their wages for some tim

If ered on thides union had taken the money it has squan. on the cöoperative plan, it could have opposed not only serious competition to the employers, but would have been able to obtain raw material for labor, to afford employment for a large portion of its members, and at the same time have sufficient funds remaining to constitute a fair working capisufflic
tal.
To the trades' union system, the strike has given a serious blow. Men are beginniag to understand the hollowness and weakness, besides the arbitrary injustice, which has character-
ized the course of the majority of the societies ized the course of the majority of the societies. Large numbers of workmen who, having no sympathy with the cause, were forced to quit their labor by the intimidations of their associates, have changed from passive supporters of the system to its most bitter opponents, while the proceedings of such revolutionary bodies as the Internationals and kindred associations have been emphatically repudiated.
The time has yet to come in this country when the workmen will be able to coerce employers into concession to de mands the sole results of which would be ruinous to both classes.
The lesson of the strike is fruitful both to employer and employed, although it is one which we trust may never be renewed. It teaches through numerous instances in our past experience, which now are corroborated by the successful adjustment of the late great Eaglish lock-out, that the true method of satisfactorily settling such extreme measures as strikes and lock outs is not by open warfare and bitter controversy; but by the meeting of both parties for the calm and temperate discussion of the questions involved.

## paper hangings and their manufacture.

Paper has been used as a wall covering by the Chinese from time immemorial. It was introduced in Europe, as a
substitute for the ancient tapestry hangings, by the French, substitute for the ancient tapestry hangings, by the French, among whom its manufacture has always been a prominent industry. Paris contains numerous factories employing over 3,000 workmen, and several large establishments exist in the southern cities of France.
In New York city, three factories are in operation. Phila delphia has six, producing annually paper hangings to the value of $\$ 800,000$.
Wall paper is prepared in several different ways. The heap varieties are rapidly printed by ingenious machinery, but for the more elegant and elaborate patterns hand labor is almost invariably used. The paper is procured by the
manufacturer in large endless rolls, weighing some eighty manufacturer in large endless rolls, weighing some eighty to eighty-five pounds each. In this condition, if of fine quality, it costs about seventeen cents per pound; if ordinary or cheap, the price fluctuates according to the market.
The designs to be printed are prepared as follows: Sketches of the different patterns are made in this country by artists employed for the purpose. These, on being approved, aro forwarded to France, where elaborate drawings are made from them. Each color entering into the design must b $\rightarrow$ printed separately, so that there must necessarily be as many blocks or types prepared to make the impressions as there are tints in the pattern. The blocks are constructed of two layers of wood, a thin piece of maple fastened to a thicker backing of pine board. Each block is about twenty inches wide, two feet long, and an inch and a half to two inches in thickness. On the maple, all of the design to be printed in a single color is drawn and afterwards cut out by engravers, or
rather wood carvers, so that the lines are left in high relief. Whon the carving is completed, the work is brushed over with boiled oil and, when dry, sent to the printer for use.
The paint employed for coloring the paper is ground color mixed with warm size and passed through several sieves so that it is rendered perfectly smooth and free from luoups.
The design being decided upon, the block carved, and the paint mixed, the first process the paper has to undergo is its uniform covering with a ground tint. This is effected by passing the paper over an endless rubber belt working on rollers. A copper cylinder at one end of the machine used for the purpose rotates in a box of prepared color. From the cylinder, the paint is distributed to revolving brushes, by which it is applied to the paper passing over the belt. As the paper issues from the machine, it is drawn out along the
loft and then hung up, in festoons over sticks resting on long rames, to dry. It is then wound on a large reel from which it is cut by boys into pieces of eight yards in length.
In case a pattern resembling oak wood is to be applied to the paper, another machine is employed. The paper is passed around a large cylinder, receiving an impression resembling the grain of oak from a smaller revolving wooden cylinder which is sut
The rolls of paper, as they are wound by the boys from the large reel, are sent to a workshop below, where they are stamped with the patterns. This process is done by hand. The workman stands before a table over wiich passes the paper. Hanging above the table, supported by an india rub-
ber cord, is the block on which the design is carved. The apper end of the rubber cord is attached to a small whee traveling on an iron guide, so that the block may pe swung
from the table over to the place where it receives its coverrom the tab
The method of making the impression is very simple. The paint is obtained from what is termed the "slush bos," which consists of a shallow box, the bottom of which is cov ered with painted ticking made watertight. This box tloats ways perfectly level. Inside of the first mentioned box is
placed a piece of woolen cloth on which the paint is uniformIy distributed. The workman first places the paper across his table, then swings the block over to the slush box, and brings its carved side down on the paint. Nest he carries the block back again, and places it on the paper, of course using great care in the registering so that the impression may fall exactly on the right place. A vertical movable arm attached to a frame above is now rested upon the back of the block, and forced down by means of a lever worked by the foot of the operator, thus completing the impression. This process is repeated until the whole piece is covered with the pattern, when it is hung up for from five to ten days until perfectly dry.
If the design is to be gilded, the parts which are to receive the gold leaf are printed in the same manner as above described, only glue size is used instead of paint in the impression. Gold leaf is afterwards applied by girls in the ordinary method.
Satin papers are sometimes prepared by mixing with the coloring matter sulphate of alumina and finishing off with a brush. Velvet or flock paper resembling velvet plush is made after printing the colors, by fixing to the surface some finely ground fibers of wool of the proper hue, by means of glue or white lead and oil
Paper after being printed is also often embossed by being passed between steel rollers on which a design has been engraved.
The great care which is exerted in printing the many tints of the more elaborate decorations has ren ered hand labor necessary in place of machine power; but the expense of producing the material has of course been proportionally.increased. Large quantities of the finer qualities of hangings are imported hither from France, but it is a well known fact that much that is represented as of French manufacture is in reality made in just such establishments and by the same processes as above described
Of late paper has been printed in patterns which have been suitable for theatrical scenery. At Booth's theatre, several of the handsomest scenes are thus made, while in Wal. lack's, the decoration of the entire auditorium is in paper.
In price, the fine grades of wall paper vary according to quality, but average from twentyfive cents to four dollars and a hail per roll of eight yards.

## SOLID EMERY GRINDER.

The value of solid emery wheels in various branches of manufacture and for various uses in the workshop is about being properly appreciated by metal workers and others. Wheels of good construction and properly mounted can be adapted by modifications of their shape, size and cut to numberless purposes, varying from the fine polishing of metallic surfaces to the gumming of a mill saw. Perhaps their eco nomic value is nowhere better shown than in their employ. ment as grinders, where they take the place of the file and render unnecessary the time and labor consumed in the use of that tool.
We may naturally conclude from the foregoing tbat a compact and efficient grinding machine that could readily be set up in any workshop requiring it would be an article in great emand.
Such a machine is produced by the Tanite Company of Stroudsburg, Pa., and called by them the "Table Emery Grinder." It is complete in itself, having its counter shaft and driv ing pulleys, fast and loose pulleys, and belt shifter all disposed commodiously at the lower part of the ts' iz. It carries two solid emery grinders, with many appurteaances, and can be run at varying speeds.
The Tanite Company have added a machine shop to their emery wheel factory, and have made a specialty of the manufacture of grinding machines of various characters, by which means they very much economize the production.

Miethod for Indelible Writing and Print At a recent meeting of the French Photographic Society, in Paris, M. Dumas, made a very curious demonstration in the presence of his colleagues and a select audience of the public. The illustrious chemist, says the Photographic News, poured upon a piece of white stuff a few drops of a solution of nitrate of silver; he then pressed the fabric lightly in a pad of blotting paper to remove the superfluous liquid, and upon certain portions of the stuff was then pressed a metal seal, bearing a design in relief; immediately there appeared impressions in black of the design wherever the stamp had been applied to the fabric. This method of printing, at once so simple and rapid is the invention of a chemist in Paris, M. Em. Vial, who has already communicated to the Academy everal engraving processes.
The particular method experimented with by M. Dumas is founded upon the circumstance that in the presence of zinc, lead, and copper a solution of uitrate of silver is immediately decomposed. Thus when a printing block engraved upon one of these metals is pressed upon a sheet of paper or any kind of fabric-cotton, linen, or silk-impregnated with nitrate of silver, this latter is decomposed as soon as contact takes place, and the silver is precipitated in the form of a black powder, faithfully reproducing in every detail the design traced in relief on the printing block. By a simple washing of the fabric afterwards in water, the remainder of the solution is removed from the stuff, and we obtain an in delible image, which adheres so tenaciously to the fabric that the design lasts as long as the linen or silk upon which it rests.
The color of the impressions may be varied at will from a very light gray to the most vivid black, according to the
fabric, and according to the metal of which the printing block is composed. In general, the image is of a more in tense black the more affinity the metal possesses for oxygen, and the further it is from the order in classification
Cotton, linen, woolen, and silken stuffs, paper, and, indeed, any kind of material of this nature that can be impregnated with the solution, is capable of employment for this kind of printing. A slight dressing in the material favors the operation, and the finer and closer the fabric and stiffer without being dry, the better will be the results. Silk yields by far the finest impressions. In support of the communication, M. Vial submitted to the Academy a collection of proofs of different kinds, remarkable both for the fineness as for the sharpness of the designs.

## the nature of comets.

Professor Zöllner, of Leipsic, in a lately published work on the nature of comets, makes it his purpose to explain the remarkable phenomena they present by an application of the established principles of physical science alone.
He starts from the fact that water, mercury, and many other substances, even solids, undergo evaporation to a certain extent; and he infers from the odors of the metals that they also, even at very low temperatures, are constantly giving off vapor, though in an inappreciably small amount; from which he concludes that a mass of matter in space will ultimately surround itself with its own exhalations, the tension of which will depend upon the gravitative energy of the mass and the existing temperature. If the attractive force of the body be insufficient to give the surrounding va por its maximum tension for the temperature, the evolution of vapor will go on until the entire mass is converted into it. A further analytical inquiry leads to the result that a finite mass of gas in unlimited space is in a condition of unstable equilibrium, and must become dissipated by continual expansion and a consequent decrease of density; and a necessary consequence of this result is that the space contained in the stellar universe must be filled with matter in the form of gas.
By assuming, for the purposes of calculation, that stellar space is everywhere filled with atmospheric air, and taking the temperature as that of melting ice, he finds that gas in space, at its lower limit of density, is so attenuated tiat a mass of air, which on the earth's surface would occupy a volume of one cubic decimeter, would, when reduced to this density, fill a sphere of inconceivable dimensions; a ray of light would not traverse its radius in a less number of years than is expressed by the numeral one followed by ninetyeight ciphers. Such a medium could have no appreciable effect either upon rays of light or the motion of bodies.
Solid bodies in space must, by virtue of their attractive force, condense the gas so as to form an atmosphere on their surfaces, and the density of the envelopes can be calculated when their size and mass are known. The value found for the moon is a vanishing quantity, and perfectly in accordance with the fact that no lunar atmosphere has ever been detected. For the larger planets, however, the value is very great, and the high density of their atmospheres must occ sion perceptible effects upon the light reflected by them.
The temperature of a fluid mass, existing far from the sun or any body capable of radiating heat to it, would be that of the surrounding space, and if its attraction were not too great, slow evaporation would convert it into a sphere of vapor. Should it , on the contrary, approach the sun, the heat would cause the whole to be vaporized in much shorter time than in the former case, and the smaller the mass the shorter the time would be. The smaller comets, which often appear like spherical masses of vapor, are examples of bodies of such a nature.
The self-luminosity of comets he sets down to electrical excitement; and if it be granted that electricity may be developed by the action of solar heat, in the process of evaporation or the mechanical and molecular disturbances arising from it, we have a cause sufficient to account, not only for their self-luminosity, but also for the formation of their trains.
He then proceeds to discuss the quantitative difference in the effect of gravitative and electrical forces upon masses at a distance, and shows that, when a body is under both influences simultaneously, an increase of the mass results in a preponderance of gravitation, and a sufficient decrease of the same, in a preponderance of the electrical action. Hence the nuclei of comets, as masses, are subject to gravitation, while the vapors developed from them, which consist of very small particles, yield to the action of the free electricity of the sun. Careful investigation shows that, supposing the free electricity of the sun to be no greater than has been repeat. edly observed on the Earth's sarface, it would speedily communicate to a sphere, 11 millimeters in diameter and $\frac{10}{100}$ of a milligram in weight, a velocity of over 408 geographical miles per iecond, or such that it would pass over a space of over $70,000,000$ miles in two days. The comet of 1680 developed in two days a train of $60,000,000$ miles, which is a mg.a oped in two days a train of $60,000,000$ miles, which is a mg.a
nitude of the order calculated. It is therefore sufficient to nitude of the order calculated. It is therefore sufficient to
attribute to the sun an electrical energy no greater than that attribute to the sun an electrical energy no greater than tha
supposed to account satisfactorily for the appearances presented by cometic trains; and it is quite unnecessary to as sume the existence of some other repulsive force. When comets appear with trains directed towards the sun, instead of away from it, such direction is easily explained by the supposition of opposite, in place of like, electrical characters, resulting in attraction instead of repulsion.
Professor Zöllner and others think there is no improbabili ity of the existence in space of fluid masses such as described consisting of water or of liquid hydrocarbons, and the spec
ra of some of the nebulæ and smaller comets confirm the dea very strongly.

## The Corn Cob Humbug.

Carbon, hydrogen, and oxygen, combined in certain proportions, make a good food for producing fat, but the fact that a substance contains either or all of those elements does not make it a valuable food. Add nitrogen to the above elements, and we have the constituents of the nutritious foods. It is not the fact that an article contains these elements, which makes it a valuable food, but the proportions and their mode of combination. Common rosin, for instance, contains carbon, hydrogen and oxygen, yet but few farmers would care to adopt it as a diet for their cattle. Yet there are uses to which rosin is put for which wheat or corn would be of no value. Chemistry presents many curious contradictions; there are substances, which by analysis contain exactly the same elements in the same proportions, which are utterly dissimilar. Therefore, because a theoretical scientist finds that similar. Therefore, because a theoretical scientist finds that
straw or corn cobs, or any other such stuff, contains a certain straw or corn cobs, or any other such stuff, contains a certain
amount of carbon, nitrogen, and oxygen, he immediately publishes to the world that they are preferable, as food, to substances which good, old fashioned experience has proven of value. We knew a farmer once who acted upon just such nonsense, and it cost him about 10 cents a pnund to fatten his pork on corn meal and corn cob meal mixed, while his neighbors fattened theirs on corn meal and potatoes at little over half the cost.
The next thing we shall hear is that corn cob meal is the best food for dyspeptics, and some vegetarian fool will be urging everybody to scratch their stomachs with it. We think it will do very well to go with the sawdust brandy, an article about which is going the rounds of the papers, and we venture the opinion that the man who eats the one and washes down the dry compound with the other will soon be the undertaker's hands.
Much more sensible is the idea suggested by some one that the corn cobs be used for fuel and the ashes be utilized for making potash.-New York World.

## Pneumatic Railway in Texas

Colonel J. H Simpson, United States Engineers, describes the operation of the cars on the temporary railway now in opera. tion at Matagorda, Texas. The road is used for conveying the materials for the new lighthouse now in process of erec tion at that place. He says:
" Transportation of material over the railroad at this work has been much facilitated by using a sail on the cars. As great speed as a mile in $2 \frac{1}{2}$ minutes was obtained by this means, and the heaviest loads the cars could take were moved along as well almost as if the cars were propelled by steam. It was found that the cars would sail almost as close to the wind as a boat."

Absorption of Gases by Charcoal.-In the case of ammonia, it would seem that the amount of the gas absorbed by the charcoal continuously decreases as the temperature rises from 0 deg. to 55 deg., but at that point a sudden change oc curs, and the amount of gas given off becomes considerably diminished. In the case of cyanogen, the absorption takes place very rapidly, being confined almost entirely to the firs ten minutes, and the curve representing the absorption be tween 0 deg. and 80 deg . is continuous; the results obtained are given in tables, and also represented by absorption curves. Hydrogen and nitrogen are very slightly absorbed by the charcoal.
The Central Park. New York, is 876 acres in area, and Phœnix Park, Dublin-one of the largest city parks in the world-is 1,752 acres.

Facts for the Ladies.-Mrs. S. W. Clark, Washington, D. C., with Wheeler \& Wilson Lock-Stitch Machine, used her first needle, No. 2, nearly years, until it was worn out, doing all kinds of family and
See the new Improvements and Woods' Lock-Stitch Ripper.

The Times are Hard, is the complaint or many, and yet no family can afford to do without a sewing machine. There is one that has grown to a popularity equalled by few in market. It is the Wilson. Their immenst manufactory is now turning out nearly fifteen hundred machines a week,
and still they with difflculty meet the demand. The Wilson for family nse has no equal, and is sold for fifteen dollars less than all other first-class machines. Salesroom, 707 Broadway, New York; also for sale in all other cities in the United States.

## Busiuss and tersmal.

The Charge for Insertion under this head is One Dollar a Line. If the Notic
exceed Four Lines, One Dollar and a Half per Line vill be charged.
The paper that meets the eye of manufacturers throughou he United States—Boston Buhetin, 8400 a year. Advertisements 17c. a line New Style Testing Machines-Patented Scales. Send fo New Illustrated
Pniladelphia, Pa.
Fouring Mill near St. Louis, Mo., for Sale. See back page. tate Rights on improved Cigar Moulds for Sale. Patented June 25, 1872. Inquire of Isaac Guthman, Morrison, White Side Co. , Ills. Wanted-Man with necessary experience to superintend Construction department of first class concern where large, well establish
ed business in Iron Bridges, Roofs, etc., is done. Ad ress " Advertiser," ed business in Iron Bridges, Roofs, etc., is done. Ad ress "
care $\mathbf{W m}$. L. Chase \& Co., 93 \& 94 Liberty Street, New York.
If you want to know all about the Best Hub and Spoke Machinery, address Defiance Machine Works, Defiance, Oh1o
For Machinists' Tools and Supplies of every description, ad dress Kelly, Howell \& Ludwig, 917 Market Street, Philadelphia, Pa.
Wanted-A Man who thoroughly understands the chemi probess for Extracting the Wool from Rags containing Cotton War probess for Extracting the Wool from Rags
Address Manufacturer, Darby, Delaware Co., Pa

A Civil Engineer, just graduated with plenty of field and

A traveling agent throughout Germany, Austria, and Switzerland, offers his services. Address A. D. P., 71 Essex Street, New York Patent Rights of a Plant Setting Machine for Sale. Address Springer \& Ambruster, Pennsgrove, N. J.
B. Baker, Caldwell, O., with one of our 30 Horse Vertical Portables and Saw Mill, sawed 712 Cross ties in $83 /$ hours. For another iust Portables and Saw Mill, sawed 712 Cross ties in $8 \%$ hours.
The Coshocton, O., Iron and Steel Works Exploded their Boilers. Our Patent Vertical Portable, 30 H.P.. takes the place of their 80 H.P. Stationary, and is running
fith \& Wedge, Zanesville, Ohio.

The best recipes on all subjects in the National Recipe Book The best recipes on all subjects in the Nablich Battle Creek, Mich. The official report of the Master Mechanics' Association will號 be published in fall in the Railroad Gazettr, 72 Broad
beginning July 6 . Send $\$ 1.00$ for 3 months' subscription.
For 2, 4, 6 \& 8 H.P. Engines,address Twiss Bro.,New Haven,Ct. We will Remove and Prevent Scale in any Steam Boiler or make no Charge. Two Valuable Patentsfor Sale. Geo. W.Lord,Phila., Pa For Hydraulic Jacks and Presses, New or Second Hand, send for circular to E. Lyon, 470 Grand Street, New York.
For Marble Floor Tile, address G. Barney, Swanton, Vt.
Millstone Dressing Diamond Machine-Simple, effective, du rable. For description of the above see Scientific American, Nov. 27th
1869. Also, Glazier's Diamonds John Dickinson, 64 Nassau st., N. Y.
For the simplest, cheapest, and best Rotary Pump in use for thick or thin liquids,send for circulars to Hersev Brothers,So. Boston, Mass. The best Bolt Forging Machines are those that work vertical, and forge Bolts any length horizontal
Abbe, 39 Charles Street, Providence, R. I.
To Capitalists-Two valuable Patent Rights for Sale or exchange for other property. For particulars, address John J. Baringer change for other property. For pa
Germantown, Columbia Co., N. Y.
Extra Heavy Oak tanned Belting-Rubber Belting, Packing Hose, \&c. Greene, Tweed \& Co., 18 Park Place, New York.
Upright Drills-The best in the world. Built by Hawes Machine Co., Fall River,Mass. send for Circular.
For the most beautiful Site, Building, and Water Power fo manufacturing pu.-poses, address Harris Brothers, Newport, N.Y.
Three fourths saving of fuel, by the Ellis Vapor Engine (Bisulphide of Carbon) in runnin
burg, Mass. To whom apply.
Tested Machinery Oils-Kelley's Patent Sperm Oil, $\$ 1$ gallon; Engine Oil, 75 cts. ; Filtered Rock Lubri
tificates. 116 Maiden Lane, New York.
Old Furniture Factory for Sale. A. B., care Jones Scale Works, Bingham ton, N. Y
Ste ${ }_{\text {el }}$ Castings to pattern, strong: and tough. Can be forged and tempered. Address Collins \& Co., 212 Water Street, New York.
Kelley's Chemical Metallic Paints, $\$ 1, \$ 1 \cdot 50$, $\$ 2$ per gallon, mixed ready for use. Send for cards of colors, \&c., 116 Maiden Lane,N. Y.
Kelley's Pat.Petroleum Linseed Oil, 50c.gal., 116 Maiden Lane The Waters Perfect Steam Engine Governor is manufactured by he Haskins Machine Co., Fitchburgh, Mass.
'resses, Dies, and Tinners' Tools. Conor \& Mays, late Mays \& Bliss, 4 to 8 Water st., opposite Fulton Ferry, Brooklyn, N. Y
Oortable Baths. Address Portable Bath Co., Sag Harbor, N.Y. Pattern Letters and Figures, to put on patterns, for molding names, places and dates on castings, etc. H. W.Knight, Seneca Falls, N. Y rown's Coalyard Quarry \& Contractors' A pparatus for hoisting nd conveying material by iron cable. W.B.Andrews $\&$ Bro, 114 Water st.,N.Y.
An inducement.-Free Rent for three months to tenants with good business, in commodious factory just built for encouragemen manufacturing. Very light rooms, with steam, gas, and water pipes,
power elevator, \&c. \&c. Manufacturers' Corporate Association, West field, Mass. Plans of Building, Room 22, Twenty One Park Row, N. Y.
Sining, Wrecking, Pumping, Drainage, or Irrigating Machin ory, for For Tri-nitroglycerin, insulated wire, exploders, with pam
phlet, as used in the Hoosac Tunnel, send to Geo. M. Mowbray, North phlet, as used
Adams, Mass.
Ill kinds of Presses and Dies. Bliss \& Williams, successor to Mays \& Bliss, 118 to 122 Plymouth St., Brooklyn. Send for Catalogue.
Peck's Patent Drop Press. Milo Peck \& Co., New Haven, Ct For Steam Fire Engines, address R. J. Gould, Newark, N. J. n the Wakefield Earth Closet are combined Health, Cleanli ness and Comfort. Send to 36 Dey St., New York, ersons in want of Portable or Stationary Steam Engines, or Circular Saw Miliscombining the latest improvements, should correspon withSinker Davis \& Co., of Indianapolis, Ind
'he "Bellis Patent Governor," made by Sinker Davis \& Co., of Indtanapolis, Ind., is acknowledged to be the most perfect engin regulator now in use
Manufacturer's and Mill Supplies of all kinds. Greene,Tweed \& Co., 18 Park Place, New York.
absolutely the best protection against Fire-Babcock Extin guisher. F. W. Farwell, Secretary, 407 Broadway, New York
Nilliamson's Road Steamer and Steam Plow, with Rubber Tires. Address D. D. Williamson, 32 Broadway, N. Y., or Box 1809 Selting as is Belting-Best Philadelphia Oak Tanned. C. W Arny, 301 and 303 Cherry Street, Philadelphia, Pa.
Boynton's Lightning Saws. The genuine $\$ 500$ challenge Will cut five times as fast as an ax. A 6 foot cross cat and buck
E. M. Boynton, 80 Beekman Street, New York, Sole Proprietor.
Setterthan the Best-Davis' Patent Recording Steam Gauge Simple and Cheap. New York Steam Gauge Coo, 46 Cortlandt St., N. Y. vor Solid Wrought-iron Beams, etc., see advertisement. Ad Iress Dnion Iron Mills, Pittsburgh, Pa., for lithograph, etc.
For hand fire engines,address Rumsey \& Co.,Seneca Falls,N.Y io Ascertain where there will be a demand for new Machin ery, mechanics, or manatacturers' supplies, see Manufacturing Newn
Onited states in Boaton Commercial Bulletin

## Motesfywerios.

 reater or less general interesst. The questions ares
prefer to elicititractical answers srom our readers.]
1.-Strength of Horses.-Will some one tell me at how many pounds pre
time?
?-M. w.
2.-Ink.-Can some one tell me how to make good ink that wint
3.-Ignition by Electricity.-Can electricity be made to pass off a charged wire and ignite powder in the tube of a riffe, without the
4.--Breakivg Weight.-If a beam. with ninety-nine hundredths of its breaking weight on it while at rest, should be moved at the
rate of thirty miles or more a minute, on a level and without any jar, would rate of thirty miles or more a minute, on
the motion break the beam?-M. W. H.
5.-Making Wine - Will some one give me a simple re ipe for making wine from an abundant crop of grapes ?-B. D.
6.-Harness Blacking.-Will some practical tanner or leather finisher give me a recipe for a good, cheap blacking for harness and
7.-Dissolving Gutta Percia.-What is the best kin f spirit tor dissolving gutta percha in, so as to retain all its sticking qual ity?-R. J.
8.-Raising Water.-What is the best method of raising ater from a tant, in a place where the power is limited?-R. J.
9.-Gilt Dip and Black Dip.-Will some one inform me What are the right proportions of acids for making the gilt dip and the black
10.-Waterproofing Paper Pulp.-Can any reader inorm me of any substance, that can be mixed with paper pulp, to render it
mpervious to water?
11.-Mill for Crushing Corn Stalks.-I wish to con struct a mill to extract the juice of corn stalks. What size and length should
make the rollers? How many revolutions should they make per minute? I make the rollers? How many revolutions should they make per minute
I wish to have the mill adapted to run with two horse power. H . A. s.
12.-Polishing Horns.-Will some one please inform me

10w to polish or clean elk horns so as to make them appear bright?-w. A.
18.-Cleaning Ivory.-How can I remove stains from y?-w. A
14.-Comparative Friction of Various Gears.-Is there any table, showing the comparative waste of power when transmilted
througk. dififerent searings, bevel gears, belts, quarter twist pelts, friction through different gearings, bevel gears, belts, quarter twist belts, friction
wheels and bevel friction wheels?
14.-Bursting of Saws.-Is it possible for a circular saw to be run at such speed that it will fy in pieces? Is there any instance
known wherein a circular saw flew in pieces from too fast a motion?G. A. H.
15.-Crystal Glass.-Would you please inform me what articles to melt together in a crucible to form the beautiful crystal llass?
mean the sort of glase of f hich the prisms that we see mean the sort of glass of which the prisms that we see on plass
are made ; they exhbibit all the colors of the rainbow.-G. T. P.
16.-Hardening of Rain Water.-Will some one inform me why rain water becomes hard in my cistern, and how to remedy the evill
It is a common cement cistern, and is covered with planks and earth ;it is
 The rooss from which the water is collected were formmerly covered with
 parent change in the water.-B. D.
17.-Mounting Chromos.-How should chromos be prepared and mounted, so that they can be framed without glass, and be cleaned
like oil paintings?
18.-Clay and Coal Oil Torches.--In the bayous in Louisiana, we pig a great many small fish, especially trout, which come
close to the bank on dark nights. The light used for this purpose should be uite Intense, which the light of pitch pine torches is not, and they are,
noreover, very uncertain and irregular. Could $\Gamma$ prepare any light that is oreover, very uncertain and irregular. Could I prepare any light that is
 ong, on one end of which was what seemed to be a lump of burnt porou clay; this he would plunge in coal oil until saturated, then light it, when it
would burn for half or perhaps one hour, and when exhaused the torch could be re-saturated for an indefinite number of times. The article was not patented. and perhaps sy making the lump parge enough, or saturating
it with some other fluid, it might give a very intense light. How may this


## Guswers to Cortespondents.

SPECIAL NOTE. This column 18 designed for the general inter est and in. 8trruction of our readers, not for gratuitous replies to questions of a purely
business or personal nature. We voll vonen paid for as advertisements at 1.00 a une, under the he
and Personal."

The Atlantic Cables.-J. H. P. is informed that the two cables between America and Great Britain were lifted and repaired in Нот Springs.-W. S. B. is informed that the heat of water, from a mineral spring or elsewhere, can never exceed $212^{\circ}$ Fah., so long
as it is exposed to the air. The only way in which water can ever rise as it is exposed to the air. The only way in which water can ever rise
to a higher temperature than this is by being heated in a confined ves-
sel. Immediately after the water is allowed free contact with the atgel. Immediately arter the water is allowed free contact with the at-
mosphere, the thermometer placed in $1 t$ indicates $212^{\circ}$ or even a lower flgure.
C. W. L. asks: Is there any invention by which a watch can be kept in a waist pocket, dispensing with aschain? Answer: Yes; wear it
without a chain, and put a button on inside the pocket.
E. A. W., asks: Can you or any of your readers tell me the
probable dimensions of Noah's Ark? Answer: One of our Sunday School probable dimensions of Noah's Ark? Answer: One of our Sunday School
friends, whose relative sailed with Noah, says the dimensions of the ark friends, whose relative sailed with Noah, says the dime
were as follows: 512 feet long, 87 feet broad, 52 feet high.
United States Coinage.-Qnery 16, page 10, Vol. XXVII. -The large United States coppers were first issued in 1793, and were con-
tinued unti! June, 1857 , with the exception of during 1815 , in which year in 1793, and was omitted in 1798, 1799, and 1801, and from 1812 to 1824 , and in in 1793, and was omitted in 1798, 1799, and 1801, and from 1812 to 1824, and in
1827,1830, 1837,1833 , and 1839 , and were discontinsed after 1857. The small eagle cent was frrst issued in 1896, and in 1858 it was discontinued, af
\#hich the " Liberty" headed cent was substituted.-I. P. H., of N. Y.

Blasting under Water. - In answer to A. A. P., query 12 page 10 , current volume, I would say that the constructing engineer of
the Potsdam wster works used a tin tube (large enough to hold the the
charge and a little smaller than the drill), watertight, with a small tube from one end long enough to reach above water, for the fuse to reach the powder.-H. K. w., of N. Y.
Canaries and Vermin.-Query 17, page 10.-D. F. W should make some perches of elder or anything that he can get a hole
through from end to end. Then cut small holes through the wood to the one in the center. It is said by those who have tried it that the vermi will go into the center of the perch in the night, so that they can be kille
in the morning. I cannot voch for this remedy. Blasting under Water.-To A. A. P., query 12, page 10 Make cartrialeses, ont the holes, of either tin pate or stout cardboar saturated with tallow and well secured, around the fuse or insulate
wires where they enter the cartridge with plenty of rosin and tallow. Tin plate I recommend, as I have used such quite suc cessfully.-E. H. H., of Mass
Milik Soured by a Thunderstorm.-To H. C. R., query 1 page 10.- Under usual circumstances the nitrogenous elements of milk
begin to putrefy and assume the sugar to absorb oxygen, and become converted into lactic acid. Doring a thunderstorm ozone is forned in the air, and this, I think, acts on the sugar, causing the formation of the same accid, without the decomposition
of the nitronenou matter. To illustrate this, make e aonution of sugar
of hillik in water and submit it to the same conditions, and you will have a similar result.-E. H. H., of Mass.
standard Measures.-To P. E. McD., query 5 , page 10 vac stanard is the lengta of a rod or pendulum beating seconds in
vacuo at the level of the sea, in the latitude of $511^{29} 9^{\prime}$ north, at a temperature of $6 \%^{\circ}$. The length of this rod or pendulum is a certain quantity, and
is divided
ant is divided into 391393 parts, whereof one part is called an inch, and 3 parts, one yard. The three berley corns, , ald down in the ola arith
tics, give only a rough and ready approximation,-E. H. H., of Mass. . H. Y. asks: Does an argand gas burner consume mor gas han an ordinary one? Answer: It depends upon the sizes of the re spective burners. If the ordinary burner is of such a size as to perm.
the flow of say elght cubic feet of gas per hour, while the arged only permits the flow of six feet per hour, it 1 simost unnecessary to form you that the first burner will consume the most gas.
Cooling Water.-To J. A. C., query 7, page 10.-Filter the water through a layer of charcoal, sand, and gravel to purity 1 t. To coo
it, fasten close, around a pitcher or other vessel, two or three layers of
 flannel, the water will be kept quite cold.-E. H. H., of Mass.
toring Lard.-W. H. C., query 2, June 22.-Lard is not Injured by being stored in bright tin cans. I Iave seen it stored in a tlin
can several years past, and it remained perfectiy good. - M. W. H., or Iowa.
dimensions of Belts.-W.G.S. (query 7, page 416, last volume) should remember that a belt of a given size and length will
transmit a given amount of power at each revolution. $A$ two ply rubber belt, running 1.500 feet per minute. will transmit one horse power fo
each twa each two inches in width; but if the belt runs slower, it mast be larger
to obtain the same result. If W . J. S. is constructing a horse power, h hat better gear up with cogs un
1,500 feet per minute.-H. A. s.

## gherent ghericat and fortign eatents.

Under this heading we shall publish weekly notes of some of the moreprom nand
RovxD Bextiva.-Albert Holbrook, Jr.. assignor to A. and C. W. Hol-
rook, of Providence. R. I.-This invention consists in folding the margins of the strap over upon the inner portion before twiting th and adiustic he parts folded so as not to extend quite to the center, by which mean he bett is formed with rounded edges meeting together along the spira ine, which gives a much better and neater Anish than the raw edges of the rdinary belt. The edges lapped over on the middle portion form the
ore, around which the said middle portion becomes twisted, and thu ore, around which the said middle portion becomes twisted, and thu
aves the sewing on of another strip for forming a core, as in the commo ay of making round belting.
SAsH Holdpr.-Hazen O. Ball, of Sioux Citty. Iowa.-The object of this nvention is to provide convenient and efficient means for supporting the onstruction: A rubber roller is supported in a metallic frame let into the rame work of the window, and a rubber strip is applied to the side of the sash so that it bears against the roller. The journal of the roller is orru
gated, and a spring, which is aduastable by means of a screw, bears agains the corrngations. By adjusting the spring, sufflcient friction is caused to old the assh as required.
Blacrboard Erasrr.-Frank G. Johnson, of Brooklyn, N. y.-This in ention relates to a new and useful eraser for use on black boards, slate nd the like; and it consists in a holder of novel construction, which 18
adapted to hold $a$ number of sheets of woven, felted, or other flbrous sub stances, so that they are sustanined suitably for doing the rubbing by means of the ends of the threads or tibers exposed at the edges of the holder. In this way the rubbing substance is fully utilized.
Drsprrss Ruddrr and Drac.-Heinrich Rabien, of New York cittyThis invention relates to a new distress rudder which is intended to be
kept on board of vesells for use in case of the loss of or injary to the regular rudder. It consists in the use of a weighted plank which is hinged to an on edge in the required position, and is adjusted by ropes so. that the ap. ight is held fast against the sternpost of the vessel. In this position it is worked by side ropes as an ordinary rudder; or it may be allowed to drag
astern.
Straw Cutrrr. -Herman Baldwin, of New Haven, Conn.-This invention frrnishes an improved fodder cutter, which is so constructed that the
upper or movable feed roller may be made to move up and down squarely pper or movable feed rolier may be made to move up and down squarely, not, and which may also be readily adjusted to cut the feed longer or

Gun Lock.-John H. Byers, of Delta, N. Y.-This invention relates $t \rightarrow$ im provements in gun locks which prevent accidental explosion by contac with the hammer, and simplify the eneral arrangement of parts. It consists principalili in setting the hammer in a recess of the gun stock, and back
of a gaurd which is fastene to to st, so that accidental contact with the ham. chis hereby prevented. The invention also consists in a consequen
change in the position and form of the nipple, which is $L$ shaped; and also In a new manner of combining the trigger, hammer, and mainspring with

Watri Heatrr and Stram Genrrator.-George M. Woodwardo of New York city. -This invention relates to an apparatus or heating builldings by Water circulations or by steam, and for generating steam for all purposes,
it consists in a chamber made with two compartments and a sertes of water tubes which are arranged in pairs, each pair beling connected by a return chamber, and the whole arranged in a freenox or arch.
Ber Hive.-William H. Roberts, of Campbell's Station, Tenn.-This in Vention relates to an improved moth-miller trap, and consists in the ar-
rangement of passages in the front and base of the hive, and a pecculiar dis position of illuminating holes by which the
which can eassly be removed from the hive.

Thrashing Machine.-John A. Lutz, of Bucyrus, Ohio.-This invention has for its object to adapt an ordinary grain thrasher for immediate use in cleaning timothy. At present thrashing machines, though provided with y, a second machine, a clover huller, is used subsequent to the process o hrashing. The improvement consists in providing an ordinary thrashin place of the wheat riddles, by means of which the timothy is cleaned.
Rafter Hoor.-Carl Gustav Buttkereit, of Toledo, Iowa.-This inve levators, etc., with hook to be used in connection with fire escapes, hay ame time permitting the obsintantaneous detachmes tof the same from the ill, rafter, or beam on which it hangs. It consists in providing the hook ith a pivoted detaching lever and with a stop for the same, in such a man makes a fulcrum of the support on which the hook hangs and raises up he latter until it is clear of the support.
Refrigerator.-Stephen A. Dunnington, of New York city.-This in vention furnishes an mproved refrigerator which is so conscructed as to e able iceand salto be apphled to produce cold, and which keeps the article laced in it perfectly dry. The inner box of the refrigerator is made of recessed and made to incline toward the center, where is formed a channe nclined slightly toward one side, so that the melted ice and salt may flow of through a hole in the slde of the box. The outer box is made large than the inner, so as to leave a space belween to receive the ice and salt. doorway is formed through the sides of the boxes, and is enced so as
C
CANAL BOAY.- Po wheel mechanism, which can be applied to canal boats and other vessels fo the purpose of propelling and steering the same. It consists, Arst, in a pe culiar construction of paddle wheel, which is formed with a double cone nd with na with a space between them and the hub; and, secondly, in a sprin which the wheel is journaled.
StovePipe Connection-Charles R. Penfleld, of Lockport, N. Y., as signor to himself and Charles Strawn, of same place.-This invention re-
ates to an improved method of connecting stove pipes to the chimney on ue; and consists in a clamp collar which surrounds the pipe, and which ghtened thereon by means of a screw. This collar prevents the pipe being or a screw and wedge, is the pipe held in positions so that it cannot be draw or a scr
out.
PAPRE

Paprr Cutting Implement.-James Cook, of Grand Manan, Canada. and doing sim furnishes an improved instrument for trimming photograph onsists in a cirar work rapidly and without danger of tearing the paper; In such a way that its edge overlaps the edge of the form or size plate whic laid upon the photograph to be trimmed. A short journal or shaft passe and to its end, at the outer side of the cutter, is attached a handle.
Reach ©oupling for Wagons.-William P. Ripley, of Friendship, Tenn. -This invention furnishes an improved coupling for connecting the reach nd counles the reach to the hounds in such a way efthat, while making the connection firm and secure, the reach is at liberty to turn freely in the ounds, but cannot move longitudinally.
Bung.-Thomas Burke, of New York city.-This invention relates to ar vessels, and consists in screwing into the bung hole of the barrel tub ar shell which is provided internally at its bottom with a valve seat. The alve, by which the barrel is closed or opened, is composed of wood, or of metal arranged with suitable packing, and is kept down on its seat by means
of a crossbar, which is made to span the shell above it and to enter spiral of a crossbar, which is made to
grooves in the sides of the shell.
Layp BAss.--Joseph Kintz, of Meriden, assignor to himself and P. J. in two parts: the lower one is a hollow cup or approximately cap whici plate, with four holes (more or less), through the bottom, and the uppe ne is a plate which covers the hollow one, and has four legs or pins corre ponding to the holes through the lower piece, which pins are pressed down tand to the base, so as to press the pieces of rubber through the bole enough to support the base above the table, and thus preventit from scratch ing or injuring it.
Boat Detaciing Apparatus.-David McFarland, of New York city,
ssignor to Adaline M. Ingersoll, of Brooklyn N. Y.-In this invention then inged arms, bow and stern, by which the lyn, N. Y.-In this invention the y sockets which slide over them. These sockets are connected by rods which are operated by a lever to release the hinged arms by withdrawing erve as guides for the sockets, and insist also in providing plates which seel of the boat is bolted, with suitable rings through which the sockets pass when sustaining the weight of the boat. In this way the weight is brought mainly on the keel and frame
Sheet Separator and Dropper. - William Van Anden and Tristram Cofmn, of Poughkeepsie, N. Y.-This invention consists of a holder for sheets
of music, etc., and retaining, separating and actuating devices, arranged in uch a manner that a pack of sheets suspended on the holder may, by the pulling of a cord or moving of a lever, be let fall one at a time upon a music
ack or any other receptacle, in such a way as to be of great convenience to rack or any other receptacle, in such a way as to be of great convenience to musicians and others by disposing of one sheet and bringing another into
use quickly while performing, so that the musical or other pertormance is not interrupted.
Vegetable Cutter.-Friederich A. Schaefer, of St. Louis, Mo.-This in ruitsinto slices, and consists in forming the cutter of a vire or wires stretched from side to side of a rectangular handled trame. It is cheaply made and easily repaired.
Bex Hive.-Amos I. Root and Meroa Andrews, of Medina, Ohio, assign-
rs to A. I. Root and Company, of same place.-The objeet of thisinvention is to so construct the honey frames of bee hives that they may be readily taken from the hive or replaced without disturbing the bees. The ordinary he frame from the hive or the corners with nails, a nd it is dificult to detach injury to the frame and greatly disturbing the bees. The improvement con-
sists in securing the frame and supporting it in the hive by means of metalic armend frame in all directions. It can readily be detached, as the wax does not adhere to metal as it does to wood.
Machine for Making Blinds.-James Milne, of Philadelphia, Pa.-Thi invention provides an improved machine for manutacturing window blind
and consists more particularly in the combination of two pairs of cutters, arranged in movable bearings, and one pair arranged in stationary bearings, with a transversely movable bed upon which the stile or side piece
of the blind is carried to have the te son cut; also, an arrangement of double chisels and boring bits for forming the mortise, in combination with a mo able carriage,
ultaneously.
Wasiine Maching.-Ezra McCoy, of Pontiac, Mich.-This invention furnishes an improved washing machine which is simple, inexpensive, convenient, and effective, it conslsts in certaln aditions which are made to an radial arms extend to the sides. A framework, composed of slotted cross bars, is secured by one of them and wooden springs to the top of the tub, and through a hole in the center of the bars is passed a shaft which carries
a-pegred or knobbed rubber by which the clothes are washed against the a.pegxed or knobbed rubber by which the clothes are washed against the
lower block snd arms. It 1 operated by a handie at the top of the shaft.

HARRow.-Greenbury Reed, Greencasatle, Ind.- In this invention, the con-
struction of harrows is is mproved so that the teeth can be readily cleared of rubbish. A light additional Irame, through which the teeth pass, is arranged close under the ordinary frame and combined with levers and springs, in such a manne
of the teeth.
Harness Saddle.-Elijah Dixon, Emporia, Kansas.-In this improvement the parts of the saddle above the back bone are all made flexible, with the exception of two curved plates by which they are connected. These
plates overlap and slide over each other, so as to admitt the adjustment of the saddle to different shaped backs, by means of screws which pass through lots in the plates.
Draft Regulator for hot air Furnaces. - Stephen J. Gould, Cornwall Conn. -This invention relates to a new apparatus which can be applied to hot air furnaces for the purpose of reducing the draft if the
heat produced should reach or exceed a certain degree. It consists princtpally in the use of a boiler which is placed within the hot air chamber that pally in the use of a boiler which is placed within the hot air chamber that
surrounds the furnace, and in the connection of the same by means of pipes, with a vessel containing a diaphragm or piston, in such a manner that, when, by an excess of heat, steam is created in the boiler, the diaphragm or piston is moved, and draws
position for reduciug the draft.
Tobacco Knife.- William A. Bernard, Danville, Va.-In this invention, the knife handle is made with a thumb rest on the back, and is so fitted by
ts shape to the hand of the operator as to eniable him to make an upward cut. The blade, also, is of peculiar formation, and has a sharp point by
which the stalk of the tobacco is readily slit before being cut off. The cut Which the stalk of the tobacco is readily slit before being cut off. The cut
being made with an upward pressure, there is no danger of dulling the knife being made with an upward
by contact with the ground.
Barber's Chatr.-Johannes N. Ewald, Frankfort, Indiana.-This invention relates to a new barber's chair, which is made with a reversible seat Fith peculiar devices for locking it in a horizontal position, and with an
index to show how often the seat has been turned. The object is to allow index to show how often the seat has been turned. The object is to anlow the spread of disease by contact with the warm seat. The invention con-
sistsin a pecullar support for the sides of the swivel seat, in a new mechansists in a pecullar support for the sides of the swivel seat, in a new mechan-
ism for removing the same, and in the arrangement of the index in connecism for removing
tion with the seat.
Churn.-Thomas Stumm, Ada, Ohio.-This invention consists in forming pureair through the same may be established when desired. By means of slldes, which have wire gauze openings to correspond with the apertures in the churn, the air may be admitted or excluded.
Lozenar Package.-Henty W. Booth, Toronto, Canada.-This invention
relates to a new method of putting uo confectionery, and consists in a box relates to a new method of putting up confectionery, and consists in a box
package of lozenges, twenty-four or more in number and of two diff crent package of lozenges, twenty-four or more in number and of two diffcrent
colors or shapes, which can be used as men, and a checker or draught board of paper which is folded to the size of the box and added to the contents.
Thus all that is neeessary for playing a game of checkers is contained in the package.
Wood Stove.-Chauncey H. Castle, Quincy, Ill., assignor to Comstock, Castle \& Co., of same place. This invention relates to an improvement in
the construction of the lining of tod-stoves-i. $e$, elongated wood burning the construction of the lining of tod-stoves-i. e., elongated wood burning
stoves. It consists in making the same flat at the bottom instead of arched, stoves. It consists in making the same flat at the bottom inistead of arched,
by which the strength and utility of the stove are very much increased and by which the strength and utility of
the facilities for cleaning improved.
Waste Pipe Trap.-Thomas Smith, New York city.-This invention is an improvement in the construct ose from sewers; it cons and is desigied to preven the escape of noxious gases from sewers; it consists in the arrarge
ment of a valve in connection with a removable cover for the trap box and in the provision of flanges on the inner side of the box, for the purpose
of keeping the valve in an inclined position. Breast Collar.-Ralph D. Kendall, Richville, N. Y.-This invention consists in forming a breast collar of a metal plate, shaped to the neck of a
horse, covered with leather, and having metal loops tor attachment of the shoulder strap, the same being secured by rivets. The loops also serve to shoulder strap, the same beligg secured bin rivets. The leops also serve to
prevent the lether from siling or working on the plate, by reason of their
projection through the leather.
Ice Cream Freezzr.-John W. Condon, Logansport, Ind.-The inven-
tion consists in providing a cream vessel, that rotates within a freezer, with a dasher rod having plate arms bent so as to throw the cream upwards and thus to assist in creating a uniform frigidity ; in providing the dashe
rod with a loosely pivoted sweep that is forced by the current of cream to keep the side of the vessel from any adherence of particles; in a mode o adjusting the sweep to bear more certainly and positively against the side;
and finally, in a frame which has clamps and a horizontal bar that may be and finally, in a Prame which has clamps and a horizontal bar that may be detachably but rigidly fastened to the case, so as to
mechanism and fixedly hold the dasher shaft or rod.
Harvistris.-George S. Grier, Milford, Del.-The invention consists in
operating a rake, by means of an endless carrier so that operating a rake, by means of an endless carrier, so that it will be transfer
red edgewise when traveling on the upper side of the belt, be turned at the end with the teeth across the front of the platform, be then drawn in that position to the rear, and, finally, be turned one quarter of a revolution as it ascends to the said upper side of the belt or chain.
SHIP's Pump.-Thomas Bell, of Bellport, N. Y.-The object of this inven-
tion is to improve the means used for discharging water from ships and for tion is to improve the means used for discharging water from ships and for
pumping water expeditiously in other situations; the pump is formed of pumping water expeditiously in other situations; the pump is formed of a
rectangular box which has the induction pipe at one end and the eduction pipe at the other; within the-box are sliding boxes containing the valves which are hinged. These valves and boxes are made to slide backward and forward by means of rods and eccentrics attached to a driving shaft whic passes through the middle of the pump box. The valves are not moved in
unison, but are arranged so as to cause a continuous flow of water through the pump.
Thrabiing and Skparating Machine. - William h. Bassett, of Burling ton, Kan.-This invention relates to a new self feeding and band cutting at
taehment for thrashing machines, and to a new arrangement of discharge screw for the separator by which help is saved in operating the machine A feed belt for conveying the sheaves of grain to the thrashing cylinder is applied to either side of the trame. A reciprocating knife is suspended above the feed belt from a crank shaft, and is made to move up and dow sheaves of grain that are conveyed to the machine. The grain, atter of theing passed the threshing machine and grain separator, is finally discharged int a transverse trough, in which there are two screws. When these screws are both turned in the same direction, they serve to discharge the grain a one end of the trough. But when the thrashing machine operates with grea from it, the screws are revolved in opposite directions and separate the stream of grain so as to discharge it at both ends of the trough.
Hemp Brafi.-Philonzo S. Fitch, of Hanly, Ky.-This invention furnishes consists in peculiar arrangements of stationary and moving knives and other machinery, by the operation of which the hemp is quickly and effectu-
ally broken and the shives beaten out.
GUN SIGATs.- John T. La Rue, of Pleasant Post Oflce, Ind.-This inven tion consists in the construction of sights for rifes and other fire arms; an thereto. The front sight is composed of two hinged plates, vhtch fold ond under the other upon a bed plate, and are controlled by the action of spring, so as to admit of being set for use either as a globe sight or a plain
open sight. The rear sight is stationary, and is provided with opening open sight. The rear sight is stationary, and is provided with opening
adapted for use in conjunction with the front sight in elther of its forms.

Devion for Cutting Screw Thriads.-Frederick G. Robinson, of Pitts-
ield, Mass.-This invention obviates the diffeulty which abtends Reld, Mass.-This invention obviates the diflculty which attends the start ing of a screw thread cutting die on the end of a rod or tube. A tubula holder is made to contain the die and is adjusted to screw into anothe Inthis way the die is correctly guided and fed on to the rod.

Rotary stram Enains.-Charles w. Patten, of Elk Point, Dakota Ter-ritory.-In this improved steam engine the cylinder is of the form of two
cylinders, with about one quarter of each cut off longitudinally. and joined together, thereby inclosing one space, which is divided in its longest diame two axles are arranged side by side, and fit together steam tight; they also fit the partition steam tight, so that, by them and the partition, the cylinder
is divided into two compartments. These hubs are placed in the axes of the is divided into two compartments. These hubs are placed in the axes of the two parts of the case, and they have each two wings applied at right angles
to each other, one being in each compartment. The hubs, with the wings, oscillate a quarter of a revolution, or thereabout, the wings moving from the partitions to the central point between them, where they meet. The steam is applied between the two wings of one compartment, and between
the partitions and the wings of the other compartment simultaneously, so that, practically, it is applied in three separate chambers, corresponding to ordinary cylinders, of which the whole or two, or only one, may be used a a time, which is desirable where the work varies considerably. This plan able sliding steam abutments or abutment valves; and it affords means for working'the steam expansively much better than it can be done with ordinary rotary engines.
Shoe Fitting Machine.-William H. Pruden and John P. Benjamin, of Williamsburg, N. Y.-This invention is an improvement in machines for
fitting together the inner lining, gore and outer vamp of a shoe or gaiter, nd consists in the inner lining, gore and outer vamp of a shoe or ganter, slide, in combination with a suitable punch and an apertured table. bolt Heading Machine.-Charles D. Wiley and Mason S. Norton, Junction, Minn.-This invention furnishes an improved bolt heading ma dropping the hammer by means of a segmental gear wheel and rack bar and also in apparatus for holding the hammer raised when the blank space of the gear is opposite the teeth of the rack bar.
Basiet.-James Graham, of Vassar, Michigan.-This invention furnishe an improved splint or stave basket, which is simple in construction and is trong and durable. The body of the basket is formed of two series or thicknesses of staves or splints, which overlap each other, and the ends of
which, at the mouth of the basket, are secured to and between two hoops, The outer series of splints or staves extend entirely across the bottom, crossing each other at the center of the bottom. The other or inner series of staves or splints do not extend across the bottom, but terminate a little
within the edge of the bottom board, so that their ends are confined beWithin the edge of the bottom board, so that their ends are coninned be
neath it. The bottom board, hoops aad staves are secured in their place $y$ means of clinched nails.
Shottle for Sewing Machine.-Frederic A. Churchill, of Pittsfield, means for applying and varying the friction in sewing machine shuttles, so as to regulate the tension of the thread; and it consists in a bent lever which operates in connection with an adjustable spring spindle in such a , -John B. Whitney, of New York city This invention relates to a lock, in which the outer key hole is closed by a sliding plate whenever the key is applied from the inside. and in which
the bolt may be thrown back by applying the key from the inside when the the bolt may be thrown back by applying the key from the inside when the outside. It consists in such a combination, of the slide with the lock tumblers, that it is held by the tumblers and is drawn:by a spring in front of the outer key hole as soon as the tumblers are raised by the key applied
from within; a plate projects from the silde close to the key, when the from within; a plate projects from the silide close to the key, when the
same is applied from without. and prevents the slide from moving while ame is applied from without.
Toy Steam Locomotive.-Francis W. Clark, of New York city.-This in vention furnishes an inaproved toy steam locomotive which runs for a con derable length of time, and has sufficient power to propel it upon
arpets or otheruneven or resisting surfaces; it is, at the same time, simple in construction and inexpensive in manufacture, and can be put int arket at a compandiy low price
Combinad Bureat and Clothers Dryer.- William Hathaway, of Northrridge, assignor to himself and Chester Hastings, of Millbury. Mass.-I
this improvement all the requirements for ironing, airing, and folding away clothes are combined in a bureau of ordinary size. It is made with drawers, a folding top, a recess above the drawers and an extension back
to which airing frames are attached. When the apparatus is extended for Ironing purpos 38 , the recess holds the articles to be ironed; when ironed nd laid in the drawers.
Machine for Drying Paprr.-Elihu C. Wilson, of Medway, Mass.-This cloth to be dried is carried on an endless apron or belt. The case is ar ranged so as to cause the air which is forced through it for drying the bat
to impinge uponits upper surface, and then escape around the edges and longthe under siae or trenter, and through the botlom of th case into a chamber or draft box, from which it is exhausted by a fan
blower or other suitable means. By this arrangement the bat is very quick y and effectually dried.
hand Corn Sheller.-Archibald McLean and James H. Ross, of Caron ention an improved hand cor convenient in use, and does its work quickly without scattering the ker-
els; it consists in the arrangement of a fixed and a movable jaw, which re provided on their interiors with flanges or threads by means which the kernels of the corn placed between them are removed. Curved
guards are attached to the sides of the jaws to prevent waste, and the oper ation is pertormed by moving forward a handle after the corn is placed in the jaws.
Fekd Water Heater.-John Gates, of Portland, Oregon.-This inven ion relates to a new feed water heater and mud retainer for steam boilers,
in which the heat of the exhaist steam is tully utilized and the sedimen

## Value of Extended Patents.

Did patentees realize the fact that their inventions are likely to be more productlve of profit during the seven years of extension than the fir themselves of the extension privilege. Patents granted prior to 1861 may b of the decease of the former, by due application to the Par of his heirs in cas ays before the termination of the patent. The extended time inures t he benefit of the inventor, the assignees under the first term having n ights under the extension, except by special agreement. The Governmen ee for an extension is 8100 , and it is necessary that good professional servic obtained to conduct MUNN \& CO.. 3y Park Row, N. Y.

## NEW BOOKS AND PUBLICATIONS.

The South African Dramond Fields. By J. L. Babe, Spe cial Correspondent of the " New York World.
York: David Wesley \& Co., $7 \& 9$ Warren Street
This book is written with the view of giving intended emigrants wel scertanned facts in regard to the diamond filds, upo
The Model Potato: An Exposition of the Proper Cultiva tion of the Potato, the Causes of its Diseases or Rotting, and the Remedy; its Renewal, Preservation, Produc-
tiveness, and Cooking. By John McLaurin, M.D. tiveness, and Cooking. By John McLaurin, M.D. 50
cents. S. R. Wells, Publisher, 389 Broadway, New York This little book is a practical treatise on the most usefal of all vege

## Practical Bints to Inveitorss.

M UNN \& Co., Publishers of the Scientific American have devoted the past twenty-five years to the procuring of Letters ed themselves of their services in procuring patents, and many millions of dollars have accrued to the patentees whose specifications and claims they ries obtain patents on the same terms as citizens.

How Can I Obtain a Patent is the closing inquiry in nearly every letter, lescribing some invention
which comes to this ofllee. A positive answer can only be had by presenting complete application for a patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specifica-
tion. Various offlicial rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without suzcess. After great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over azain. The best plan is to solicit proper advice at the beginning. If the
parties consulted are honorable men, the inventor may sately confide his parties consulted are honorable men, the inventor may sately confide his
deas to them: they will advise whether the improvement is probably pat. ideas to them: they will advise whether the improvement is probably pat
entable, and will give him all the directions needful to protect his rights.

## How Can I Best secure My Invention?

This is an inquiry which one inventor naturally asks another, who has had
some experience in obtaining patents. His answer generally is as follows and correct:
Jonstruet a neat model, not over a foot in any dimension-smaller if pos-
able-and send by express, prepaid, addressed to MONN \& Co., 87 Park Row New York, together with a description of its operation and merits. On reeipt thereof, they will examine the invention carefully, and advise you as to Its patentability, free of charge. ©r, if you have not time, or the means at hand, to construct a model, make as good a pen and ink sketch of the im orovement as possible, and send by mail. An answer as to the prospect of a
jatent will be received, usually by return of mail. It is sometimes best to tave a search made at the Patent Otllice; such a measure often saves the cos or an application for a patent.

## Preliminary Examination.

In order to have such search, make out a written description of the inven tion, in your own words, and a pencil, or pen and ink, sketch. Send these
with the fee of 85 , by mail, addressed to MUNN \& Co., 77 Park Row, and in tue time you will receive an acknowledgment thereof, followed by a written report in regard to the patentability of your improvement. This spectal
eearch in made with great care, among the models and patents at Washing. search is made with great care, among the models and patents at Washing

## To Make an Application ror a Patent

The applicant for a patent should furnish a model of his invention, it susention be a chemical production, he must furnish samples of the ingredient of which his composition consists. These should be securely packed, the iaventor's name marked on them, and sent by express, prepaid. Small mod els, from a distance, can often be sent cheaper by mail. The safest way to der of MUNS \& Co. drant, or postal order, on New York, payable to the or usually purchase drafts from their merchants on their New York corres pondents.

## Caveate,

Persons desiring to file a caveat can have the papers prepared in the short ment tee for a caveat is \&10. A pamphlet of advice regarding application or patents and caveats is furnished gratis, on application by mail. Addres

## Reissues.

 A reissue is granted to the original patentee, his heirs, or the assignees othe entire interest, when, by reason of an insufficient or defective specificaion, the original patent is invalid, provided the error has arisen from inad vertenc
tion.

A patentee may, at his option, have in his reissue a separate patent to by paying the required fee in each case, and complying with the other re arrements of the law, as in original applications. Address MUNN \& Co.

## Rejected Casea.

Rejected cases, or defective papers, remodeled tor parties who have made applications for themselves, or through other agents. Terms moderat Trademarks.

Any person or firm domiciled in the United States, or any firm or corpora on residing in any foreign country where similar privileges are extende citizens of the United States, may register their designs and obtain pro Iy so to foreigners. For full particulars address MUNN \& Co., 37 Park Row New York.

## Design Patents.

Foreign designers and manufacturers, who send goods to this country, mas
secure patents here upon their new patterns, and thus prevent others from tabricating or selling the same goods in this market.
A patent for a design may be granted to any person, whether cltizen or
alien, tor any new and original design for a manufacture bust, statue, altoelievo, or bas relef, an n , silk, cotton, or other fabrics; any new and origina impression, orna ment, pattern, print, or picture, to be printed, paint
placed on or worked into any article, of manufacture.
Design patents are equally as important to citizens as to foreigners. Fo Design patents are equally as important to citizens as to foreigners. For
tull particulars send for pamphlet to MUNN \& Co., 37 Park Row, New York.

## European Patentr.

MUNN \& Co. have solicited a larger number ot European Patents tha any other agency. They have agents located at London, Paris, Brussels
Berinn, and other chief cities. A pamphlet pertaining to foreign patents and the cost of procuring patents in all countries, sent free.
MUNN \& Co. will be happy to see inventors in person, at their office, or to vise them by letter. In all cases, they may expect an honest opinion. Fo such consultations opinions and advice
do not use pencil, nor pale ink: be brief.
All business committed to our care, and all consultations, are kept secrea In all matters pertaini
In an matters pertaining to patents, such as conducting interferences of patents, etc., special care and attention is given. For information, and fo Address

## MUNN \& CO., <br> POBLISHERS SCIENTIFIC AMERICAN, <br> sy Park Row, Now York.

Office in washing ton-Corner F and 9 th streets, of posite
ent ofice.

## [OFFICIAL.] <br> Index of Inventions <br> For which Letters Patent of the United States were granted <br> for the week ending July 9, 1872, and fach <br> bearing that datr.

Amalgamating gold and silver, A. B. Crosby, (reissue).

Baking dish, B. Harrington
Bale tie wire,

Basket, fruit, W. A. Tr issiler.................................
Bath tab, A. R. Robb.
Bed bottom, spring, G. E. . Burt.
Bed bottom spring $F$ F. De Witt
Bed bottom, spring, F. Fe Witt.
Bed bottom, spring, J. Johnson
Bed bottom, spring, s. Puffer.
Bedstead, lounge, $\mathbf{H}$. H. Reichert.
Bee hive, P. and $A$. Hurst.
Berths, step for,
,

Blind, window, L. H. Wooden
Boat, S. Elwell, Jr.

Boiler feeder, steam, Karns and Douthentt
Boiler, steam, Paxman and Davey
Boiler, steam, Paxman and Davey
Boiler, steam, Rogers and Vance..
${ }^{\text {B }}$ Blers, saanety valve for steance.................
Bolt making machnne, A. Charbono
Bolt work for doors, $J$. Sargent....
Bolt work for doors, J. Sar
Book support, L. Willson.
Boot and shoe soles, stiffener for, Bars
Boot and shoe stretcher, T. C. Maris.
Boxes, machine for nalling. . . Beard
Breeching loop, s. Ward.....
Brick machine, Z. Ludington
Brick machine, Z. Ludington.
Brick machine, R. A. smith.
Brick machine, BuImer
Brush, stove, $w$. . $m$ mall
Brash, tooth, G. M. M. Allerton..
Buckle, harness, M. M. Stewart
Buckle chape and strap loop, G. Crouch
Buggy top, J. C. McCully
Bung, Marriott and Rueg
Bang cutter, J. S. Manroo
Burning vapor
Burning hydrocarbons as fuel, apparatus for, w. H. Russell.
Bustle, C. . . P. Pollock........................
Button hole cutter, H. H. Pinkham
Camera, photographic, C. A. Waterbury....
Camera stand, photographic,
T. M. Schleter
Can, grocer's, J. Adair.
Can, oll, J. A. Bostwick.
Cai coupling, , O. Ottinger
Car, dumping, Mclean and Elton
Car truck, J. Olney...
Carding machine, feeding apparataus for, J. W. W. Barbour
Carpet raga cutter and loopper, combine
Carpet rags, tooper for, G. W. Ansley

Chair, R. S. Mains.
Chair, folding,P. B. viele
Chimney and dire place, J. Briggs.
Churn, J. C. Johnson..
Churn, J. C. Johnson....................
Clock calendar, Clinton and Mood.
Cloth, machine for folding and plaiting, E. D. Gird

Collar, horse, c. c. Cotten.
Collar for horses, breast, R. D. Kendall.

Cultivator, F. W. Tolley.
Cultivator, M. D.
Cultivator,
W.
P. Brown.
Curtain fixture, S. Hartshor
Desk, school, w. N. Foster............
Door, hanging sliding, G. F. Prinde,
Doughnut catter, J. F. Blondel
Draft regulator, J. Woodruff.
Drawing knife, H. c. Smith
Dryer, grain, W. L. Card...

| Egg carrier, D. A. Fangha |
| :--- |
| Egg carrier, w. $\mathbf{O}$ |

Enameling checkers, apparatus for, I. S., J. w., and c. M. Hyatt Engine, oscillating steaw, J. B. Sweetland.
Fabric, felted, W. E. Bloodgood.
 Faucet, I. N. Smith.
Fishing lines, float for, E. Jewell.
Friction clutch, C. E. Burwell
Fuel, artificial, B. F. Penny, (reissue)
Furnace, glass, Eels and Deabold.
Furnace, hot air, J. B. Haupt.
Furnace, hot air, J. M. Thache
Furnaces, air pipe for, J. P. Dawson
Game counter, F. H. Richardson,
Gas, manufacture of illuminating, w. H. Spencer
Gage, clapboarding or siding, J. W. Osgood.
Gin, cotton, R. McKenna........................................................
Gold, etc. Irom waste solutions, recovering, P. Shaw, (reissue). Grain, decorticating machine, W. P. Robinson
Grater, J. A. Hard.
Harvester, J. Fa ris.
Harvester rake, G. . . Gr.....
Hat shade, M.
Heat shade, M. L. Battle....
Heel -have, J. H. Sanford.
Hemmer, G. M. Hall....
daes, method or reating raw, H. W. Southwort
Hook and ladder apparatus, J. S. Hunt...
Hydrant, J. N. Smith..
cream freezer, J. W. Cordon
nking pad, Whitney an
ron, flat, P.Wilbur.
ron stand, sad, G. O. Ballou.
Ironing board, J. M. Childer

Jack, lifting, c. Maynard Kars and bottles, cover for, S. s. Butler
Knob, door, L. L. Smith............. Knob, door, L. L. Smith................
Lamp chimney cleaner, R. R. Howell.
Lap board, S. Mahan.
Lap boara, S. Mahan
Letter box, S. N. Brooks (reissue) Lightning rod, J. C. Schoonmaker
 oom stop actuating mein
Mat, door, J. v. Oldaker.
Metal, machine for cutting. punching, and upsetting, H. B. Sevey........................................ Milk strainer, R. G. Kendall
Mill, rolling, c. H. Perkins...................................
Millstones, grain and middlings feeder for, B. B. Broyles Miter box, A. C. Hall.,
Mop head, C. B. Clark Nitrous oxide and oth
Nut lock, J. F. Saiger.......... .................
Organs, operating fan tremolo for, A. C. Bradles
Packing for steam engines, Raymond, Dunn, and Col
Paint for ships' bottoms, G. B. Bair.
Paper board for buldings, etc., manufacture of, F. N. Davis
Paper cutting machine, F. Schoettle..........
Paper pulp machine, J. M. and F. Burghard
Paper steck, manutacture of, M. L. Ke
Pavement, composition, E. S. Martin
Phosphatic rock, etc., treating, Pratt
Pipe elbows, machine for crimping, C. E. Bell.
Pipe joint, flexible, R. M. Shurtlefi
Piston rods, etc., stuyling box for, J. S. Reed.
Pltchers, ice, E. A. Parker.......
Planter, corn, Jones and Dwight.
Plow, M. L. Gibbs, (reissue)
Plow, mole, J. R. Barne
Plow, wheel, G. Tozer..
Printing press, T. Leavitt, (reissue)
Printing press, w. Johnson...................
Pulley, differential, T. A. Weston, (reissue).
Pulley, differentia, 1.
Pump, c. o. Sylvester...
Pump, submerged, J.
Rakes, tooth fastening tor horse hay, B. Pickering
Ratchet, T. Searls
Remedy, pile, L. E. Brady.
Roaster, coffee, W. L. Dalbey.
Rod, connecting. S. N. Wate, Jr
Sash holder, H. F. Lawrence..
Sash weight, c. S. Knight.
Saw guide, J. Arthur.
Saw set, J. E. Emerson
Saws, attaching handle to, J. E. Emerson
Screw driver, c. W. Porter
Seeding machine, C. H. Wat
Sewing machine, w. A. Springe
Sewing machine, w. Butterfield
Sewing machine, E.P.W st
Sewing machines, braid guide for, E. T. Thomas
Sewing machines, treadie for, R. N. Allen..........
Shafts, regulatiag the speed of driven, L. Wright.
Sharts, regulatigg the speed of driven, L. Wrightines, ccnstruction ot F. Schoettle, (reissue)
Shears, rotary, H. F. and G. F. Shaw.
Sifter, ash, J. S. Brooks.
Signal for railroads, time, w. Wickersham.
Soldering rod, W. M. Neill.
Sole and heet trimming machinery, cutter head for, S. H. Hodges
Spinning rings, holder for, T. Marsh
Spokes, machine for throating, Stanley and Smith.
Spring, door, D. C. King.
Stand and secretary com
Stand and secretary combined, M. P. Brown.
Steam generator, sectional, G. W. T. Shafn
Stereotype block, R. P. Tickle
Stone, tool for dressing, J. Oman.
Stove damper, A. Cowan.
Stove damper guard, R. R. Howel
Stove, heating, E. Harmon.
Stove lid lifter, J. H. Dene
Stove platform, Smith and Kimball
Stoves and furnaces, hot air drum and grate for, B. F. Campbell.
Stoves, top for heating, E. Bussey...
Straw cutter, Protzman and McClarman..................
Tebles, cell cover for sewing machine, G. A. Wheeler.
Tables, cell cover for sewing machine,
Tables and stands, leg for, G. H. Bell..
Telegraph apparatus, G. Little.
Telegraph instrument, dial, s. C
Thermometer, churn, C. Tyler
Thill coupling, J. H. Morgan
Thill coupling, J. H. Morgan.
Thill coupling J. T. Hards...
Thill coupling, J. . Harss....................
Thrashing machines, dust fan for, c. c. Allen.
Thrashing machines, dust fan for, C. L. Allen......................
Tin and other metals, apparatus for coating with, E. H. Davies
Toy, A. Ffoiliott................
Trap, fy, d. o. Greene..
Trap, steam, A. L. Jon
Trunk, C. A. Taylor..
Trunk, C. A. Taylo
Truss, J. D. Barnes
Tubes, machine for making sheet metal, D. A. Ritchie..............
Valve, stop, S. P. M. Tasker..................... 128,922, 128,9 Vehicle wheels, axle box for, D. Dalzell
Vehicles, hub for, C. G. Gray.
Vehicles, dash rail for, H. W. Warner.
Vehicles, wheel for, J. W. Ford.......
Vehicles, wheel for, J. W.
Ventilator, F. Z. Tucker

Vise, pipe, C. E. Haynes.
Warmer, peanut, w. Chrysler
Washing machine, E. B. Hull.
Washing machine, A. c. Langworthy
Washing machine, R. P. Gillett
Watch case spring, J. Laurent.
Water closet attachment, W. G. Rhoad
Water wheel, F. H. Palmer.......
Weather boarding, A. W. Murray
Wells, reamer for rock drills and, Peri
Wells, tube tor drive, c. E. Whelpley
Welt trimmer, J. H. Sanford.
Whiffetree, J. B. Small.
Whiffletree, E. C. Gordon.
Whiflletree clip,
Whiffetree clip, S. J. Foreman.........
Whiffletree draft eye, E. E. Tompkins
Winmetree dract eye, e. .e.
Windmill, T. S. Van Devort...........
Wood, machine for splittins. F. Wagner

## DESIGNS PATENTED

5,974.-BUtToN.-J. R. Farrell, Boston, Mass.
5,975.-CasE For Rrbions, ETG.-J. Gross, N.
5,975.-CASE For RTBBONs, ETC.-J. Gross, N. Y., A. Ruth, Decatur, Ill
5,976.-Cooking Range. - D. Hathaway, Green Island, N. Y.
5,977.-BRER MUA.-J. H. Hobbs, Wheeling. W. Va 5,977.-Berr Mut.-J. H. Hobbs, Wheeling, W. Va.
5,978.-ENDS of Belting.-B. A. Lewis, Flativille, Con
5,979.-Stove.-G. G. Wolfe, N. S. Vedder, F. Ritchie, Troy, N. Y.

TRADE MARKS REGISTERED.
 835.-Gunpowdegr.-Laflin \& Rand Powder Company, New York cit. Soasp, ETC.-Proctor 9.-WHISKy.-H. K. Thurber \& Co., New York city. DISCLAIMER.
$\xlongequal{\text { 20,727.-Cartridge. -G. W. Morse. }}$

## 

APPLICATIONS FOR EXTENSIONS.
Applications have been duly filed, and are now pending, for the extension
of the following Letters Patent. Hearings upontherespective applcation of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinarter mentioned.
are RAKE.-M. Raezer. September 18, 1872 . 21,864.-Sorew Cutting Lathe.-G. W. Dạniels. October 2, 1872 21,917.-HuLL OF VEsSEL.-R. and T. Winans. October 9, 1872. 22,157.-Pipe Tonas.-J. R. Brown. November 13, 1872. EXTENSIONS GRANTED.

## ,7z2.-Cartridge.-G. w. Morse.

20,756.-Ore Separator.-H. Bradford.
0,824.-Planing Moldings.-H. B. Smithen
20,834.-Ear, Cheren, and Chin MuFFs.-W. P. Ware.
20,841.-Railway Bridar Stanalizer.-A. Burnham
20.920.-Spinning Frame.-A. Houghton.
20,923 .-Machine for Cleaking Grain.

FOREIGN PATENTS---A HINT TO PATENTEES.
It is generally much better to apply for foreign patents simultaneously vith the application in the United States. If this cannot be conveniently
cone, as little time as possible should be lost after the patent is issued, a ine laws in some foreign countries allow patents to any who first make th pplication, and in this way many inventors are deprived of valid patent or their own iventions. Irshourd also be borne in mind that a patent is eal inventor; therefore, it is important that all applications should be ntrusted to responsible agents in this country, who can assure parties that heir valuable inventions will not be misappronriated. The population of Treat Britain is $31,000,000$; of France, $40,000,000$; Belgium, $5,000,000$; Austria, $4,000,000$ : and Russia, $70,000,000$. Patents may be secured by American citizens in all of these countries. Mechanical improvements of all kinds are diways in demand in Europe. There will never be a better time than the resent to take patents abroad. We have reliable business connection vith the principal capitals of Europe. A large share of all the patents se Address

Crirculars. with full information on forelen natents, furnished free.
The new patent law in Canada permits Americans to take patents there The new patent law
on favorable terms.

## Inventions Patented in England by Americans.

[Comphed fom the Comileners of Patents' Journal.] From June 18 to June 27,1872 , inc
Chece Tickets, etc.-T. A. Jebb, Buffalo, N.Y.
Clote Cuttina Machine.--I. Fenno. P. Howe, Boston, Mass.
Drying White Lead, etc.-J. b. Pollock, Port Richmond, N. Y.
URNaOE, etc.-b. Franklin, Indianapolis, Ind.
athering ATtachent,
iathering Atrachment, eto.-A. Johnston, Ottumwa, Iowa.
Iydrant.-J. Fricker, Jr., Cincinnati, Onio,
IAKing Oil, etc.-W. B. Fisher, Newark, N. J.
faking Vinegar, btc.-R. D. Turner, I. Vanderpoel, New York city
Cuhioal instruments.-T. Atkins, B. Drewer, Cincinnati, Ohio.
'Latiting Attachment.-O. McC. Chamberlain, New York city. iallway Brake.-F. A. Canfield, Dover, N. J.
Zaising Boats, etc.-W. M. Wood, Baltimore, md.
iAISING FLuIDs, ETC. -J. Sagar (of California), Leeds, England,
iAssina Fluids, erc.--J. Sagar (of California),
iotary Plow.-W. E. Bleerker, Brooklyn, N. Y.
iddder and Drag.-H. Rabien, M. Wellinghoff, New York eity
afety Valye, -J. R. Cazier, North East, Pa
afety Valve.-J. R. Cazier, North East, Pa.
iecurina Knobs to Spindles.-W. B. Chapin,
jecurina Knobs to Spindles.-W. b. Chapin, Wickford, R. I.

STop Moтion.-W. Corney, S, S. Turner, Westborough, Mass.
frimming Boot Heris.-R. C. Lambert, Quincy, Mass.

## NEW PATENT LAW IN CANADA.

By the terms of the new patent law of Canada (taking effect September 1st, 872) patents are to be granted in Canada to American citizens on the most avorable terms.
The patent may be taken out either for five years (government fee \$20), or or ten years (government fee $\$ 40$ ) or for fifteen years (government fee $\$ 60$ ). Che five and ten year patents may be extended to the term of fifteen years. 'he formalities for extension are simple and not expensive.
In order to apply for a patent in Canada, the applicant must furnish at nodel, specification and duplicate drawings, substantially the same as in .oplying for an American patent.
American inventions, even if already patented in thiscountry, can be pafe
nted in Canada provided the American patent is not more than one yeart ld.
All persons who desire to take out patents in Canada are requested to com unicate with Munn \& Co., 37 Park Row, N. Y., who will give prompt at .
Messrs. Munn\& Co., have had twenty-flve years experience in the busiless of obtaining American and Foreign Patents for inventors; they have rate charges and prompt attention may always be expected.

Juiv 27, 1872.]
gatextisements.

| gates of advertising. |  |
| :---: | :---: |
| Back Page - - - - - $\$ 1 \cdot 00$ a line, Inside Page - - - - - 95 cents a line |  |
|  |  |
| Engravings may head adveritisements at the same rate per ine, by measurement, as the letter-press. |  |
|  |  |

## $\boldsymbol{G} \boldsymbol{A} \boldsymbol{R} \boldsymbol{D} \mathbb{N} \boldsymbol{E} \boldsymbol{R}$

 FIRF HXTNGOTJSHER
an absolute protection from fire Itisiluys readr for instant ued pereectig simple in






A NEW COLONY IN KANSAS! At " SKIDDY," in Neosho Valley, on Missouri, Kansas

THE AMERICAN COLONIST AND HOMESTEAD

PROPELTYR PUMMP

N JTICE IS HEREBY GIVEN, that



[^0]

Niagara Steam Pump. CHAS. B. BaARDICK,
VARIETY MATNT MOLDPROVED CIRCULAR Ad A A Stable BENCHES. W ANTED- 「o Purchase, in any location





H0W ${ }_{\text {siol }}^{\text {TiL }}$ PATENIS.


[^1]
## 


J. A. FAY \& CO.

## HARTFORD

Steam Boiler
INSPACTION \& INSORANCE CO.
CAPITAL ...................... 8500,000
 Boilers, Bnildings, and Machiner"j,

STEAM BOILER EXPLOSIONS.
STEAM BOILERS,
STATIONARY, MARINE, aND LOCOMOTIVE. Full information concerning the plan of the Company'
perations can be obtained at the HoMie OFFICE, in Hartford. Conn..




 THOS. ......... CUNN ING HAM, Manager.
R. K. MCMURRAY Inspector.

## a Neve anin Valailie Buat.

 THE
gimeticau.

|  |
| :---: |
|  |
|  |
|  |
| ${ }^{\text {NE }}$ |
| Rolled Shafting. |

## Sturtevant Blowers

Of every size and description, constantly on hand.
GEDREE PLACE \& CO
121 Chambers \& 103 Reade Streets, New York.
Pat. Punching Presses

Gikir proction w prices



 MI EDWARD H. HOSKIN,
CONSULTING AND ANALYICAL
CHEMIST, Chemstry as applieq to toll he trast
O LATHE CHUCSE- HORTONS
 STEPTOE, MCFARLAN \& C0,


0 ITS' $\begin{gathered}\text { safetr histing } \\ \text { Machinery. }\end{gathered}$
R RISDON'S improved Turbing Water Wheel



$$
S T E A
$$

PUMPING MAEHINERY
 Independent
BOILRR FEFDRR
$\frac{\text { Works Hot and Cold Water. }}{\text { LARGE AND SPLENDID * }}$ Illustrated Catalogue,
Cono \& Maxwell Man'fí Company,

E.M.MAYOS BoLT CUTTER-Patented STEEL CASTINGS
Torattern; tensilo strength equal to




1882. SCHENCK'S PATENT. 1871 WOODWORTH PLANERS



$\overline{\text { Rid }}$
 $\mathbf{S}_{\text {Improved AND BARRISL MACHINERY.-. }}^{\text {Hint }}$



## Andrew's Patents.







THE Union Iron Mills, Pittsburgh, Pa. The






A ${ }^{\text {GENTS Wanted. Agents make more mon. }}$
 Buy Barber's bit brack. SAWING MACHINES

P. BLAISDELL\& CO. M MACHACTURERS OF FIRST CriAs
ROPER RIOT ATR
WOODBURY'S PATENT
Planing and Matehingy
 Berin


 L. L. \& J. T. Smith

## Nickel Platers, <br> 133 \& 135 WEST 25 th

## $P A M E M T$ $B E D$ SEABEERENE









Three-Ply Roofing. Two-Ply Sheathing. Send for
Samples and Circuar.
MICA ROOFING COMPANY, 73 Malden Lane, N. y. MORRIS, TASKER \& CO., Amerixan Characal Irom Biler Thes. For Gas, Steam, Water and Oity. Steam and Gas Fitters' Supples, Machinery
Coal Gas Works, \&c.
NO. 15 GOLD
ST., NEW YORK. Trade-Mark Patents.



 or anylength of time, or abo rut to bead optedeact in use
Fnil informationon this important subject can oe ob.
talined by addressing



NILESTOOL WORKS,


HARDWOOD LUMBER



The Union Stone Co., EMERY WHEELS \& ENERY BLOCKS




Tondeam Rafrerty, Manfacturer


Grand National Industrial Exposition, Louisville, Ky


WILL OPEN SEPTEMBER 3d, 1892, AND CONTI NUE UNTIL OCTOBER 8th,



## THE HEALD \& SISCO



PATENT CENTRIFGGAL PUMPS,

## $\underset{\substack{\text { Or } \\ \text { or } \\ \text { or }}}{\substack{2 \\ \hline}}$




 | one from New York. As a wrecking-pump, and as an |
| :--- |
| IIrrigator, it is unrivalled. both for cheapness and efl- |
| ciency. It makes a splendid Fire Pump. |



COVERING

TRON PLANERS, ENGINE LATHES,


American Saw Co.

 MañF Acturers or
Patent Movable-Toothed CIRCUILAR SAWS, Patent Perforated ( Cross-Cllt Saws. -

## Milling Machines.



Pateamtsafety
Steam Engine Governors and Water Ganges
PAT. SOLID EMERY WHEELS AND OIL


PORTLAND CEMENT,
 $\mathbf{R}_{\text {and mantains vacuum }}^{\text {An SON Steam }}$ SnER perfects




AMES IRON WORKS.

 LEFFELIMPROVED DOUSLETUABINE M:GerB WR13BL 6000 IN USE. NEW WHEELBOOK 152 PAGES,ROR 1872


## WHAHTH \& LHVY

 PENN WORKS, WOOD, DIALOGUE \& CO., Phila., Pa. MACHINE SHOP, EA, STEAM FORGE,
 JOINER SHOP, Sin SHIP YARD.
Propeller Wheels furnished on shortest notice.
$\mathrm{H}_{\text {PLETE }}^{\text {AVING ORE }} \mathrm{ONE}$ OF The THE MOST COMHe PLeet morks in the Untted state and the latest Tug, ocean and Rivers. Diteamer Builders, Phila., Pa. THE TANITE CO.S GOODS Are Kept in


Diamonds 登Carbon



## Dramond Pointed STEAN DRIISS.

$T_{\text {HE adoppition of nem and improved applica }}^{\text {tionso to }}$






## IUBRICATORS.




Working Models

 FISHER \& DUNCAN


L.W.Pond--New Tools. EXTRA HBAVY AND TMPROVED PATTERN

 at Worcester, Mased. C. strbbins, New York, Aent.





$\mathrm{T}_{\mathrm{HE}}^{\mathrm{HE}}$ "Scientific American" .is printed with


[^0]:    To Electro-platezs. B ATTERIES, CHEMICALS, AND MATE
    

[^1]:    Steam Super-Heaters.
    
    PORTABLE STEAM ENGINES, COMBIN
    
    

