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MACHINE FOR BUNOHING, WIRING, AND

## BRISTLES IN BRUSH BACKS.

We take pleasure in presenting to our readers engravings their length. The back of the comb being clamped in a suit able vise or holding apparatus, the bristles are drawn in beand a description of a machine which is so compounded of ing the loristles from comb, the pressure of the teeth hold the oblique portion of the slot being suspended at E, and ingenious devices that it deserves to rank with such chefs that the teeth hold them as near the middle as the eye can the vertical portion at F. The lower portion of this piece is d'Ceuvres of inventive sbill as the machine for inserting teeth in cloth carding, the Jacquard loom, Blanchthe Jacquard loom, Blanchard's lathe, etc. To accomplish all that this machine does automatically, most inventors would have used more than one machine. The fertility of mechanical resources brought to bear upon its construction is a remarkable example of the power of combination, characteristic of the highest order of inventive genius.
While we shall endeavor to give the reader a good general idea of the peculiar general idea of pecutiar culminating in the final and culminating in the final and firm irsertion of the bristles in the wood, leather, hard rubber, bone, or ivory backs, we shall be entirely unable to show, in our prescribed limits, the exact means by which each step in order is accomplished. To do this would require a multiplication of diagrams, for which we have not space. Our description will not, therefore, do justice to the mechanical beauty of the machine, which must be seen in operation to be fully appreciaration to be fully appreciated. In witnessing its working, the appreciative mechanic will be ready to share in the enthusiasm which compelled a bystander to ejaculate in our hear-
ing" that machine has a brain!"
Fig. 1 is a perspective view of the machine with all the parts in adjustment for work, the brush block being in position, and two of the holes having had bristles inserted in them.
The other figures are detailed representations of im . portant parts of the ma chine, which will be referred to below.
The first operation is the filling of the comb, A, with bristles. This comb is a plate of metal of uniform thickness. slotted so as to

flush but does not enter the hole in the brush block when the bunch of bristles is to be inserted; one bunch being put in at every descent of this part of the machine; which from its resemblance to a hook, we shall call by that name as we proceed.
As the hook rises, it forces its point between the pro per quantity of bristles for a bunch, and as the bristles cannot ascend they are obliged to move along the inclined portion, $E$, of the slot in the hook, and so ar rive at the bottom of th vertical portion $F$ of the they are acted upon Here plunger, $G$, plunger, G, Figs. 2, 3, and
4. The form of 4. The form of this plun ger is shown in Fig. 3. Its end has two slots, cross ing each other at right an gles when viewed end wise. One of these slots receives the bunch of bristles, as shown in Fig. 3 The other slot (H, Fig. 3) is only of a width to allow the passage of a wire which is destined to bind the bunch together and secure it in the block Th plunger is carried by in genious mechanion to in scend till it dounto de scend till it doubles the bristles into a loop at the middle. Other mechanism then unwinds the binding wire, I, Fig. 4, from a reel or spool, straightens the wire, passes a proper length through the slight ly enlarged upper portion of the slot, H, Fig. 3, and cuts off the length of wire required. The plunge then descends further now receiving as it descends rotary motion, on its tical axis which winds wire spirally by foristh into spirally by forcing it into the thead of a nu contained in the lower end of the hollow cylinder fastening it around the doubled end of the bunch of bristles. This spirally

## WOODBURY'S MACHINE FOR INSERTING BRISTLES IN BRUSH BACKS.

 wound wire is destined arrange them, so that when the comb is placed in the ma-| be a screw thread for the bunch of bristles as the latter is chine, one half of the length of the bristles appears above screwed into the hole in the block, J. Fig. 4. The lower end the comb, as shown, the other half extending downward. The comb is inserted in guideways, and is actuated by an are all along the distance of one tooth and space to bring another filled space into position. Whenever one comb is emptied another is made to follow it in the same guideways, the empty one being taken out at the opposite end of the guideways from that in which it was inserted. The operation is then precisely like what would be the case with an endless comb, the teeth of which should be filled in one part of the circuit before reaching the point of discharge.As the comb is actuated in the manner described, each space is brought successively to correspond with and form a part of a twisted way or channel, B, Fig. 2. An ingenious combination of devices then forces the oristles, as they are wanted, down through this twisted channel, holding them all the time at the middle and bringing them at last into a horizontal position, as shown in Fig. 2
At the end of,the channel, the plate which forms the upper wall is bifurcated, the ends of the bifurcations being turned of the wire acts as a tap, cutting a female screw in the hole of the block, which the spiral of the wire exactly fits. The upper cut end of the wire thread expands and engages with the material of the block, and acting as a pawl, prevents the unscrewing of the bunch, which is thus held with unequaled firmness and strength, so much so that to remove it from

very resisting material will require the block to be split. These operations proceed at the rate of from seventy to eighty bunches per minute
In order to bring the hole in the block exactly under the cone pointed hollow cylinder extending from the bottom of the hook, a guide, $K$, is employed which descends upon the block while the bristles are entering one of the holes. A slight movement of the guide by the operator causes the point of the guide to engage the next hole in the series. As
soon as the plunger rises, the guide automatically draws the ole it engages to the exact position required to receive th nextbunch.
We think the reader will agree with us that a machine that performs so many distinct movements harmoniously and, at the same time, has nothing flimsy or weak in its con struction, is a masterpiece of invention, and one which is doubtless destined to effect a complete revolution in the im portant industry of brush making. By its use, the diffi culty of making the bunches of uniform size and fastening them thoroughly in the block, as well as all other difficulties unsurmounted in other machines hitherto designed to accom plish the same purpose, are entirely overcome. The machine although including so many movements, is extremely simple nd compact, the space being most ingeniously economized The power required is very small. The table, S, Fig. 1, upon which the block is held, may be inclined at any angle and held by the notched arc, M, so that bristles may be inserted in blocks of any contour or pattern. Patented April 26,1870 and Dec. 27,1870 . For further information, address Wood bury Brush Machine Co., 30 Cortland street, New York Concerning European rights, address H. C. Covert, proprie Concerning European rights, address H. C. Covert, propre of H. E. Towle \& Co., 20 Budge Row, London.

## sumil.

The Moniteur Scientifique contains a paper by M. Papillon on this subject, having reference to recent discoveries in chemistry and physiology. We extract from it the following
The seat of the sense of smell is, as we know, in the lining membrane of the nostrils. This membrane has a mucous and rregular surface, over which spread a number of nerve with delicate terminations. It secretes a lubricating liquid By means of muscles, the apparatus of smell is dilated or contracted, like that of sight.
The mechanics of smell are, simply, the contact of odorous particles and the olfactory nerve. These particles are carried by the air into the nostrils. If, on the one hand, the nerve is injured, or even compressed: if, on the other, the air is prevented from passing into the nostrils, there is an absence of smell. The upper part of the nostrils is the most sensi tive as regards odor. The sense of smell varies much in dif ferent people. Some are entirely without it. Others are quite insensible to certain odors, a case similar to that of Daltonism, in which some eyes fail to perceive certain colors. t is recorded of a certain priest that he perceived no odors but those of smoke and decayed cabbage, and to anothe person vanilla seemed quite inodorous. Blumenbach speak f an Englishman who could not perceive the fragrance of mignonette.
smell is sometimes voluntary, sometimes involuntary. In the former case, to obtain a lively sensation, we close the mouth, and make a long inspiration, or a series of short and jerking ones. The muscles contract the orifices of the nostrils, and thus increase the intensity of the current of air. On the other hand, when we wish not to smell, we exspire through the nose, so as to drive away the odorous air, and inspire by the opened mouth.
Smell and odors are closoly connected with the phenomena of taste or gustation. Most savorsperceived by us arise from a combination of sensations of smell with those of tas e There are, indeed, only four primitive and radical kinds of by experiment. If we close our nostrils on tasting any sapid substance, the perceived taste will come under one or othe of these four heads. Thus, when the olfactory membrane is diseased, the savor of food is altered.
How do odorous substances act with reference to the mat er which separates them from the organ of smell? Prevost in 1799, showed that if an odorous body were put in a saucer full of water, the emanations from it agitated the molecule of the water visibly. These motions, of which camphor gives a very good example, have been recently studied by M Liégeois.
He found that some substances caused movements of gyra ion and translation over the water surface, similar to those of camphor. Of this class are benzoic acid, succinic acid, and orange bark. In the case of others, this motion ceases very snon, as they become encased in an oily layer over their sur face.
He thinks these motions are due, not to a disengagement of gas, causing something like recoil, but to the separation and rapid diffusion of the odorous particles in the water. The luid shows affixity for these. Similarly, a drop of oil falling n water sends out an infinite number of very small globules, which spread through the liquid, while the volume of the drop is not sensibly diminished. So with aromatic essences Though insoluble in water, the small odorous particles tend to disperse themselves in it. A small quantity of odorous powder will thus impart perfume to a large body of water.
It is these same odorous molecules which are carried to our nostrils. And the action of water is thought by M. Liégeois to assist in the formation of them. In the morning when the ground is moist, and the flowers are covered with dew drops, there is a large exhalation of perfume, and similarly after a shower of rain. In gustation, we have something an Alogous; the saliva is fitted to diffuse the odorant principle
by the motion of the tongue in the cavity of the mouth, this diffusion is promoted, for the surface of evaporation is en larged. Now, in the same way as the small particles diffuse themselives in water do they diffuse themselves in air, w
then becomes the vehicle carrying them to our nostrils.
Some odorous substances have a very great diffusibility Ambergris, newly cast on the shore, is smelt a long way off Bertholin states that the odor of rosemary off the Spanish coast is perceptible long before the land comes in sight. The degree of division of the particles is in some cases marve lous. A grain of musk will perfume an apartment for whole year without sensibly losing weight. Haller mentions having kept for forty years some pieces of paper perfumed with a grain of ambergris, and at the end of that time they till retained their odor
It is to be noted that the odorous particles are sent out, an he body emitting them does not act as a center of agitation giving rise to vibrations. It is thus a different case from
those of light and heat. The odor is the odorous molecule those of light and heat. The odor is the odorous molecule
itself; whereas light, as perceived, is not the luminous body. We cannot tell whether oxygen has some chemical influence on the particles, nor what kind of action takes place on con tact of the particle with the nerve, whether a mechanica gitation or a chemical decomposition. But the distinction of the senses into physical (sight, touch, and hearing) and chemical (taste and smell) is a just one. In the latter, con tact is always implied.
An able writer has recently tried to prove a kind of musi in odors. That is, different odors, according to him, affect he olfactory $\mathrm{n} \leftarrow$ rve in various degrees, corresponding to those in which sound affects the auditory nerve. Thus we may ave octaves odors. He enumerates various substance hat produce the same impression, but in different degrees; fo instance, these four, almond, heliotrope, vanilla, and clematis
By combination he obtains semi odors, corresponding to semi ones : forinstance, a rose with a geranium. He points out prin ples of harmony in perfumes corresponding to those in col ors, and thinks it possible to produce a desired perfume from mixture of others.
The theory is ingenious and worthy of attention, but it is open to grave objections. For the harmony in colors and sounds depends on exact numerical relations, which may be accurately determined; whereas, in the case of smell, the criterion is capricious and uncertain, and

## duce to formula what our sense reveal

There are many cases of hallucination as regards smell, nited, generally, with insanity on other points. Lunatics have been met with who constantly complained of a fetid
odor; others rejoiced in the most delicious, thoughimaginary, perfumes. M. Lelut tells of a patient, in the Salpêtrière, who was continually troubled with the smell of dead bodies, which e thought to have been buried in the establishment.
Capellini mentions the case of a lady who could not bear he smell of a rose, and fainted one day when a friend came in with one in her hand. Many other instances could be given. It seems to be well authenticated that in lunatic asylums hese delusions as to smell are very frequent.
The intensity and delicacy of the sense of smell vary in different individuals and races. In some it is wonderfully sensitive. Woodwart tells of a woman who predicted storms, everal hours in advance, from the sulphurous odor (due to zone probably) which she perceived in the air. A young merican, who was deaf, dumb, and blind, became a good botanist simply by the sense of smell. It is, however, in ome of the lower animals that we find the sense most highly eveloped, ruminants, pachydermous animals, and above all, arnivorous mammifers. Smell is, with some of them, like an eye, which sees objects, not only where they are but
where they have been. The keen scent of the dog is well where th.
known.
Humboldt mentions that when, in his travels in South America, it was desired to attract condors, all they had to do was to slaughter an ox or a horse, and in a short time the dor attracted a number of these birds, though none were visible previously. Of birds, waders have the largest olfac ory 1

The oifactory organ in reptiles is large. Fishes also have olfactory membrane, and fishermen have observed that hey are driven away when certain odorous substances are rown into the water. Sharks and other voracious fishe ften gather from great distances when a carcass is thrown nto the sea. Crustaceans are not insensible to e
Entomologists say that the sense of smell in insects is ver ubtle, but it is difficult to determine the seat of it. When meat is exposed in the air, flies soon appear in great numbers, though none were seen before. The carcases of animals left thegroundatract hosts of insects, whichil often happen hen the object is concealed, so that their search cannot be guided by sight.
The fower of the cuckoo fruit gives forth a fetid odor, and number of flies and other insects are often seen moving bout on the corolla, in search, it is said, of decayed matter


How Long should a Man Stict to his Engine? A correspondent of the Locomotive Engineers' Journal, writ ing from Rutland, Vt., speaking of the duty and extent of the responsibility of an engine man in case of accident, says "Where an accident takes place, such as going down the dump or colliding with another train-a bridgemay be gone culvert washed away-he may see the fatal leap; I ask you

and plunge with my engine into certain and dreadfu death? Is there anything brave about it? Have you no
responsibilities here on earth, no matter if you have ten cars responsibilities here on earth, no matter if you have ten cars
loaded with passengers that must follow the engine as the ase may be? Now I consider an engineer's responsibilit ceases, in such cases, when he has sounded his whistle prop orly and reversed his engine, opened his throttle, pulled open is sand box. He has done his wiole duty to God and man as far as he can to stop the train, and if he has time and op portunity, if he is true to himself, he will try to get off and not go down to the bottom calling for brakes. Many engineers go down and collide and are killed, for the reason they do not have time after doing their duty. I never should feel as if a man was fit to run an engine if he had not courage to do his wholeduty. But after he his stood to his post and don ll that has been put into his hands to do, then I say he is a man that will try and save his own life."

Two Miles of Track Laid in One Night.
The new Baltimore and Potomac Railway, which Colonel Thomas Scott and the Pennsylvania Central are now build ing as a rival to the Baltimore and Ohio, a through line be ween the East and Washington, was completed through to Baltimore last week in a novel and characteristic manner The opponents of the road, having failed in all other expedi ents, had determined to get out an injunction to prevent it passage through Baltimore. Their project becoming known to the officers of the company, all hands-some 300-were massed from all along the line, and, as soon as the court ad ourned on Monday, work was begun in earnest in construc ing the road and laying the track through the city. Night set ing in, they were returded a little; but the moon soon came out, and they went on the same as ever. At twelve o'clock nearly half the track was completed, and the men, tired and hungry from their excessive labor, pitched into four wagon oads of provisions, that had been brought along, with a fine lish. Work was renewed with vigor, and before nine o'clock in the morning-the time when it was supposed the injunction was to hate been made-the last spike had been driven. The distance of the track laid was about two miles, and crossed three streets, Calverton Road, Franklin and Townsend. At the two latter, double tracks were laid. The hands belonging on the lower section of the road embarked n the train for their quarters, and they moved off amid a chorus of yells and screaming of engine whistles.

## Improvement in Street Watering

An official trial lately took place at Hyde Park Corner Knightsbridge, Eng., of the system for watering streets, pub ic parks, and market gardens, patented by Messrs. Isaac Brown \& Co., Edinburgh. The patented apparatue was shown pon the drive at the east end of Rotten Row, Hyde Park and upon one of the large enclosed flower plots, which has been fitted with it by order of Mr. Ayrton, her Majesty's First Commissioner of Works. In one of the illustrations of the new mode of road watering, one and one half inch lead pipes are laid along close to each kerb stone, these subordinate pipes being supplied from the mains. At intervals of about two feet apart, the pipes are drilled with small holes of from sixteenth to a thirty second of an inch, in groups of three ach of which is pierced at a different angle. These aper ures from the pipes command the complete road, which a he place where they are exhibited is about nineteen yards wide. The water is, of course, supplied under pressure, with a head of about 100 feet, and a shower of a quarter of a mile in length can be commanded with a one and one half inch pipe. The other experiment for road watering was by a
central pipe in the middle of the road, which throws its jets central pipe in the middle of the road, which throws its jets towards the kerb stones. The pipes are protected by shields, and provision is made for the surface water being sent past the sides of the pipe to the bottom, where it finds a passage The central pipe is of course upon the crown of the road, and is protected by an asphalt covering. Anapparent objection may be that the small apertures may get choked up by the débris of the roads. In practice, however, this is found not to be the case, as the pressure of the water, when it is pu on, keeps the drilled holes open. In winter, when there is the danger of freezing, the watering pipes are kept empty hich is not found to be a matter of much practical difficulty

The Origin of Metalliferous Deposits
Great deposits of iron ore, says Professor T. Sterry Hunt enerally occur in the shape of beds, although waters hold ing the compounds of iron in solution have, in some cases, deposited them in fissures or openings in the rocks, forming rue veins of ore.
The chemical history of iron is peculiar, since iron requires reducing matters to bring it into solution, and since it may be recipitated alike by oxidation and by farther reduction, pro vided sulphates are present. The metals copper, lead, and silver, on the contrary, form compounds more or less soluble in water, from which they are not precipitated by oxygen but only by reducing agents, which may separate them in some cases in a metallic state, but more frequently as sul phides. The solubility of thesalts and oxides of these met als in water is such that they are found in many mineral springs, in the waters that flow from certain mines, and in the ocean itself, waters of which have been found to contain copper, silver, and lead. Why then do not these metals accu mulate in the sea, as the salts of soda have done during long ages? The direct agency of organic life again comes into play, precisely as in the case of phosphorus, iodine, and pot ash. Marine plants, which absorb these from the sea water, take up at the same time the metals just named, traces of all of which are found in the ashes of sea weeds. Copper moreover, is met with in notable quantities in the blood of many marine molluscous animals, to which it may be as ne-
cessary as iron is to our own bodies. Indeed, the blood of man and of the higher animals appears never to be without traces of copper as well as iron.
Water, as we have seen, is a universal solvent, and the matters which it may bring and deposit in the fissures of the earth are very curious. There is scarcely a spar or an ore to be met with in the stratified rocks that is not also found in some of these veinstones, which are often very heterogeneous in composition. In some veins we find the elements of limestone or of granite, and these often include the gems, such as amethyst, topaz, garnet, hyacinth, emerald, and sap phire; while others abound in native metals, or in metallic oxides or sulphides. The nature of the materials thus depos ited depends very much on conditions of temperature and of preasure, which affect the solvent power of the liquid, and still more upon the nature of the adjacent rocks and of the waters permeating them.
We are apt in explaining the appearances of the earth's crust to refer the formation of ore beds and veins to some distant and remote period when conditions very unlike the present prevailed, when great convulsions took place and mysterious forces were at work. Yet the same chemical and physical laws are now, as then, at work ; in one part dissolving the iron from the sediments and forming ore beds, in another separating the rarer metals from the ocean's waters while in still other regions the consolidated and formed sedi ments are permeated by heated waters, to which they give up their metallic matters, to be subsequently deposited in veins These forces are always in operation, rearranging the chaotic admixture of elements which results from the constant change and decay around us. The laws which the First Great Cause imposed upon this material universe on the first day are still irresistibly at work fashioning its present order One great design and purpose is seen to bind in necessary harmony the operations of the mineral with those of the veg etable and animal worlds, and to make all of these contrib ute to that terrestrial circulation which maintains the life o our mother earth.
PHENOMENA ASSOCIATED WITH A HYDROGEN FLAME
Phenomena of much interest, and possibly of future use fulness, are associated with the combustion of ordinary hy drogen.

1. To study these phenomena free from disturbing causes, three things should be attended to, although the effects to be described can be obtained without any special precaution (1) The gas must be stored and purified in the ordinary way namely, by passiog into a glass holder through a solution o potash, and then through a solution of perchloride of mercu ry or nitrate of silver. (2) From the holder, the gas must be led through red or black india rubber tubing to a platinum or, better, a steatite jet. (3) And then the gas should be burnt in a perfectly dark room, and amid calm and dustless ris
2. In this way, the flame gives a faint reddish brown color, invisible in bright daylight. Issuing from a narrow jet in a dark room, a stream of luminosity, more than six times the length of the flame, is seen to stretch upwards from the burning hydrogen. This weird appearance is probably caused by the swifter flow of the particles of gas in the center of the tube. The central particles as they shoot upward are pro tected awhile by their neighbors; metaphorically they are hindered from entering the fiery ordeal which dooms them finally to a watery grave. Dr. Tyndall has shown that the
radiation from burning bydrogen is hugely ultra-red, and radiation from burning bydrogen is hugely ultra-red, and
moreover, that it has not the quality of the radiation from an moreover, that it has not the quality of the radiation from an
elementary body like hydrogen, but practically is found to Le the radiation from molecules of incardescent steam. So that, except at its base a hydrogen flame is a hollow stream of glowing water raised to a prodigious heat.
3. Bringing the flame into contact with solid bodies, in many cases phosphorescent effects are produced. Thus, al lowing the flame to play for a moment on sand paper and then promptly extinguishing the gas, a vivid green phosphorescence remains for some seconds. The appearance is a beautiful one, as a luminous and perfect section of the hollow flame is depicted. Similar phosphorescence is produced by the flame on white writing paper, or on marble, or chalk, or granite, or gypsum, etc. But no such effect is produced by coal gas, or olefiant or marsh gas. It is evidently a ques tion of temperature, as oxygen driven through coal gas shows the phosphorescence well.
Far exceeding in generality the effect just noticed is a really magnificent blue image of the flame that starts up on almost every substance with which the flame is brought into contact. I have already drawn attention to this effect in the Philosophical Magazine for November, 1865, and the same effect has more recently formed the subject of a me moir, presented to M. Wurtz, of the Paris Academy of Sciences, the author of that paper evidently being unaw The appearance is follows: When the hydrogen flame is brought either vertically or sideways, say upon a white plate or a block of marble, there instantly appears a deep blue and glowing impression of the exact size and shape of the hollow flame. The moment the gas is extinguished, or the flame removed to the slightest distance from the solid the effect as instantly ceases. If the flame be brought suc cessively to the same spot on the solid, the effect grows fainter and finally vanishes, but instantly reappears upon an adjoining portion.
Other combustible gases, such as carbonic oxide, or marsh gas, or olefiant, or coal gas, do not yield this effect, nor does any lamp flame, luminous or otherwise; nor is it obtained in perfectly produced in the reducing flame when coal gas is
used; it is not seen when oxygen is driven through coal gas unless the latter be in excess; and it is poorer and vanishes more quickly with the oxylydrogen flame than with hydro gen alone. This blue luminosity is therefore, not a question of heat, but some oroperty depending either on $(a)$ the chem. ical nature of hydrogen, or on (b) the physical effect of its radiation. At first I thought it was the latter, and that it was a new form of fluorescence, so closely did it resemble those phenomena. But after a weeks' incessant experimenting the true cause was hunted down and found to be dependent on the former effect ( $\alpha$ ), and in every case ultimately due to the presance of sulphur. A chemically clean body, or a freshly broken surface, did not show the blue coloration; but after exposure for a short time to the air of London, the sub tance invariably yielded the blueness; this, however, was not the case when the clean surface was covered by a shade, or exposed to the air of the open country. The combustion f coal gas and coal fires yields sulphate of ammonia, a body often deposited in acicular crystals in the glass tube in a
laboratory. Sulphate of ammonia is decomposed by a hydroen flame, and when that salt is brought into contact with burning hydrogen, it permanently yields the blue colores ence. Hence this body is the main source of the blueness seen whenever a hydrogen flame comes into contact with glass tubes or a dirty surface. The effect must repeatedly have been seen by every one who has experimented on sing ing flames.
When the blueness, as is so often the case, is seen tinging the tlame itself, without contact with any body, the sulphur is derived either from the vulcanized tubing, the dust of which is taken $u_{2}$ by the passing gas, or, it the hydrogen be burnt from the bottle generating it, the blueness is due to he decomposition of the sulphuric acid spray, as will be shown further on.
As achemical re-agent for detecting sulphur, the delicacy of a bydrogen flame is extraordinary. This fact was esti mated as follows: Pure precipitated silica yields no blue ness with the flame; 500 grains of silica were intimately mingled with one grain of milk of sulphur. Less than one hundredth of a grain of this mixture was thrown on the surface of pure water or placed upon chemically clean platinum foil. The water is best, but in either case the blue color (absent before) now shot forth on bringing the hydrogen flame down. Tried again and again with fresh portions, the effect was very evident, but quickly vanished. The sulphur in a similar portion of the mixture could not be detected hemically by nitro prusside of sodium. The wonderful sen itiveness of the flame may be still better seen in anothe way. Immediately after washing, the fingers show no color when brought for a noment into the flame, but if a white ndia rubber tube be touched ever so lightly, the fingers not
nly show a vivid blueness, but for some time any clean only show a vivid blueness, but for some time any clean ob ject touched by them, such as platinum foil, shows traces of sulphur by the appearance of the blue coloration with the flame. A.block of melting ice continually weeps itself free rom dust, and thus presents an excellent surface upon which to try the foregoing experiment. Or a plate of plati num, after heating to redness, may be written over with a stick of sulphur. If kept covered, the invisible letters may long after be traced out by sweeping the hydrogen flame over he surface of the platinum.
Examined through a prism, the blueness derived from any ource shows blue and green bands, similar to the spectrum f sulphur, but I have noticed algo a red band. This mode f obtaining a sulphur spectrum suggests further inquiry hite marble smeared over with a bit of sulphur, or with ulcanized rubber tubing, is a convenient source for obtaining the effect at pleasure.
Some sulphates and sulphides show the blueness with the flame, and are evidently composed by the hydrogen. Thus sulphate of soda gives no blue appearance, while sulphate of mmonia, or alum, does.
Various liquids were tried in contact with the flame. Sulphuric acid was very notable. Here a magnificent blue ffect was observed. For persistence and brilliancy of the the color, this experiment leaves nothing to be desired spectrum is very fine. If the liquidis in a glass dish when the flame is brought vertically
ghts up the glass in a lovely manner
4. But the presence of sulphur is by no means the only phorus is detected by the production of a vivid green light. It is striking to notice the wonderful sul division of matter in these experiments, and how an immeasurable trace of an
element can evoke pronounced and disproportionate effects. Might not this ready detection of minute quantities of sulMight not this ready detection of minute quantities of sut phur and phosphorus be of use in the manufacture of iron and might not hydrogen introduced into the molten metal employed for the removal of
5. Among the range of substances I have tried, tin was was found to gield the most conspicuous effect, after the bodies named. A fine scarlet color is almost instantly prouced when the hydrogen Hame is brought into contact with n or any alloy of tin. Tin is somewhat volatile, and its pectrum is rich in red rays. The tin must be clean; or the A charming experiment may be made by partially scraping soiled surface of tin; the blue and the scarlet colors mingle and a lovely purple is the result. Wben a trace of phosphorus is present, there may be obtained a green belt encir-
cling a rich blue, then a purple zone, and finally a glowing scarlet at the root of the flame. These colors, it must be remembered, are not imparted to the flame, but reside on the surface of the body which the flame touches. And where the combustion of the hydrogen is complete, as in the upper
part of the flame, or in the luminous stream referved to (2), these effects are not produced: they are best developed at the root of the flame.
6. Passing from liquids and solids, I next tried gases in contact with the flame of hydrogen. Many gases imparted a color to the flame, but, here the effect was different to that previously noticed. The whole flame was tinged with the color imparted to it. A mere trace of hydrochloric acid gas imparts a reddish brown to the flame; ammonia gas gives a yellow, and burns freely. It is striking to note the combustion of ammonia gas rising from an unstopped bottle that contai
flame.
ame.
But carbonic acid gas yields the most striking resmit in contact with the flame. A pale lilac tinge is instantly produced by a stream of this gas. This, I imagine, is due to the decomposition of the carbonic acid by the hydrogen, and the production and combustion of carbonic oxide. For it is at
the lower part of the flame that the effect is most marked. the lower part of the flame that the effect is most marked.
One per cent of pure carbonic acid, admitted to a jar of air, can be detected on holding the jar over the flame. The breath, of course, shows the effect most strikingly.
7. Here then is an eminently practical method of noting the presence of vitiated air in rooms or public buildings. A continuous hydrogen apparatus might be employed with a wash bulb attached. The tlame might be burnt from a brase burner or lava jet, placed within a blackened tin cylinder. Opposite the flame a lole might be pierced in the cylinder and closed by a lens for better viewing the flame within. As soon as the atmosphere in a room becomes uupleasantly vitiated, the flame would indicate the fact by its changed color. A similar apparatus might likewise be emoloyed by miners, in metal mines as a warning against impure air, and in coal mines as a detector of fire damp. In this latter case the ends of the cylinder could be covered with wire gauze.

## Irrigation Canal of the whone.

The proper irrigation of the four departments of France, the Drôme, Garde, Hérault, and Vaucluse, has been for many years under consideration, and at last the Minister of Public Works has granted a credit of small amount for the necessary preliminary steps to be taken to carry out the plans of M . Aris ide Dumont, Engineer in Chief of Ponts et Chaussées, who proposes to cut a canal for irrigation from the Rhone t Condrieu, to Mornas.
The length of the canal from its source to Morass will be bout one hundred and twelve miles; all the towns by which it passes can be supplied with water, and it is anticipated that many new factories will spring up in consequence From a reservoir at Mornas, the canal passes to the right bank of the Rhone by means of a siphon aqueduct. After passing Uyés through a tunnel more than three miles long, it reaches Montpellier at the hisht of 180 feet above the level of the sea, irrigating the whole of the environs of this town by means of numerous channels which will distribate the water over the vast plains, which suffer terribly and frequent ly from drought, that lie between Montpellier and the sea.
The amount of water to be taken from the Rhone at it: nwest level is set down at 33 tuns per second, but during about half the year the volume will be increased to 40 or 45 tuns.
The distribution is calculated in the following proportions: 20 tuns for agricultural irrigation, 10 for irrigation in the vicinity of towns, and 3 tuns for evaporation and loss.
The great importance of this canal consists in the fact that while in the summer all the other rivers in the South of France are nearly dry, the Rhone, being fed by the snow and glaciers of the Alps, pours a grand stream into the sea, which would make the fortune of agriculture. At extreme low water, this noble river passes Lyons at the rate of 235 tuns per second, Tournon at the rate of 310 tuns, Valence at 410 , Avignon at 450, and Beaucuire at the rate of 530 tuns per second. At average states of the river, the flow at the spot where the canal is to commence is equal to more than 600 tuns per second; there is little fear then of ex hausting such a supply as this, and it is asserted that the abstraction of the volume of water above named will have no effect, even upon the shallowest parts.
The estimated cost of this important work is equal to ten millions of dollars for the formation of the canal and its distributing conduits, and the time required for its execution. is three years.
The great hight of the source of this proposed caval will allow the itrigation to be carried to poor dry lands on the slopes of the hills, and thas greatly increase their value and the author of the plan sets down the increased value of such lands at about sixty dollars.
Grand as this scheme is, there is nothing extraordinary or even novel in it; the canal of the Muzza takes 77 tuns of water per second from the Adda, and the grand canal of the Techino, 48 tuns par second from that river.
The great quantity of water proposed to be taken from the Rhone will require the canal to be very little larger than an ordinary one for navigation.

Restoring Waste Rubber.-Among the recent patent xtensions is that of Baschnagel's patent of 1858, for restoring waste vulcanized rubber. The invention consists in suh.
jecting the old rubber to a heat of from $150^{\circ}$ to $600^{\circ} \mathrm{F}$, eitber jecting the old rubber to a heat of from $150^{\circ}$ to $600^{\circ} \mathrm{F}$, eitber
with or without immersion in water or other cooling liquid, with or without immersion in water or other cooling liquid.
This process so restores the qualities of the gum that it can. be used again in the manufacture of rubber goods.

The density of the four satellites of Jupiter has been asplanet itself.

## CINCINNATI

In the city of Cincinnati we are afforded an excellent ex ample of the rapid rise and growth of our Western towns In the year 1800, four hundred people were settled there, in a small straggling, unpromising village, and surrounded by an uncultivated wilderness.
Great natural advantages attach to the site, which is peculiarly favorable to commerce and health. Lying on a nattural plateau nearly twelve miles in circumference, which is surrounded by hills three hundred feet high and through which the Ohio river flows, it affords a large variety of position and scenery, while tion and scenery, while the situation of the city enables it to collect within itself the raw material of mines and forests, and other productions of a large extent of surrounding country, and to redistribute them after they have undergone the process of manufacture or been otherwise prepared for market.
It was estimated, in 1859, that the river imports and exports must have reached nearly $\$ 100,000,000$,and thepresent increased prosperity of the city is perhaps best evidenced in the number of its public schools, libraries, etc., and the development of a taste forimproved architecture, all of which have been much aided by the greatliberality of by the greatlote citizens. Among the benefactors Among the benefactors are numbered Messrs. Davidson \& Probasco, the well known merchants. That they have assisted the advancement of their city with no stinted bands, is proved by the present they have lattly made of the magniflcent fountain shown in our illustration.

## Wooden Railways

Wooden Railways
The substitution of The substitution of
timber for iron perma timber for iron perma
nent way, wh*ch constinent way, whech consti-
tutes the great feature tutes the great feature of the Canadian wooden
railways, is due to Mr . railways, is due to Mr .
'J. B. Hulbert, an American engineer. After a short line, 6 miles in length, had been built and worked for a considerable time, another was commenced $47 \frac{1}{2}$ miles long, between Carthage (New York) and Harrisville, and was opened ville, and was opene for traffic in 1868.

In addition to this, a third line was laid down in Canada, in the pro vince of Quebec, and known as the Qutbec and Gosford wooden railway. This line is

26 miled long, but next
next year its extension for 100 miles is intended. Another, the Sorrel, Drummond, and Arthabasca Counties railway, 60 miles long is finished, and several short branches are about to be made next spring, whilst the Levis and in progress. This line will also be 60 miles in length, wi,h 40 miles of ex. tension to be made at a future time.
Tae traffic upon all of these lines is of course very light, and would noc have warranted the con-truction of the cheapest po sible form of railway in which iron permanent way was employed; nevertheless three through trains a day are, on an average, run over the railways already opened, and carry passengers and freight at least equal to what is conveyed over many lines upon waich a large construction capi tal has been exp. nded. Moreover, a fair speed, varying from 18 to 20 miles an bour for passenger trains, and from 12 to 16 miles for freight trains, can always be secured, and the amount of adhesion with the 30 tun engines now running, is sufficient to take any required load up the gradients which are severe. Thus on one of the lines, where 20 tun en gines are employed, from 60 to 80 tuns can be taken up gradients of 1 in 60 , whilst there is no difficulty, on far steeper inclines of 1 in 21 , in taking up 20 tun trains with engines weighing 14 tuns. Experience has also shown that the
wooden rails remain in at least as good a condition in winter as iron ones; and with the use of the snow plough, there need be no check to the traffic, even when the snow lies on the ground to a depth of 3 or 4 feet.

## Screw Propeller.

An improvement in the design and construction of the blades of screw propellers, for steam vessels, has lately been atented by Hermann Hirsch, London.
This is intended to remedy the great vibration, produced by ordinary screw propellers, by obtaining the best effect in con
verting the force given out in rotation into a pressure direct-


## OUNTAIN PRESENTED TO THE CITY OF CINCINNATI

ed in the line of the axis, so as to produce a maximum amount of longitudinal pressure as useful effect for propul sion. To obtain such maximum of useful effect, the im screw propeller, or each blade of the same, is so direction the direction in which the water yields will be a the axial line of the propeller; and consequently opposed to the centritugal action which the rotary motion of the blades tend to impart to the water. Thus this curvature of the tends to impart to the water. Thus this curvature of the blade counteracts the centrifugal action, and so utiliz
propulsion the power that would otherwise be wasted. propulsion the power that would otherwise be wasted.
The effect will be to drive the water in a cylindrical umo aft in an axial direction relative to the screw, thereby producing the most dirtct and economical application of the power appli-d to the propeller, and at the same time avoiding vibration and increasing the efficiency of the rudder by surrounding it with a column of unbroken water, thrown di rectly against it with considerable velocity.

The Sewing Machine and its Attachments.
We have just inspected an advance copy of a book entitled "Sewing Machine Attachments," published by G. W. Greory, Esq. Examiner of Sewing Machines and Textile Manu factures, United States Patent Office, Washington, D. C.

Mr Gregory has collected in his work the claims of all the patents for sewing machine attachments to January 1, 1872 nearly 400), has given a description of each, with the claims in force, with a photo-lithographic drawing, and has also added rejected cases open to public inspection January 1, 1872, and English patents on like subjects. This compilation, the first of its kind, has been prepared with much care, and will prove a most valuable work for persons in any way connected with sewing machines, either as attorneys, manu facturers, inventors, or dealers. Price $\$ 25$.

The Prospective Supply of Pig Iron
While there is, naturally, some diversity of opinion with re gard to the probable course of the iron mar ket within the next twelve months, we think it safe to con clude, from all ind cations, that both pro duction and consump dion will show a tion will show a marked increase be fore the end of anoth
er year. Owing to er year. Owing to
the present scarcity of the present scarcity of
iron in the market iron in the market,
and the high price demanded and obtained by the furnaces, there is, just now, a tempo rary falling off in the consumptive demand this is particularly noticeable in the case of rails, the high price of iron having forced many of the rail mills to suspend operations, to suspend operations, because rails canno
now be marketed at remunerative prices, since, as compared with pig iron, they are relatively cheap. There has also been a noticeable curtailment of consumption in other ways, bu this cannot be othe than temporary. Iron is an article in which there can be no economy of consumption. Just so much is need ed, and if it is not supplied this year, $i$ supplied this year, it must be next year. If
we build a less mileage this year because rails are high,we shal make the more rapid progress when rails become cheaper.
Thus, while the con sumptios may fluctu ate from year to ypar, the percentage of in crease must be and will be maintained. It need notbeinferred therefore, that because there isjust now a curtailment of consumption, there is less encouragement to in crease the supply than when the inquiry was more active, the consumption greater, and the supply more abundant. On the contrary, the fact that consumers are now compelled to limit their purchases, to the supplying of their immediate and imperative requirements, gives assurance of a greater and more pressing demand in the immediate future; and no better opportunity was ever offered for startiag new furnaces, wherever coal and iron can be had, than that which now presents itself. Great as it was last year, the consumption of iron in the United States is capable of indefinite expansion.-Iron Age.

A New Light.-At a recent meetiug of the Inventors. Institute, Mr. M. M. Harris, member of the council, in the chair, Mr. Carl Molchin, a native of Hamburg, exhibited lamps burning a new compound oil to be used for lighting purposes, which was found to afford a steady, even light, very closely approximsting in power, clearness, brilliancy, and intensity to the electric light, at a cost somewhat less than that of colza oil. It resulted from experiments made with this oil, burnt in a moderator lamp, that a light of $17 \frac{1}{2}$ spermaceti candles was obtained. This light is considered as very valuable for light houses, railway signals, railway carriages, and other purposes, and received the hearty approval of those present at the meeting, opinions being expressed that its use would mark a new era in artificial light.

## carriage wheel.

The great difficulty in effecting real improvements on th ordinary carriage wheel has lain in the seeming impossibili ty of retaining the elasticity which is so great a point of ex cellence in the common wheel. Mr. James O'Connor, of Jackson, Mo., has invented and lately patented an improved wheel which appears to overcome this difficulty. Our engraving illustrates the invention.
The first object the inventor had in view was to prevent the spokes working loose when subjected to lateral strain which sometimes gives rise to serious accidents. This is ac which sometimes gives rise to serious accide
complished by working the mortises in the hub of a double dovetail form, as shown at A. Fig. 1, and by shaping the tenons on the spokes to correspond, as shown at B, Fig. 4 The tenons are made slightly larger than the mortises, so as to fit tightly. In the common form of joint, the whole force o any lateral strain is exerted on the end walls of the mortises, and if the tenon is shrunk in the least, it easily works loose. In the form shown, the sides of the dovetails ar made to bear a great part of the latera train as well as the end walls, which o curse renders the hold on the spoke muc more stable. The shoulders of the spoke est on the hub on the divisions between the mortises, and may be slightly beveled so hat they may fit close to and support each other, as shown in Fig. 2. The strength of his joint in resisting lateral strain has been experimentally compared with that of the old, and found to be as seven to one.
The second part of the invention consists in forming the hub band with a shallow groove in its inner face, as shown in the sectional view of the same, at C, Fig. 3, and
in putting the bands on to the hubs after the metal of which they are composed has been heated. As the metal shrinks in cooling, it becomes imbedded in the wool on each side of the groove, and thereby forms a rib on the hub which fits into the groove. The bands are thus very securely fixed on the hub and remain so under ali ordinary circumstances.
It is claimed that the elasticity of the common wheel is attained in this improvement, together with an increase of strength and durability, and a beauty of form, which gives it great superiority over the former. The mode of construc tion will apply admirably in heavy work, as the larger the surface of the tenon is, the greater will be the strength gained
For information regarding rights to manufacture, Messrs O'Connor \& Davis, of Jackson, Cape Girardeau Co., Mo., may be addressed.
BRICK AND MORTAR ELEVATOR AND DISTRIBUTOR.
Our engraving represents a machine of considerable valu or building purposes, which is designed more especially to upersede the labor of hod carrying. By its means the then distributed among the laborers for use.
The plan, construction, and operation of the mahine will readily be understood from an examiation of the engraving. A frame, containing the driving drum, etc., is secured in position on the ground, and a second frame, which carries a shaft and pulleys corresponding with the drum, is secured on the scaffold or platform to which it is intended to have the bricks and mortar elevated. The drum below and pulleys above are connected by endless chains, the links of which fit between and engage with lugs which project from the faces of the drum and pulleys, in such a manner that no slip can take place. To these endless chains are attached buckets which carry up the bricks and attacked The upper pulley shaft is bred in an mortar. The upper pulley shaft is geared in an appropriate manner to a drum which drives the distributing apparatus. This latter consists of the drum mentioned and ancther, which are placed
at any required distance apart, and upon which is run an endless band by which the bricks and mortar are carried along. The band is composed of boards placed side by side and hinged together. The operation of the machine is as follows: Upon the driving drum being operated by the winch, the buckets of the elevator, which are filled by the attendant laborers, are carried up. At the same time the rotation of the upper pulley shaft sets the drum of the distributing apparatus in motion, and the endless belt is kept moving from one side of the building to the other. When the full buckets arrive at the top, they are necessarily turned over by the action of the machinery, and deposit their contents on the moving belt beneath. A wide board is placed behind the belt at this point, which prevents either bricks or mortar falling over, and in front the descending buckets are made to pass so close to a kind of scraper set there as to insure their contents being lodged on the belt. The bricks and mortar are carried by the belt across the building, and are thus distributed among the workmen. A barrier is placed across the belt, as shown, to arrest the progress of the load and prevent any part of it being carried over the end drum. The machine is also particularly useful in taking the material out of cellars while they are being dug, in which case it may be made to dump it directly into a cart. There is no doubt that wherever its services can be employed it will prove itsolf a great labor saver.

Thcinventor and patentee, Mr. Thomas Shanks, is willing to dispose of the whole or part of his rights, and further information on the subject may be obtained by addressing him corner Lombard and Sharp streets, Baltimore, Md.

Tunnelling by Diamond Boring Machine. The diamond boring machine, of the company of which aptain Beaumont, R. E., M. P., is chairman, has been achiev ing great triumphs in the Cleveland district, in Lancashire umberland, and other northern counties where it has been ployed in "prospecting" for coal and ironstone. At tanghow, in Cleveland, the borer recently reached a dept


O'CONNOR'S CARRIAGE WHEEL. of 689 ft . in two months; that could not have been got at in ployed at the Clifton tunnel on the Bristol Port and Channel Dock Railway. The tunnel, which is under Durdham Downs, is more than a mile long, and through hard mountain limestone. The heading is 10 ft . by 8 ft ., into which the machine drills six holes of about 4 it . deep at a time. A core of about an inch diameter is brought out of each boring, showing ex actly the material gone through. The drills made from 180 to 200 revolutions per minute, and advance about 2 inches in hat time. The outside diameter of the boring is about 2 inches. Hand labor was employed at first in drilling the heading. It has been ascertained that the machine advances at about five times the speed that could be attained by as many men as could find room to work. The drill holes are in perpendicular rows, and the first blast is a wedged shaped piece taken out of the middle of the section. Dynamite is employed for blasting, and is found to answer the purpose admirably. The machine is so constructed that the drills command every part of the face of the heading, and the


SHANKS' ELEVATOR AND DISTRIBUTOR.
holes can be bored at any angle. Jets of water, under about 30 lb . pressure, are forced into each boring, and wash out the dêbris. The feed motion, which may be made absolute, is regulated by sensitive friction gear that indicates extra resistance. Compressed air is employed as a motor, but not, of course, for percussive action, as in the Mont Cenis Tunnel. The air engine has a 24 inch steam and 18 inch air cylinder, and a 4 ft . stroke. The engine in the tunnel, upon which the air acts, and that, in its turn, gives motion to the drills, has a 13 inch cylinder and 12 inch stroke. The engine is worked by the compressed air, and is similar in construction and action to an ordinary steam engine. We believe that the diamond drill machine is to be employed experimentally upon the St. Gothard Alpine tunnel, and will be entrusted with the entire work should the experiment prove satisfactory, which there is little or no reason to doubt it will. - Engineer.

## Paper Shields.

The possibility of employing paper as a material for the armor plating of vessels occupied the attention of many more or less ingenious inventors when the revolution in the con struction of heavy artillery brought with it the necessity fo total change in the science of naval defence; but, in this country at least, no successful results have been attained, nd the advocates of these schemes have allowed them to drop, in common with many others who, even more imagi ative and less practical, have from time to time proposed to rotect the sides of ships with all kinds of foreign bodies, rarying from cotton bales to sugar canes, and more recently, as we have lately seen, with cork.
On the Continent, however, and especially in Italy, the idea that properly prepared fab rics may be employed successfully as armor plating material has never been abandoned and so early as 1860, Signor Muratori, a colonel in the Italian army, commenced investigations and experiments upon the subject, which he has prosecuted ever since. In 1862, the attention of Victor Emmanuel was drawn to the results he had achieved, and which had ob tained the approval of a body of officers in the Italian army. About the same time General Griffini published a pamphlet, in which he ex pressed his favorable opinion of Colonel Muratori's invention, and recorded all the results of the trials which had been officially conduct ed, and which satisfactorily proved the great power of resistance which the material off9red. In 1868 the matter was submitted to the no tice of the Emperor Napoleon, who caused experiments to be conducted at Chalons, the results of which confirmed the earlier official trials made in Italy. The French report, indeed, speaks in very sanguine terms of the invention, and indicates the manner in which it could be utilized for the protection of vessels. After some delay, further trials were commenced, but before any action was taken, war with Germany was declared, and this matter, in common with a thousand others, was swept aside to make way for the pressing requirements of the time
Colonel Muratori, who is now in England, is, we be lieve, making arrangements for an exhaustive trial of the armor, which has been approved of by several naval officers who have seen it, and who express an opinion that most val uable service may be rendered by it. One successful application certainly has already been made by the inventor, namely, in the construction of cuirasses, which, weighing the same as the ordinary service cuirass and costing less than one fifth as much, has nevertheless a far greater power of resistance. We have seen it turn a regulation pistol bullet fred from a distance of three feet, and it is equally capable of resisting a bayonent thrust.
By a modification of the process, fabrics suitable for miliary gaiters are endued with a singular power of resistance, and are thus invaluable in action, by protecting the wearers from spent balls or sword cuts.
While we refrain from advancing any opinion upon the more extended application of this process for defence against heavy guns, we speak with confidence as to its efficiency for the military purposes we have alluded to, although the Italian experiments, and later, those at Chalons, seem to point to a wider and more important use. And it appears to us as possible that this armor plating of cemented fabric may be found of service in protecting the bottoms of vessels from the explosion of torpedoes, combining, as it does, great lightness and power of resist-ance.-Engineering

Shade Trees.
No native tree we have is better adapted to the purposes of shade and ornament than the sugar maple. Its foliage is full and dense, and its form is that of a rounded cone of beautiful proportions. It is also clean and free from insect enemies. It would be well if, in planting shade trees on our streets, there could be a suitable alternation of different kinds, some of rapid growth for temporary use, and others for permanence. Some attention should also be paid to variety. Probably the very best trees for general street planting are the different varieties of the maple. Next in value we would place the lms. For intermediate and temporary planting, the box elder and the ash may be mentioned. Here and there should be the bass wood, or linn, the tulip tree, the horse chestnut, and the buckeye.

## Mechanical Table Waiters.

The dining tables of the Oneida community, Oneida, N. Y., re made double, and the central part revolves. All articles of regular use, such as bread, butter, salt, water pitcher, goblets, spoons, milk, sugar, etc., are placed on this central portion, and persons seated at the table wait on themselves, by turning the center until the thing they want swings around in front of them. These mechanical table waiters are found to be very convenient.
A friend of ours once had in regular use a little railway car on his breakfast table, which carried the sirup for the buokwheat cakes. and was propelled by strings back and forth across the table in front of all the plates. The children always derived the sweetest satisfaction from the movements of this conventent littlo machire.

## Cutrespmatence.

The Ecilors
spontents.
\% the Editor of the Scientific American
In your issue of June 22d, 1872, the interesting article on "Metallie Crystals" iaduces a small contribution on the part of oue who, though not a deep or scientific student, has seen enuch to admire and venerate in the wonderful effects of law osiginated and maintained, constan
On one occasion, I was exbibiting to a friend the peculiar and wonderful action of antimony in a state of fusion cast on a plane surface; this is well known as an interesting chemical experiment, but it is not generally known that, just before fusion, the fragment of antimony is in a condition to deposit crystals of exquisite beauty and variety; some lit le skill in manipuation is requisite, but I have found results invariable under the following conditions: Take a small bi of the metal (in condition usually obtained from any exten sive dealer in metals), weighing about two or three scruples place it on a bit of charcoal with the broadest surface a way from the flame of the blow pipe; heat it by cominencing at the side nearest the lamp, and gradually working over to the broad side, getting the whole into a state of red heat; do no allow fusion. After it has been maintained at a red heat for wo or three seconds, a dense, yellowish smoke will be observed to emanate from the broad side of the fragment; keep he metal hot for about one or two seconds after this smoke has made its appearance; then discontinue the heat and allow the fragment to thoroughly cool, when the broad surface will be found covered with a coating of the most delicate rystallization, which, examined under moderate microscopic power ( 75 to 100), will show an array of beauty and variey cldom equalled. The formation of the crystals may be clearly seen by the naked eye while the metal is cooling but only as a dense forest of brilliant, diamond like points under the microscope, they are seen to be transparent and omewhat polariscopic, having the shape of crosses, spears eculiar shaped flowers, fans, etc. What the substance i bat forms the crystals I cannot say, but a chemical frien suggests that it may be antimonious acid.
Another beautiful object for the polariscope is saturated atueous solution of chloride of mercury (corrosive subli mate). About one dram may be put into a small vial (those used by homœopathists are best, say a two dram vial) and fill with water (distilled water is best). It is immaterial whether the water takes up all the chemical or not; indeed the shortest way to obtain a saturated solution is to have nore of the chemical than the water will dissolve. Put a drop of this solution on a glass slide, and pass it a few times hrourh the flame of a spirit lamp to facilitate evaporation ind the crystals resulting will be found, under the polari cope, gorgeous in coler and beautiful in shape. Too muc heat will result in disappointment.
I would add, in reference to the antimonious crystals, that hey may be produced by making a small cavity in the char coul and laying a flat piece of the metal over it, directing the Hame from the blowpipe down on to it, as nearly perpendic hlar as possible; this gives a copious deposit both in the avity and on the under surface of the metal; but I have not found them so interesting nor quite so pure in color a those produced in the modefirst described. In breaking up lump of the metal some of the pieces will assume a some whit triangular form; these are the best to use without an n excavation in the charcoal. Do not allow the metal to fuse, and watch carefully for the peculiar smoke.
J. De Walden Churchill

Buffitlo, N. Y

## san sickmess in Railroad Cars.

To the Eiditor of the Scientific American:
In your paper of June 15th, there is an article on sea sick wss from riding in railroad cars, in which the writer says he ammot tell why he with others" was made sick, when there was no pitching or rolling motion to the care." My theory of sea sickness is, not that wo are made sick from the pitching and rolling motion alone, but from a combination of both logether with the sudden stopping of either motion. When vo rise on to the crest of a wave, we take an upward motion, and when we sink into the trough of the wave, we take a downward motion, and there is a moment in each case when there is a sudden stop or almost a dead point (as in the case of the engine), reversing the mechanical action of the stom ach and other viscera, causing a whirl of the brain, thus af ach and other viscera, causing a whirl of the brain, thus al
frotiog the whole system.
C. Leavirt.
Windrorvilic, Conn.

## An Invention Wanted.

T'o the Zeditor of the Scientijic American:
It must be admisted by all persons who have given the matter serious thought that a great desideratum of the age is a clean and durable material for covering ficors of dwell ings. Carpets are certainly far from meeting the want, as hey collect dust and impurities which are exceedingly in urious to the lungs of those sweeping them.
Some material susceptible of being manufactured in pleas ing desigus, which will be agreeable to the tread, durable and not too expensive, would meetwith very extended sale. San Francisco, Cal.

George Tasheira.
RED ANTS, if made angry, discharge a very pungent acid substance, called formic acid, "formica" being the word for aut. If these ants are distilled, a substance is produced so burning that, if it is dropped on the skin, it eats into it like fire. It is also derived from the stinging nettie.
the gatling gun. does history repeat itself
A writer, over the signature "S." under the head of " Note and Queries," in the Scientific American of June the 18th, says: "In Littell's Diary, under date of January, 1690, men-
tion is made of an expedition being fitted out arainst Ireland tion is made of an expedition being fitted out against Ireland,
and amongst the munitions taken are four of the new inand amongst the munitions taken are four of the new in
vented wheel engines which discharge 150 musket balls at once, and, turning the wheel, as many more; they are very serviceable to guard a passe." And the writer asks the question; "Does history repeat itself in this instance, and is this the forerunner of the Gatling and mitrailleur gans of all kinds?"
Many persons write upon subjects they do not understand But this does not account for the habit some writers get into But this does not account for the habit some writers get into
of depreciating the value of the labors of modern inventors by hunting up some ancient and obscure allusion to some hing that the writer (with the modern invention before hi yes to give him the idea) supposes may have been like what hat he now sees. As to the case in point, it may be truly said he Gatling gun is not a "wheel engine," nor does it dis charge 150, nor even 10, balls "at once." If it did, it would ready have become a gun of the past, like your correspon dent's antiquity, instead of
The Gatling gun was designed expressly to secure con tinuity of fire. It loads itself, and fires one shot at a time, but it delivers its fire in rapid succession, at the rate of over 400 shots in a minute. Persons who are well acquainted with the history of firearms do not need to be informed that with the history of firearms do not need to be informed that
in past ages many engines of warfare have been invented in past ages many engines of warfare have been invented
which disharged a number of balls in a volley, or "at once." Connoisseurs of the subject well know that none of thes rude old ideas developed any of the essential features of the Gatling gun, which differs in principle, in method of opera-
tion, and in construction, from anything which has preceded tion, and in construction, from anything which has preceded

The Gatling gun is a repeating firearm, consisting of a cluster of barrels, or rather of breech loading guns, grouped bout a central shaft to which they are attached and together with which they all revolve; each barrel is furnished with nd bappropriate lock which revolves with forward and back at each and every revolution of the gun. A single stationary cam provided with inclined planes, con ained within the casing of the gun, operates the breech me hanism of all the barrels, opening and closing their breeches they successively come within its range so as to allow the cartridges to drop one at a time into line with the barrels and then be forced into their rear open ends. A single stationary
cocking device effects the firing of each barrel in turn. In fact, he main characteristic of the Gatling gun is that it consist of sets of three parts, namely: locks, inner breech and barrels, all revolving at the same time; and a remarkable eature of the arm is that it cannot be loaded or fired when either of these three parts is at rest. The gun is supplied with metallic cartridges, which are of modern origin, from feed cases" or "feed drums" through a kind of hopper in the same way and about as fast as corn is supplied to a mill. The gun also has a traversing arrangement which permits of wide sweep of its shots during the very process of firing What person, previously to this invention, ever saw, hear f, or wrote about, a firearm of this kind?

Laboring Men and Men of Leisure
One of the prominent speakers, at the meeting of employ ers in this city the other day, stated very distinctly tha there were in the late strikes some very marked traces of communism, and that the question had been frequently heard among the strikers "Why should we, too, not live in brown stone houses?" Twenty years ago, the sole object of a strike was to obtain a slight increase in wages today most of the leaders, at least, look on themselves as doing sometbing to has en a social reorganization, in Professional men, clerks, and all others whom mank is mainl of the mental kind, or is at all events clean work which may be done without disfigurement of any kind, have become in their eyes nearly as obnoxious as the regular loungers. In hort, the ideal society of the labor reformers, every where hough more vaguely held in some places than others, i one in which all shall be in a greater or less degree manual laborers, so that the social distinction now created by a man' not laboring with his hands shall disappear.
The effect of such a revolution as this on civilization-that is, of the disappearance from society of everybody who did not settle down every morning to some distasteful physical task and work at it as long as his nervous energy enabled him, and of everybody who owed anything in the way of greater social freedom, or the greater freedom in the choice of pursuits which wealth gives, to his father's accumulations or his own rapid success-would form a curious subject o civilization" and glory in the diff, when we talk about civen us and gr stince hundredth of it are the result of theen call the "leisured class," that is, the class whom our social arrangements permit to live in what to the manual laborer seems idleness. In fact, the first step in civilization is not made until some portion of the community is released from the necessity of toiling with its hands and allowed to occupy he train of abstract reasoning and playing with the imagiation; and the rapidity of the rise of every people into civilization has been in the ratio of the number of those whom it was able to release in this way from the common drudger
of life. A great majority of these have always, will always, it were an essential feature in the moral order of the universe it were an essential feature in the moral order of the universe
that there should be this seeming waste of effort in every department of human activity. But the number of those who have tried to make such contributions without succeed ing, and the number of those who have made trifling contribu tions not great enough to rescue their names from oblivion but good enough to helptheothers, the Keplers, Newtons. Davys, nd Harveys, to their discoveries, has doubtless been almost be yond count. But they could not have shown themselves at all, in a society of manual laborers such as some working men dream of.
God has somehow not organized society according to our notions of justice. He hasmade some menstrongand healthy hers weak and sickly; some men wise and able, other men foolish and stupid; some women handsome, other women plain; He has imposed on one half of the human species the pains of reproduction, to the other half He has given only its pleasures, and on this inequality, human society is organized Every man has his post, but there is an enormous difference in the comfort and dignity of the different posts.
The safety and progress of humanity, as a whole, depends on each man's serving faithfully and without murmuring The rude fishermen of the Northern sea, as a great English writer has finely said, collects the oil which fills the scholar's lamp in the luxurious capital three thousand miles away. Should the day ever come when the fisherman will insist on the scholar's collecting his own oil, the doy when there will be neither scholars, fishermen nor oil will not be far distant. Christian Union.

## Replanting Teet

On the 24th of April, 1868, a young, man C. W., called a my office to consult me in relation to three of his incisors In a scuffle, the night before, he had these teeth knocked out by a blow,-the two central and left lateral incisors. He had replaced them as well as he was able at the time of the injury, but from the breaking of the alveolar border, the eeth did not stay in their places,-protruding about two ines. The gums were considerably lacerated and much in lamed. I administered the nitrous oxide, and with the aid of a pair of forceps, replaced the teeth. I then softened some utta percha and molded the same over the loosened teeth including two of the firm teeth upon either side of the loose nes, thus forming a dental splint which kept the teeth in heir places until they became firm. I applied tincture of aconite and camphorated chloroform to the injured parts. At the expiration of five days, the gums were badly inflamed and the teeth sore. I continued the use of dilute aconite for ne week longer, when the inflammation had subsided, and I removed the splint. At the expiration of four weeks, the eeth were sound and firm in their sockets; but from the effusion of lymph, the teeth protruded slightly from their sockets, and to avoid irritation I removed the cutting edges with a file.
Fouryears have intervened since the accident occurred, and the teeih remain perfectly firm, and have never given him the slightest trouble, nor have they changed their color
Case 2.-In August, 1871, a young man, about seve ears of age, came to me with alveolar abscess. I persuaded him to have the tooth extracted and replanted. He finally consented. I extracted the tooth, bringing away the sac a the apex of the root, containing pus. I cut three eighths o an inch from the end of the root, cleansed the socket by syringing it out by dilute carbolic acid, immersed the tooth in aconite and camphorated chloroform, and replanted it Infour days the tooth was a trifle sore, but he expressed himself as perfectly satisfied. About one month afterward I filled the tooth, which remains perfectly sound and firm until the present time.
I have replanted four others with like treatment, and with good results.

## Poor Boy's Victory

An appointment to the United States Naval Academy having been placed within the gift of Colonel Wm. R. Roberts, member of Congress from New York city, he determined to ward it to the applicant who should, in a competitive exam nation, prove himself to be best qualified therefor. This ex mination, recently took place in the hall of the Board o Education in this city. Twenty six boys were present, thir teen from the public and thirteen from the private schools of the Fifth Congressional district. S:xteen of the numbe were rejected by Dr. Skiff, the medical examiner. The ex amination was conducted by Superintendent Kiddle and his assistant, Mr. Harrison. Master John O'Keefe, aged fifteen years, of 107 Washington street, stood first in the order of merit and is to be the noninee. His parents are in very humble circumstances, his father, Timothy O'Keefe, being an ordinary dock laborer. The announcement of the decision of the committee was received with applause, as the appear nce of the lad denoted his condition in life. He was heartil ongratulated by all present, but by none with so much pride and emotion as his principal teacher, Mr. Duffy. Mas er O'Keefe, it was remarked by all present, bore a striking esemblance to ex-President Lincoln. A subscription is to b mmediately started in the First Ward for the purpose of se curing his necessary outfit.
IT is alleged that colored persons are never sunburned because the dark color of their skins absorbs the heat and conveys it into the system, so that it is converted into sensible heat, producing perspiration. But the white skin doe not absorb the heat; the sun's rays therefore rest upon and burn it.

## PRESSURE ON FOUNDATIONS.

We make the following extracts from an admirable article on this important subject lately published in the Builder, in which the principles governing the attainment of safety in building are laid down and classified.
The nature of the soil to be built upon is evidently the first object for consideration; and it is scarcely necessary to say that soils vary in their strength or bearing power as much as in their geological formation. They range from a soft or semi-fluid condition-such as that of marsh, mud or silt,through all intermediate stages to the condition of the hardest rock. The inherent strength of the soil itself, therefore and the load to be sustained upon a given unit of its surface (which is usually taken in practice as a square foot) are first to be inquired into.
Where the soil is incapable of sustaining the incumbent load of the structure to be placed upon it, it becomes the duty of the constructor either to increase its bearing power by artificial means, or else, by widening the area of the foundations, to extend and enlarge the bearing surface until it contains within it the resisting power necessary to the requirements of the case. The means by which these results are arrived at will form the second branch of the inquiry.
The materials commonly used for these purposes and the amount of bearing power obtained from them will also be considered.
Every soil is capable of sustaining a certain weight upon each unit of its surface, which varies according to the ing in fluidity to water itself may be assumed at zero, or the lowest point in a scale, and the bearing power of hard rocks may be assumed as the highest; and if these bearing powers be taken at from 0 to 30 tuns per square foot, it will be sufficiently accurate for practical purposes. Between these extremes lie all the intermediate soils of weak rocks, shale, gravel, sand, clay, loam, silt, etc. Supposing the soil to be capable of bearing a pressure of three tuns per square foot, it follows, of course, that either one square foot of foundation must be provided for each three tuns weight in the entire structure, or that the bearing power of the soil must be increased by some means to the required standard.
The weight of the intended structure should first be calculated, and should include all extraneous loading which may be incidental to it. Care must, of course, be taken to ascertain the proportion of weight carried on each part of the foundation, and the area of the part must be proportioned accordingly. The allowance for extraneous loading will vary according to the use of the structure.
Thus in a railway bridge, it is usual to calculate the weight of the trains at from 1 to $1 \frac{1}{2}$ tuns per foot run, for each single line. On a road bridge, the usual load assumed is from one half to one cwt. per superficial foot, the load of a crowd of persons standing close together having been ascertained to be a little more than three quarters of a hundred weight per square foot. In ordinary floors, the load may be assumed as similar to that of the road bridge. In a warehouse, the load must be ascertained.
It is then necessary to determine the number of tuns pressure per square foot which the constructor will put on the soil on which the building is to be erected. In this respect, great variety exists in the practice of the most eminent engineers, and pressures varying from 1 to 8 tuns have keen allowed on foundations on the London clay. About 4 tuns is recommended in practice as a safe pressure on stiff clay. Loam, indurated clay or shale, as well as soils of similar strength, such as chalk, etc., vary in bearing power in degrees impossible here to indicate. The practical judgment of the constructor must determine in each case. Beds of solid gravel form, when of sufficient thickness and uniformity, one of the most unyielding of the ordinary soils, and they may be safely loaded with double the pressure which can be put on London clay.
The soils of sand vary from a compact close sand, with a clayey bind perfectly impervious to water, through all conceivable varieties of coarseness, looseness and porosity. Porous sand aoils are easily removed by running waters, and they require the constructor's extreme care where this is likely to occur. The only course is to lay the foundations so deep that the current shall not lay them bare. Perhaps the most difficult of all engineering work is the foundation of bridge piers in a deep soil of this nature. The usual means employed in these cases up to a comparatively recent date have been the erection of coffer dams round the space to be occupied by the foundation of the pier, the piles forming the dam being driven till they reached solid soil. When a solid bottom could not be attained, long piles were driven all over the foundation surface and the concrete or masonry foundations were laid upon them. In the first case, the natural sustaining power of the lowest soil reached must be the measure of the pressure to be allowed; in the second, this is increased by the friction on the sides of the piles as well as the resistance of their lower ends to sinking. Of late years, these plans have been superseded by sinking, into the bed of the river, upright cylinders. (The construction and mode of operation of such cylinders are already familiar to the readers of the Scientific American, and need not be dwelt upon here.)
It is generally found that ordinary soils will bear more weight at great depths than nearer to the surface; which is owing to their condensation by the superincumbent pressure, and, also, to the increased difficulty of laterally displacing the soil. This may be understood by considering the action of a pointed pile, which, as it is driven, displaces the original material and renders the soil in its immediate vicinity more condensed.

When sand of good quality is protected from the influence of running water or rains, it forms an excellent foundation, and, when in thick beds, may be loaded with from 6 to 8 tuns per square foot with perfect safety.
There are, however, some practical considerations which modify the question of what constitutes a safe pressure. uppose, for instance, a solid block of masonry, 20 ft . square and 20 ft . high, and a thin wall of the same material, also 20 ft . high, were placed on the same soil. On this supposi tion, the conditions of both soil and pressure for each square oot of the foundations would be alike in each case; and yet the thin wall, as regards the stability of its foundation, would be far less advantageously situated than the square block. It is customary, therefore, in practice to extend the foundation courses of a wall or column to a considerable width beyond the face of the superstructure.
Rocky soils, which vary from the harduess of granite to hat of soft crumbling stone easily worn by exposure to the weather or to running water, may be considered in the same category of bearing power as masonry itself.
The weight of the structure having been calculated, the pressure per square foot on the soil determined, and the are of the foundations deduced therefrom, as above described he base of the structure must be extended, either by foot ings, concrete, or otherwise, so as to cover that area and transmit the pressure equally and uniformly over it.
It now remains to consider the pressures which may safely e adopted on the materials themselves which are used in foundations.
Good, ordinary brickwork will crush with a load of about thirty tons, and may be loaded safely up to ten tuns per oot. Brickwork of the best description, set in Portland cement, can be loaded with double this weight; though thi should be considered extreme.
The load which can be put upon stonework depends upon he workmanship as well as upon the hardness of the ston tself. Thus, rubble walls with thick and irregular joints of mortar are weaker even than inferior brickwork, while well
bedded ashlar masonry will bear loading to an immense extant. In general, from eight to thirty tuns per square foo may be taken as the practical limit.
Concrete will bear from six to twenty tuns per square foot ccordingly to the goodness and proportions of its materials The bearing power of timber piles is an important featur in foundations, and varies according to the nature of the soil and the size and length of the pile driven. Where lon piles of whole timber are driven through a loose stratum to a firm one underlying it, to the usual extent (a tun hammer with a 15 ft . fall not driving the pile more than a quarter of an inch), they may be trusted with a load of from ten to fifteen tuns. Where their bearing power depends on the friction or adhesion of the soil on their surfaces, it may be easily ascertained by pulling up one of the driven piles by a lever. The measure of the weight required to raise it will be, of course, the friction of the ground on the surface of the pile. When the soil throughout is of a weak and fluid character, it should not be loaded with more than one sixth of the weight which will draw it.
These remarks are, of course, subject to modification in the ndless variety of circumstances met with by the practical rchitect and engineer.

Instruments for observing Earthquake shock Owing to the great importance of being able to foresee the eruptions of Vesuvius, the late Government of Naples was led to put up an observatory to watch its signs. The house, built in 1844 on Mount Vesuvius, stands near the hermitage, 2,080 feet above the sea, being placed on a ridge of the mountain, which has turned aside many lava currents without beng itself submerged. It is founded on vaulted arches, above which is a large hall for specimens of lava and volcanic min erals. Steps lead up from this hall to the observatory proper The whole is in charge of Professor Palmieri, of the Royal University of Naples, who, by his ingenuity and zeal, has brought the instruments to a state of great perfection.*
The most important sections of the apparatus are the seismographic or shock recording instruments, which are in a separate room, and are worked by electricity. There are the pressure of the wind and amount of rainfall, as well as the diurnal variations of the magnetic needle.
All former attompts at measuring and recording earth quakes depended directly on the shocks making their own marks; slight ones thus escaped notice, but by the use of electricity the certainty of record is invariable. The instru ments are made to record the horizontal and vertical oscillations, the time of their occurrence, and their duration and direction.
Mercurial columns of ingenious forms are employed in the instruments. The agitation of the mercury, or its change of level, by any shaking of the earth, sets the delicate electrical recording apparatus at work, which instantly shows what has happened.
By means of this apparatus, the astronomical time of the shocks, and the duration of each; their nature, whether vertical orhorizontal, is given, as also the maximum of intensity ; and, in the case of horizontal shocks, their direction is indicated. Professor Palmieri has the instruments examined hree times a day, and an assistant observer is always at hand, to hear the bell and put back the apparatus to its nor
*The late eruption, which was so extensive and so fatal, was foretold by
im as about to take place, and with admirablecourage he remained in the bservatory at the most dangerous period, when the building ran great risk of being ruined, in order accurately to observe the records of his instruments; a service for
the kingdom of Italy
mal position for fresh observations. It appears that it re cords all the violent shocks that occur in the Mediterranean basin; thus, on the occasion of the late eruption in the Greek Archipelago, Professor Palmieri was able to announce to the Neapolitans that a great disturbance had taken place long before the news reached Italy. The shocks in connection with Mount Etna are readily observable.
It is recommended that where earthquakes are frequent he observatory should be founded on solid masonry, bedded in the earth, and should consist of a wooden house not liable to be overthrown.
The following signs of an approaching eruption are considered reliable : First, when the crater fills up and the vapor from it diminishes in quantity. Secondly, when the vapor from the crater gives much deposit of iron or sodium. Thirdly, when the water sinks in some of the springs of the neighborhood.
The phenomena more nearly preceding an eruption are the occurrence of earthquakes, increasing in intensity and fre quency for some days beforehand, also the irregularity of the diurnal variations of the magnetic needle. One of the re markable attendants of an eruption (which may be observed oo a lesser degree whenever the mountain is steaming much is the frequency of lightning flashes, attending on the con densation of the vapor of water from the crater; just as, in an ordinary thunderstorm, lightning occurs at the time the vapor is condensing, as is proved by the rain that follows. In addition to these phenomena of Vesuvius, the volcanic activity of the district is shown by a gradual rising of part of the coast of the bay near Torre dell' Annunziata, where there is already an alteration of several feet; while on the other side of Naples, at Pozzuoli, the pavement at the edge of the harbor is sinking below the level of the water, and the pavement of the temple of Jupiter Serapis had, in the spring of 1869 , sunk about 16 inches lower than in 1858.

## Hot July.

In New York, the heat of the first July week has not been paralleled within ten years. On Tuesday, the 2nd inst., the mercury at 3 P. m. stood at $100^{\circ}$ in the shade. On the Sun day and Monday previous, it reached $98^{\circ}$, the three day averaging nearly ten degrees hotter than the corresponding days of 1871 .
The suffering of both man and brute has been terrible. In the crowded business streets of down town, in the new buildings in process of erection, it was pitiable to see the la borers working unprotected by shade and sweltering in the fierce rays of the sun. Cases of sunstroke were frequent. On the 2nd inst. nearly one hundred and fifty persons were prostrated during the day. Owing to the admirable ambuance system now in working order throughout the city, the sufferers were promptly cared for, but aboutseventy of their number. it is stated, have died. The horses on the street cars and omnibuses seemed unable to draw their load, dozens succumbing to heat and exhaustion. Among the tenement houses and rookeries in the lower wards of the city, the mis. ery has been appalling.

## Railway in Egypt.

The staff of surveyors and assistants, nearly thirty in num. ber, taken out by Mr. John Fowler, C. E., to make a survey for a railway in the valley of the Nile, have returned. after
having successfully completed their work. The line surveyed having successfully completed their work. The line surveyed near the second cataract, and terminates at Khartum, where the Blue and the White Nile unite their waters, above the sixth cataract. For nearly three fourths of its length, the line will be on the edge of the valley of the Nile, about three fourths of a mile from the river, and constructed above the level of the periodical inundations. At the commencement of the great bend, between $18^{\circ}$ and $16^{\circ}$ north latitude, the railway will leave the valley, and proceed by a direct line across the desert of Bayuda to a point near the sixth cataract, whence it will follow the valley southwards to Khartum, the intended terminus for a time.

The merchants in Birmingham, Eng., and the surrounding ownships who do business on foreign account continue to receive valuable advices from nearly all the markets, as well in Southern as in Northern Europe, from the British antipo dean colonies, and from British Canada and the United States. The reduced tariff which will come into operation in America on the 1st of August, by which all metals and their manufac tures, except iron wire, watches, and jewelry, are to be ad mitted at a reduction of 10 per cent, and tin plates at a reduc tion of 15 per cent, is stimulating not only the demand for iron by American customers, but is also leading to an enlarged business in respect of nearly all the goods contomplated in the reduction. Valuable orders have already been sent across and enterprising manufacturers and merchants are stimulated o greater energy with a view to the extending of their con nection with the different United States markets.

The velocity of electric waves through the Atlantic cables has been ascertained by Professor Gould to be from 7,000 to 8,000 miles per second. Telegraph wires upon poles in the air conduct the electric waves with a velocity more than double this. It is a curious fact that the rapidity of the transmission increases with the distance between the wire and the earth, or with the hight of the support. The Journal des Telegraphes says that wires, placed on poles slightly elevated, traosmit signals with a velocity of 12,000 miles a second; and those at a considerable hight give a velocity of 16,000 or 20,000 miles.

RAILROAD CAR BRAKE
The improved brake illustrated in our engravings is more especially adapted for use on four wheel coal cars, or such ore cars as are generally used about furnaces, though it admits of various modifications of its arrangement which would adapt it to other forms of car without altering the principle involved.
Fig. 1 represents a coal car with the brake applied to one pair of wheels. Only the upright shaft and hand wheel are shown in the engraving, the other portions of the brake being indicated by dotted lines. Fig. 2 shows the side frame of the car, in section, with the side frame of the car, in section, with the brake attached. At A are shown the brake blocks, which are made of wood or other suitable material. These are at tached to a flexible iron strap, B, the end of which are secured to the frame of the ear ky the nuts and screws shown at C. This strap is about threeinches wide and a quarter of an inch thick. $D$ is a vertica brake rod which is operated by the wheel seen in Fig. 1. On the lower part of the brake rod is a screw which works in the nut, $E$, attached to the frame of the car and on its extreme end is the block, $F$ which has a groove lengthwise through which the strap passes. It is prevented falling out by a pin. The end of the brak allor in the block in od work in a to raise or depress the block manner as it When it is desired to without turng. Wen is is desired to apply the brakes, the rod is screwed down by means of the wheel, and the strap is car ried down with it. This brings the blocks, A, in contact with the wheels of the car and throws part of the weight of the car upon the brakes. The amount of weight sustained by the brake blocks is dependent upon the pitch of the screw on the rod, D , and upon the diameter of its wheel When the brake is not in use, the rod, strap and brake blocks are elevated sufficiently o relieve the wheels of all restrain Should the strap stretch, it may be easily brought to the proper tension again by brought to the proper
It will be noticed that the brake blocks are applied directly on the top of the wheels, which prevents the strain coming upon the boxes as it does when they are placed in any other position. On gravity roads, this brake is said to work admirably. One in use on a road having a uniform grade of 200 feet per mile, did all the braking up of five cars for six months, and has been running, in all, two years in good order. It appears to be durable, and costs only an in significant sum to keep in order. For further information, the inventor and patentee, Mr. Frederick A. Canfield, of Do ver, N. J., should be address $\&$ d. Patented Jan. 9, 1872.

## RAILROAD RAIL.

The improvements in railroad rails, which we this week il lustrate, are designed to give to the rail that degree of elasticity which will enable it to bear all the pressure and shocks o which it may be subjected with the least.possible amount f wear and tear to itself and the rolling stock which passes over it. To effect this much to be de sired object, the inventor relies on the merits of the form and construction of his rail, the material of which it is made, and his method of joining the ends of adjacent lengths. Several designs for the rail are shown in our engraving, where, generally, $A$ is the rail and B the connecting piece, all of ila The first patent granted to the in No Mr Rufus S Sanborn, of Rock erd Ill . ord, Ill., dated August 8, 181, wa for the rail and joint shown in Figs. 1 and 2. It will be seen that the rail is tubular, the upper part being nearly cylindrical and the lower somewhat of triangular figure. The material o which it is formed is steel. The rail used in practice would be four inches high and four inches wide at the base, which, it will be noticed, is slightly arched. The sides approach at the neck, C, to within about a quarter o an inch of each other. Now it will be ready seen that the effect of a weight pplitd on the top of this rail will be pring the sides nearer together at o bring the sides nearer together at . A sufficiency of pressure would make them touch. There will, at the same time, exist a lateral thrust of the lower sides which will tend to flat ten out the arched base, the yielding of which bring into play a reserve of elasticity that is available after the sides are closed at C. The closure of the neck effect a slight change in the form of the arch at the rail top, which enkances its strength without sensibly affecting its bearing hurface. The joint, $B$, is, in efect, a hollow epring of about



SANBORN'S RAILROAD RAIL. between the sides at C, and by the arch in the base. The in ventor claimsthat by this arrangement the tread is not affect by pressure sufficiently to produce an up grade ually, a continuous rail. The junctures are made without beltu or other fartenings, and allow of expansion and cor
traction taking place freely while keeping the rails securel $y$ in position. In this way the violent hammering arising from the wheels striking the ends of the ordinary $T$ rails is obviated, and consequent damage to the rails and rolling stock is prevented by the elasticity of the joint.
The rails made as in Figs. 1 and 2 have the advantage in strength and durability, and those constructed as in Figs. and 4, with lap joints, possess that of cheapness. The elliptic top may go with either construction. The inventor state that all the forms presented can be readily manufactured The first form he proposes to make by pass ing a round tube of proper size through rolls constructed to press it into the re quired shape. The other forms, and th connecting pieces for all, may be made of olled metal plate of the requisite thick ness. He claims that a length of rail of this kind, weighing forty pounds, has as much strength as a similar length of solid rail weighing sixty pounds, and that grea conomy of material will consequently arise rom the use of the new rail.
Mr. Sanborn designs placing his inven tion under the control of a stock company, by whom it would be tested and its prac tical worth fully developed. He may be ad dressed, as previously stated, for further in formation on the subject

## The Polariscope.

Most of our readers have seen an exam ple of what is termed double refraction by lo king at any object through Iceland spar which is a crystallized carbonate of lime When a piece of the spar is placed upon sheet of printed paper or any other well marked object, two images of that object or print will be seen, each separated from th other by a small degree. If the rhomb o par be turned slowly round with the same face resting on the paper, one of the image will be seen revolving round the other. By judiciously sawing the rhomb of spar in two and cementing the surfaces with Canadia balsam, one of these double imer may be etirely or the trea , and which is all wh well orms the prism, forms the means by which the great major ity of the experiments with polarized ligh are at present made. This simple piece of apparatus is most extensively used wher ever light and its various phenomena form the subject of research. No microscope of the better class is considered to be complete nless it has a polariscope attached to it.
The polarization of light may be em

## CANFIELD'S RAILROAD CAR BRAKE

ruction. The elliptic form of the top arch and the conf ration of the connecting spring, B, shown at Fig. 4 form the subject matter of a further patent dated March 26, 1872 n this form the sides are at once connected with the bas without being doubled over, as in Fig. 3. The elliptic arch affords a wider tread for the wheels, and the connection is endered more secure by the enlargement of the spring joint The three forms of rail described are similar in principle, so far as their elasticity is concerned, and in each case the so far as their elaiticity is concerned, and in each case the
limit to the rield or give of the rail is fixed by the space left ployed as a means of chemical investigation. A few days ago says the British Journa! of Photography, a friend called upo with two bottles of similar size and appearance, filled res ectively with aqueous solutions of bromide of cadmium an and labls on which he supect " just before being pasted on leavin a got in some doubt the Instead of subjecting one the chemical test, as had been suggested, we merely placed one drop from each of the bottles upon a small plate of glass warmed it slightly to start the crys tallization, and examined the two crys tallizing solutions with the polariscope. ln less than thirty seconds afte placing the glass slide on the stage of he instrument, we indicated, in the most definite manner, which was the cadmium salt and which the ammo nium. Thisis only one of many uses to shich a polariscope may be put.

## M. Blanquart-Evrard.

M. Blanquart-Evrard, recently de ceased in France, aged 70, may justly be esteemed one of the early fathers of the photographic art, for he it was who first popularized its production and proved that it could be applied successfully to the illustration of books. At the time when he first start ed his photographic printing establish ment at Lille (1850), nothing was hear of in photography but daguerreotyp portraits and prints from calotype ne gatives upon paper, in a rusty red, in artistic style. He began by entirel changing or reversing the process of Talrot in taking negatives, and estab ished the principle which has since ished the principle which has since been observed in the common collodion process. He showed the importance of organic matter in the film as con ducing to clearness and density. He discovered sulphur toning, as well as the gold toning of pape prints; and so modified the negative process of printing ly development as to enable it to produce the most artistic photo graphy upon paper yet seen. His latesi discovery was a mode of inteneifying a negative by exposing it with its back to the IIght for an houn two after it is develogiod but bof ose it is fixed.

# Frientifir Amorican. 

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NEW YORK, SATURDAY, JULY 20, 1872.


## THE DOMESTIC TELEGRAPH.

Not many evenings ago, an intelligent, gentlemanly look ing individual presented himself at our door and asked "if we didn't want the district telegraph put into our house." At the same time he handed over for our examination a very pretty little instrument, composed of cog wheels and some what resembling a clock. "Weattach the instrument to the wall," he said, " in some convenient position in your house, and to it we connect a wire leading to your roof, where it unites with another wire that extends to one of our district offices on Broadway." Pointing to a small knob, he contin ued: "If a fire breaks out in your house, you just push that lever, and in three minutes the firemen will be here. It thieves break in, you move that other lever, and in three minutes the policeman will make his appearance. If you want a special messenger to go upon any sort of business, night or day, you just turn this little button, and in three minutes the man will be at your door ready for service. The signals you thus make are all received and recorded at our Broadway office, where we keep a force of attendants, in readiness at all hours, to execute the requirements of our customers. Your wife or any other intelligent person can make the signals. We make no charge for putting the in strument into your house or for keeping it in order; but you pay as $\$ 2.50$ per month for its use and fifteen cents an hour for the time occupied by our messenger in doing your business. When you go away to the country in summer you can have an attachment put on, so fixed that, if burglars attempt to break in, an alarm will be sounded at our office when our policemen will quickly surround the house, and catch the thief in the act."
We rather liked the idea of having such a telegraph in the house, gave the order, and it was promptly put in.
In the course of a week or so afterwards, thinks we to ourselves, that is our wife and we, "let's try our telegraph just for fun, and see whether the telegraph folks are as wide awake as they pretend, or whether they are napping." This was early in the morning, just between getting up time and reakfast-before business begins-the hour when nigh hands go home and day hands have rot yet come-the time when the manager is probably not on hand. Now let's see what this new-fangled telegraph is good for. So we pressed
the knob, and there followed a slight click and a buzz. the knob, and there followed a slight click and a buzz.
We looked at our watch, went down stairs, took seats at the We looked at our watch, went down stairs, took seats at the
breakfast table, when we were startled by a ring at the door well. "Messenger from the District Telegraph Office. Got your signal. Wants to know what is wanted," was the re port that came to us. Looking at the watch we found that just two and a half minutes had elapsed since we gave the signal. We felt a little bit sheepish in being obliged to tell the messenger that we had sent for him "just for fun, to see if he was really awake," etc., and as we were entirely sat isfied on that point, he retired, sorry that we had no rea business for him to do.
After breakfast, we went to the company's office, where we ound a Morse paper recorcing apparatus, with which the various dwelling houses in the district are connected. When ever a signal is given from any of the houses in the circuit gong sounds in the office, which notifies the attendant, and at the same time the telegraph clock work is set iu motion the paper moves, and upon it a signal is stamped and re stamped or repeated. Each house instrument gives a differ ent signal, and the various signals, with the names of the oc cupants and numbers of the respective dwelling houses, are registered or tabulated on the wall, like a hotel indicator By glancing at the register, the attendant sees at once from what house the signal has come, also its nature, whether a Aipe has cocurted, a robbery going on, of a messengor needed.

The office is in connection with the city fire telegraph and olice offices, and instant signals are sent thither if required Taken altogether, this district or domestic telegraph is a most usoful and valuable institution, promotive of comfort convenience. and safety of families. That it will soon come into general use, cannot be doubted. The wires are so ar ranged that in case they are severed, either by design or ac cident, an alarm is instantly sounded at the district offic and the repairs are quickly effected.

## SUMMER HEATS IN vARIOUS COUNTRIES.

For the benefit of our readers who are suffering under the effects of the present heated term, we have collected, from va ious sources the following, relative to the extreme summer emperature of the different countries of the world.
Thibet, situated in Central Asia, between the thirtieth and thirty-eighth parallels of north latitude, is a decidedly hot country, so hot, indeed, that even the fiercest heat which the firemen in a sea-going steamer have to endure is comparafiremen in a sea-going steamer have to endure is compara-
tively insignificant besides its midsummer temperature. "Misery loves company," and as the reader sits slowly melt" Misery loves company," and as the reader sits slowly melt-
ing with thermometer at $98^{\circ}$ Fah., he will probably gather ing with thermometer at $98^{\circ}$ Fah., he will probably gathe
consolation from the knowledge that the unfortunate inhabi tants of the above mentioned country are worse off than himself. The intense heat, reaching $150^{\circ}$, doubtless prevent their remaining either in their houses or their garments dur ing the day, but such is the inconstancy of the weather that if they venture to remain out doors or to continue in their primitive costume throughout the night, they may possibly be frozen to death before morning.
Senegal in Africa and the island of Guadeloupe in the West Indies are next to Thibet in summer heat; the weather is variable, but often reaches a temperature of $130^{\circ}$. Stil more changeable is the climate of the Great Desert of Sahara where the thermometer, afcer rising to $130^{\circ}$ during the day t nightfall descends to among the fifties. In Persia fearful plagues and pestilences are bred by an atmospher heated to $125^{\circ}$. At Calcutta and on the Delta of the Ganges, points from which the Asiatic cholera is said to begin its
western march, the mercury rises to $120^{\circ}$, while in Central western march, the mercury rises
America the same limit is attained.
In the jungles of Affghanistan and in the deserts of Egypt $10^{\circ}$ is the maximum. Strange to say, the same high tempe rature is reached in some of the interior valleys of Califor nia, although the average of the surrounding country
is much lower. At Cape Colony, the diamond diggings in is much lower. At Cape Colony, the diamond diggings in heat is $105^{\circ}$. hen comes Arabia, $103^{\circ}$, the arid deserts of that country being much less heated than the vast expanse of Sahara Now follows a strang anomaly: it will hardly be Nahara Now follows a strange anomaly. it wil hardy be credite hat our blue nosed neighbors in vanada ever experienc uch a temperature, but it is nevertheless a fact that at Mon treal the extreme summer heat is often as high as that of
the deserts of Arabia, both being $103^{\circ}$. Our own State-New York-is not far bshind, its summe limit being $102^{\circ}$. Spain, Upper India, Canton, China, the island of Jamaica, and most of our Southern States average $100^{\circ}$. With the exception of New York, $98^{\circ}$ is the highest ange in the Northern States. The island of Mauritius is next on the list, having a summer temperature of $96^{\circ}$; the come Sierra Leone in Africa and Guiana in South America both $94^{\circ}$; then Ceylon, $92^{\circ}$. Throughout France, in St. Pe tersburg (Russia), Denmark, Belgium, Burmah, Shangha n China, Penang, the Sandwich Islands, Buenos Ayres, and the islands of Bourbon and Trinidad, the average is $90^{\circ}$ That of Nova Scotia and the majority of the Azores islands is $87^{\circ}$. England, Ireland, Sicily, Siam, and Peru in summer are of about the same temperature, not exceeding $85^{\circ}$ Pekin in China, Portugal, and Natal Colony in Africa all have mild summers, $80^{\circ}$ being the extreme. In Siberia, $77^{\circ}$ is the limit. In Western and Southern Australia and the eastern and western parts of Scotland, the temperature does not rise above $75^{\circ}$. In Italy, Venezuela, and Madeira, 73 is the maximum.
The thermometer in Prussia, Victoria Land, and New Zea and rarely rises above $70^{\circ}$; in New South Wales not above $68^{\circ}$, nor, in Switzerland and Hungary, above $66^{\circ}$. Colder still are the summers in Bavaria, Sweden, Northern Siberia Tasmania, and Moscow, in Russia, where $65^{\circ}$ is the extreme limit. Norway, Greenland, and Newfoundland have no weather warmer than $60^{\circ} ; 55^{\circ}$ is the maximum for Central Scotland, the Orkney Isles, Patagonia, and, the Falkland slands; and finally, amid the ice and snow of the arcti gions, the heat of midsummer is below $50^{\circ}$.
Iceland, however, is colder still. The northern portion of that country virtually have no summer; on its southern shores, which are swept by the Guif Stream, the temperature sometimes rises to $45^{\circ}$. Last comes Nova Zembla, bleakest and most inhospitable of islands, lying frozen in the Arctic ocean, on the confines of Northern Asia. It can be truly said that in that country there is no summer; for even in eat, there the mercury fails to rise beyond $34^{\circ}$-two degrees above the freezing point-and this is the very extrem of temperature.

Function of Potassium in Soils.-According to Nobbé he presence of potassium in soils is necessary in order to en able the chlorophyll grains of the leaves to form starch sodium and lithium being unable to replace potassium in this function, the latter indeed being actually injurious. He has also ascertained that the different combinations of by far the most eflicacious.
the new patent law of canada
We are indebted to the editor of the New York Daily Wit hess for an official copy of the new patent law lately passed by the Dominion Parliament, and which goes into effect Sep ember 1, 1872.
As this new law provides for the grant of patents and caveats to American citizens, our readers will doubtless b interested to know its general features, and we therefor ubjoin an abstract.
The Canadian law is somewhat peculiar. It appears to contain a mixture of the English, American, and Continenta ystems, togetber with a few original articles.
Under the English and American laws, the patentee may Xercise his own discretion as to the date when he commence he manufacture of his improvements. In consideration of making known his invention, the exclusive right to it for the period of the patent is guaranteed to him, and he may do as he thinks best about introducing it. If he chooses not to work the patent until a latedate, or even not at all, it is his own affair. The grant is his and holds good during its allot ted term. But at the end of the term, the invention become public property, and all persons may then freely enjoy it benefits.
The Canadians have adopted the Continental plan by requiring that the invention shall be actually worked in Cana da within two years from the date of the patent on pain of forfeiture of the grant. Provisions of this nature are gener ally discouraging and inconvenient to inventors. But the proximity of Canada to this country, and the fact that Amer proximity of Canada to this country, and the fact that Amer goods here and take them to Canada, still enjoying protec ion under the patent, will greatly assist them in establish ing the manufacture there within the period required.
Any American invention, even if it has been already pat ented here, may also be patented in Canada, provided that he American patent is not more than one year old. But i he sale and manufacture of the article has been commenced in Canada before the grant of the Canadian patent, the par ties so manufacturing may continue the manufacture after the issue of the patent, without accountability to the paten tee. But all other persons will be required to obtain the consent of the patentee before they can sell or manufacture Our citizens can readily avoid any difficulty on this score by pplying for the Canadian patent before the American pat ent issues.
The Canadian law affords suitable facilities for the sale o part rights in patents. and fortherecord of assignments. But hese privileges appear to be somewhat nullitied by anothe clause, of singular phraseology, which reads as though it was intended to empower the owner of a paltry town righ to destroy the validity of the entire patent, should he choose o do so, thus sacrificing the interests of all other owners or workers under the patent, without their knowledge or con sent. To effect this nullification of the patent, a part owne has only to import or cause to be imported into Canada single example of the patented article. This section evident y n eeds modification.
Another incongruous section is that which punishes the patentee with flne and imprisonment if he fails to stamp the word "Patented" and the year of the patent upon every patented article. The law is specific upon this point; but ompliance with it would in many cases be almost impossible or example, upon needles, hooks and eyes, percussion caps yelets, etc., it would be difficult to place a legible stamp In this country, the law directs that the stamp shall be placed upon the package when it cannot be conveniently affixed to The Can
The Canadian law is also faulty in making the omission of he stamp a penal offence. A patentee's own interests wil lways lead him to attach the stamp to his goods; and wheth $r$ the stamp is affixed or not, the public is benefitted, not in jured, by the issue of the improved goods. Surely a patentee ougit not to be treated as a criminal for the omission of a rivial thing which only concerns himself.
In this country, if the patentee fails to stamp the date of the patent upon his goods, and if any persons not knowing hat such goods are patented should imitate them, they can not be held liable for infringement of the patent. This is more just and equitable provision than that of Canada
The Canadian method of deciding interferences is nove If two persons apply for a patent for the sameinvention, they re each to choose an arbitrator, and the Commissioner of Patents is to appoint a third. The arbitrators have power to summon witnesses and take evidence, upon which they determine who is the prior inventor, and to him the patent is issued. We shall watch the workings of this peculiar mode f settlement with much interest.
bstract of the new canadian patent law, taking EFFECT SEPTEMBER 1 st, 1872.
The Canadian Patent Office is attached to the Departmen of Agriculture, the Minister whereof and Deputy are, re of Agriculture, the Minister whereof and Deputy are, re
spectively, Commissioner and Deputy Commissioner of Pat spectively, Commissioner and Deputy Commissioner of Pat
ents. The Governor appoints clerks and assistants. No em ployee in the Patent Office shall hold an interest in any pa ent. The Commissioner shall publish an annual report, a list of patents granted, and may also print the specifications and rawings if he thinks best.
Any person having invented any new and useful art, ma chine, manufacture, or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter, not known or used by others before his invention thereof, and not being in public use or on sale for more than one year previous to his application in Canada, with the consent or allowance of the inventor there of, may, on a petition to that effect presen ted to the Commis

Act, obtain a patent granting to such person an exclusive property therein; but no patent shall issue for an invention having an illicit object in view, nor for any mere scientific principle or abstract theorem.
But an inventor shall not be entitled to a patent for his invention if a patent therefor in any other country shall have been in existence in such country more than twelve months prior to the application for such patent in Canada; and if, during such twelve months, any person shall have commenced to manufacture in Canada the article for which such patent is afterwards obtained, such person shall continue to have the right to manufacture and sell such article, notwithstanding such patent ; and under any circumstances,where a foreign patent exists, the Canadian patent shall expire at the earliest date at which any foreign patent for the same invention expires. The patent may be granted to any person to whom the inventor has assigned or bequeathed the right of obtaining the same, or in default of such assignment or bequest, to the executors or administrators or as signs of the deceased inventor. The applicant for a patent must make oath (before any Judge in the country where he lives) that he is the inventor, must furnish a full specification of his invention, with drawings in duplicate, together with a neat working model, made on a convenient scale. If the invention is a composition, he must furnish specimens thereof and of the several ingredients.
duration and extension of canadian patents. Patents shall be valid for a period of five, ten, or fifteen years, at the option of the applicant; but at or before the expiration of the said five or ten years, the holder thereof may obtain an extension of the patent for another period of five years, and after those second five years, may again obtain a further extension for another period of five years, not in any case to exceed a total period of fifteen years in all; defective patents may be corrected by reissue or the filing of disclaimers.
The Government of Canada may always use any patented invention, paying to the patentee such sum as the Commissioner may report to be a reasonable compensation for the use thereof.
Patenis may be assigned in whole or in part; assignments shall be registered with the Commissioner; the assignment first registered shall be good as against any other assignment of the same patent or interest therein.

INFRINGEMENTS.
An action for the infringement of a patent may be brought before any Court of Record having jurisdiction to the amount of damages asked for, and having its sittings within the Province in which the infringement is said to have taken place, and being, at the same time, of the Courts of such jurisdiction within such Province, the one of which the place of holding is nearest to the place of residence or of business of the defendant; and such Court shall decide the case and determine as to costs. Any Judgethereof, in chambers if the Court be not sitting, may, on the application of the plaintiff or defendant respeciively, make such order for an injunction restraining the opposite party from further use, manufacture or sale of the subject matter of the patent, and for his punishment in the event of disobedience to such order, or for inspection or account, and respecting the same and the proceed ngs in the action, as the Court or Judge may see fit.
jmanufacture and importation of patented improve ments in canada.
Every patent shall be subject to the condition that such patent and all the rights and privileges thereby granted shall cease and determine, and the patent shall be null and void, at the end of two $y \in a r s$ from the date thereof, unless the patentee, or his assignee or assignees, shall, within that pepatentee, or his assignee or assignees, shall, within that pe-
riod have commenced, and shall after such commencement continuously carry on, in Canada, the construction or manufacture of the invention or discovery patented, in such manner that any person desiring to use it may obtain it, or cause it to be made for him at a reasonable price, at some manu factory or establishment for making or constructing it, in Canada, and that such patent shall be void if; after the expi ration of twelve months from the granting thereof, the patentee or his assignee or assignees for the whole or a part of his interest in the patent, imports or causes to be imported into Canada the invention for which the patent is granted.
Whenever a patentee has been unable to carry on the construction or manufacture of his invention within the two years hereinbefore mentioned, the Commissioner may gran to the patentee a further delay on his adducing proof to th satisfaction of the Commissioner that he was for reasons be yond his control prevented from complying with the same

## canadian patent fees.

The following are the patent fees:
On petition for a patent of 5 years.
On petition for a patent for 10 years.
On petition for a patent for 15 years.
On petition for extension from 5 to 10 years.
On petition for extension from 10 to 15 years
On petition for extension from 5 to 15 years.
On lodging a caveat
a patent.
aveats in canada.
An intending applicant may file in the Patent Office a description of his invention so far, with or without plans, at his own will; and the Commissioner shall cause the said document to be preserved in secrecy, and such document shall be called a caveat. If application shall be made by any other person for a patent for any invention with which such caveat
way in any respect interfere, it shall be the duty of the Commissioner forthwith to give notice by mail to the person who missioner forthwith to give notice by mail to the person who
has filed such caveat, and such person shall within three months after the day of mailing the notice, if he would avail
imself of the caveat, file his petition and
teps necessary on an application for patent.
REJECTIONS.
The Commissioner may object to grant a patent in the following cases:
When he is of opinion that the alleged invention is not patentable in law.
When it appears to him that the invention is already in the possession of the public with the consent or allowance of the inventor.
When it appears to him that there is no novelty in the invention.
When it appears that the invention has been described in a book or other printed publication before the date of the application, or is otherwise in the possession of the public. When it appears that the invention has already been patented in Canada (or elsewhere, for more than one year), except, however, when the case is one in which the Commissioner has doubts as to whether the patentee or the applicant is the first inventor.

## interferences.-ARBITRATORS TO DECIDE.

In case of interfering applications for any patent, the same shall be submitted to the arbitration of three skilled persons, one of whom shall be chosen by each of the applicants, and the third person shall be chosen by the Commissioner or his deputy or the person appointed to perform the duty of that office. And the decision or award of such arbitrators, or any two of them, delivered to the Commissioner in writing, and subscribed by them or any two of them, shall be final as far as respects the granting of the patent.
The arbitrators, or any one of them, after having been so worn, shall have the power of summoning before them any party or witness, and of requiring him to give evidence on oath, orally or in writing (or on solemn affirmation, if the person be entitled to affirm in civil matters), and to produce uch documents and things as such arbitrators deem requisite to the fall investigation of the matters into which they are appointed to examine, and shall then have the same power to enforce the attendance of such witnesses, and to compel them to give evidence, as is vested in any court of law in civil cases.
The fees for the services of arbitrators shall be a matte of agreement between the arbitrators and the parties.

## Canadian stamp penalties.

Every patentee under this act shall stamp or engrave on each patented article, sold or offered for sale by him, the year of the date of patent applying to such article, thus: "Patented 1872, " or as the case may be; any such patentee selling or offering for sale any such patented article not so marked shall be liable to the punishment of a fine not to exceed one hundred dollars, and, in default of the payment
of such fine, to imprisonment not to exceed two of such fine, to imprisonment not to exceed two months.
The penalty for using the stamp of patented upon an article that has not been patented is a fine not exceeding two hundred dollars and imprisonment not exceeding three months.

The above new Canadian patent law goes into effect Sept 1st, 1872, when a large number of patents will be applied for by Americans. In fact many persons, desirous of avoiding delay, have already ordered Canadian patents, and their spe cifications, drawings and models, are now in preparation for deposit in the Government archives at Ottawa. Messrs. Munn \& Co. have perfected their arrangements for securing Canadian patents in the most prompt manner, on very reasonable terms, and will be happy to furnish, without charge, further
information upon the subject to all who apply. Enquiries information upon the subject to all who apply. Enquiries
may be addressed to them at the Scientific American Office, may be addressed to
37 Park Row, N. Y.

# LETTER FROM PROFESSOR R. H. THURSTON. 

Pittsburgh, Pa.,June 25th, 1872,
A visit to the works of Messrs. Sellers. The Giffard Injector The Baldwoin Locomotive Works. Mountain scenery. The Pneumatic Railway Brake. The Water Scoop.
Another of the most interesting among the great manufac turing esta $\operatorname{sishments}$ of Philadelphia is that of Messrs Sellers \& Co., the well known builders of machine tools. Here about five hundred and fifty men are employed, and with the ingenious machinery and the effective system adopted in doing work, they produce a larger amount per year than could two thousand men have done ten years ago in even these works, which were then, as now, remarkable as a leading establishment in the business.
The Messrs. Sellers were among the very earliest in the introduction of the system, now almost universal among the best buil lers, of making all their work precisely to gage, and thus securing the best of workmanship and interchangeable parts. As representing the effectiveness of this modern parts. As representing the effectiveness of thin
method of manufacturing, their shops form, as in many other respects, a model establishment. Their machines are a nearly perfect in material and workmanship as it is to day
possible to make them, and they were probably the first to possible to make them, and they were probably the first to
prove by actual experience that such machinery can find a prove by actual experience that such machinery can find
market in this country at remunerative prices. It must be confessed that there are, however, comparatively few build ers who adhere, like this firm, to a determination to do none but the best possible work under all circumstances.
The planing machines and the steam hammers made here are, if a distinction can be made at all, particularly noticeable spiral pinion working into a rack, is found as effective as it is ingenious. The steam hammer has the weight of its drop in ts piston rod, which is made very large, and the system
adopted in guiding it and thus escaping the serious danger which arises in ordinary hammers from a glancing blow, is peculiarly excellent. The valve gear is at once the simplest a splendid tool.

## THE GIFFARD INJECTOR.

The Giffard steam boiler injector-that wonderful substitute for the steam pump-is another of the most interest ng machines made here. I well remember the incredulity with which I first heard, a dozen years ago, of this apparatus in which steam left the boiler, picked up a quantity of water while passing through the instrument, and carried it into the boiler again without the loss of a drop of water or of a particle of steam. I remember that the story appeared still more absurd when it was added that the new pump needed neither valve, plunger, nor any other moving part. It required a visit to the works of the Messrs. Sellers shortly afterward to remove all doubt, and, as a matter of course, the wonder, once seen, became the simplest thing imaginable. The manufacturers have greatly improved the injector since that time, and now there are few railroads in this country on which it is not in regular use.
Every minute spent in this establishment afforded useful information, and I only regretted that I had not a week to spare, instead of but a few hours.

THE BAIRD LOCOMOTIVE WORKS
An afternoon was spent very pleasantly, and most profitably, in the great Baldwin Locomotive Works of Messrs. Baird \& Co. At this establishment, more than twenty-five hundred men are at work, turning out from seven to nine completed locomotive engines every week, and the orders still increase. The proprietors of the works were working men who have, by their industry, intelligence and good management, become the employers of this industrial army, and who have shown what may be done by labor in the acquisition of capital, teaching the same lesson that may be learned in nearly all of the most successful manufacturing estallishments here and abroad. All work is here, also, made to gage, and the several parts are "assembled," to make the complete machine, without the expense attending the old process of "cutting and carving" in fitting up. Some of the engines in progress here are for Russian railroads. Like the majority of great industrial establishments, this immense manufactory has been many years in process of growth. It was established half a century ago, and its first locomotive was built in 1830. In 1831, an engine was built here for the Philadelphia and Germantown railroad, which is said to have run a mile in a minute.
Good material, good work, and a plain finish, seem to be the practice here.
There are many other large manufactories and interesting places that attract the attention and afford valuable information to the engineer, and a dozen of them would each affor 1 material for a full column in the Scientific American ; but my time was limited, and I was compelled reluctantly to leave the "City of Brotherly Love," and to pursue my journey westward over that most excellently managed road, the Pennsylvania Railroad.
the pennsylvania railroad and its scenery. The excellence of the road bed and the smoothness with which the train ran-sometimes over forty miles an hourallowed the passengers to enjoy, without annoyance, the beautiful scenery of the Alleghaniea. The atmosphere was slightly hazy, but not so much as to interfere seriously with the view of distant mountains and adjacent valleys. At this season, when every mountain side is clothed with the fresh verdure of early summer, and the atmosphere still gives that softness to the distance that is only seen when the heats of summer or the low temperature of winter has not deprived it of its moisture, the scenery is most lovely. This oldest of our mountain chains certainly presents studies for an artist which, if surpassed in grandeur by those of younger ranges, cannot be excelled in quiet beauty.
The run down the western slope of the mountains gave an excellent opportunity of watching the operation of the Westinghouse air brake, which has been many months in use on the Pennsylvania railroad and, we were told, giving perfect satisfaction. We were much pleased with what we saw of it. A continuous brake, not liable to break down just when
most needed to "brake up," powerful but controllable in most needed to "brake up," powerful but controllable in action, and directly under the hand of the engineer-all of which merits are claimed for this-is a much needed invention, and its successful introduction would undoubtedly save many ives, a large amount of property, and perhaps considerable of the expense of running fast trains making frequent stops; and, still further, it would save time to a very important de gree. S
At apted.
At Altoona, a station house roof truss attracted attention y its neatness and simplicity. We noticed also, at two oints on the road, troughs of considerable length laid down thplied $x$ red supplied with water, without stopping, by letting duwn a
curved pipe until its mouth entered the water; and, at the curved pipe until its mouth entered the water; and, at the
high speed at which it ran, it scooped up a quantity while high speed at which it ran, it scooped up a quantity while
running the length of the trough to replace that previously drawn from the tender. This device has been for some time in use abroad, but the Pennsylvania railroad is probably the first to introduce it in this country. It will probably be found a very valuable device on long lines of road running through express trains.
We finally arrived at Pittsburgh on time, after a quick and pleasant run, and are perfectly willing to agree with those who claim for the Pennsylvania Railroad the credit of baving an excellent road bed, good rolling stock, and the best of management.
R. H. T.

Facts for the Ladies.-Mrs. H. F. Taylor, Brasher Falls, N. Y., has
ased a Wheeler \& Wilson Lock-Stitch Machine since 1858 in dress-making aud tamly se wing, without any repairs and has broken but 2 needles in 13 years. See the new Improvements and Woods' Lock-Stitch Ripper
Burnett's Cocoaine gives new life to the hair.
To Lead all Competitors is the aim of the proprietors of the New To Lead all Competitors is the aim of the proprietors of the New
Wilson Under-Feed Sewing Machine. It is founded on the very best prin. ciples known to the sewing machine science, and improvements, in advance
of all other sewing machines, are being adopted constantly. The Wilson is of all other sewing machines, are being adopted constantly. The Wilson is
rapidly gaining the preference of all parties that are acquainted with sewraxidly gaining the preference of all parties that are acquainted with sew.
ing machines, and it has already taken the front rank among the first-class ing machines, and it has already taken the front rank among the first-class
machines of this country; and its price, owing to its being manufactured where labor and material are much cheaper than in eastern cities, is fifteen dollars less than all other first-class $m$ nchines, which fact alone is sufficient to induce all to examiue the New Wilson before buying any other. Sales.
room, 707 Broadway, New York; also tor sale in all other cities in the U. S .

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For Sale-To R. R. Contractors: Two second hand direct-act ing Locomotives, 12 tons and 20 tons weight-in good running order. Ad-
dress Grice \& Long Loco. Works, 1310 Beach St., Philadelphia, 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
Wanted-A 2d Hand Boiler of about 3 horse power. Whit ney
Wanted-A situation under instructions in draughting room by a young man who is a machinist. Address J. s. C., care of B. F. C.
For the simplest, cheapest, and best Rotary Pump in use for thick or thin liquids,send for circulars to Hersev Brothers,So. Boston, Mass Wanted-Iron Planer, of 5 to 6 ft . square by 12 to 16 ft . long, capacity. Must be new, or as good. Will exchange for some choice selected lands situated within 5 to 10 miles of
Iowa. John Cooper \& Co., Mount Vernon, Ohio
The best Bolt Forging Machines are those that work verti cal, and forge Bolts any length horizontally. For such, address John R.
To Capitalists-Two valuable Patent Rights for Sale or ex change for other property. For particulars, address John J. Baringer Germantown, Columbia Co., N. Y.
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 for manufacturing pu., wosez, 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.
Old Furniture Factory for Sale. A. B., care Jones Scal Works, Binghamton, N. Y
Steel Castings to pattern, strong and tough. Can be forged and tempered. Address Collins \& Co., 212 Wa - © treet, New York.
The Waters Perfect Steam Engine Governor is manufactured by he Haskins Machine Co., Fitchburgh, Mass.
Presses, Dies, and Tinners' Tools. Conor \& Mays, late Mays \& Bliss, 4 to 8 Water st., opposite Fulton Ferry, Brooklyn, N. X.
Portable Baths. Address Portable Bath Co., Sag Harbor, N.Y Standard Twist Drills, every size, in lots from one drill to 10,000 , at $2 /$ manufacturer's price. Sample and circular mailed tor 25 c . Hanilo
If you want to know all about the Baxter Engine, addresss
Wm. D. Russell, ofllce of the Baxter Steam Engine Co., 18 Park Place,N.Y. If you want a perfect motor, buy the Baxter Steam Engine. Manufacturer's and MillSupplies of all kinds. Greene,Tweed \& Co., 18 Park Place, New York
Blake's Belt Studs. The best fastening for Leather or Rub ber Belts. 40,000 manufacturers use them. Greene, Tweed \& Co., 18 Park
Brown's Coalyari Quarry \& Contractors' Apparatus for hoisting zud conveying material by iron cable. W.D.Andrews \& Bro,414 Wator st.,N.Y.
Minaing, Wrecking, Pumping, Drainage, or Irrigating Machin. ery, for sale or rent. See advertisement, Andrew's Patent, inside page. For Tri-nitroglycerin, insulated wire, exploders, with pam phlet, as used in the Hoosac Tunnel, send to Geo. M. Mowbray, Nort

Machinery Paint, all shades. Will dry with a fine gloss as soon as put on. $\$ 1$ to $\$ 1.50$
Agents, 116 Maiden Lane.
All kinds of Presses and Dies. Bliss \& Williams, successors to Mays \& Bliss, 118 to 122 Plymouth St., Brooklyn. Send for Catalogue For Steam Fire Engines, address R. J. Gould, Newark, N. J. In the Wakefield Earth Closet are combined Health, Cleanliress and Comfort. Send to 36 Dey St., New York,for descriptive pamphlet. To Ascertain where there will be a demand for now Machin


Dry Steam, dries green lumber in 2 days; tobacco, in 3 hours; and is the best House Furnace. H. G. Balkley, Patentee,Cleveland, Ohio. The Patna Brand of Page's Patent Lacing is the best. OrAbsolutely the best protection against Fire-Babcock Extin Absolutely the best protection against Fire-Babco
guisher. F. W. Farwell, Secretary, 407 Broadway, New York guisher. F. W. Farwell, Secretary, 407 Broadway, New York.
Williamson's Road Steamer and Steam Plow, with Rubber Tires. Address D. D. Williamson, 32 Broadway, N. Y., or Box 1809. Belting as is Belting-Best Philadelphia Oak Tanned. C. W Arny, 301 and 303 Cherry Street, Philadelphia, Pa.
Diamond Carbon,of all sizes and shapes, furnished for drilling rock, sawing stone, and turning emery wheels or other hard substances
also Glazier's Diamonds, by John Dickinson, 64 Nassur st, New Boynton's Lightning Saws. The genuine $\$ 500$ challenge Will cut five times as fast as an ax. A 6 foot cross cat and buc
E. M. Boynton, 80 Beekman Street, New York, Sole Proprietor. The Baxter Steam Engine is safe,and pays no extra Insurance. Peck's Patent Drop Press. For circulars address the sole manufacturers, Milo, Peck \& Co., New Haven, Ct.
Better than the Best-Davis' Patent Recording Steam Gauge Simple and Cheap. New York Steam Gauge Co,, 46 Cortlandt St., N. Y. For Solid Wrought-iron Beams, etc., see advertisement. Ad or Solid Wrought-iron Beams, etc., see adven Iron Mills, Pittsburgh, Pa., for lithograph, etc.
For hand fire engines,address Rumsey \& Co.,Seneca Falls, N.Y

## T10tersiquwries.

[ We present herewith a series of inquiries embracing a variety of topics of greater or less general interest. The questions are sit
prefer to elicitpractical answers from our readers.]
1.-Coloring Linseed Oil.-How can I color linseed oil d or brown? Aniline in alcohol will not do.-.d. P. W.
2.-Taxidermy.-How are birds and animals stuffed?-
3.-Cleaning Marble.-What is the best way of clean
4.-Polishing Knives.-Will some one inform an old 4.-Polishing Knives.-Will some one inform an old
bscriber how the English polish is put on knives, how the wheels are subscriber how the English polish is put on knives, ho
made and what kind of leather should be put on?-J. G.
5.-Walnut Stumps.-What is the value of walnut tumps and in what shape should they be sent to market? Are the white
6.-Vinegar.-Will some practical man inform us of the best mode of making vinegar from the best materials, that the public may
not continue to be poisoned by vitriolic and other mixtures?-G.
7.-Skin Diseases.-I notice in your paper of May 11th, 872, a communication from a sufferer from skin disease, attributing the cause to the use of a certain kind ot soap. I am one of many shop mates
who have the same disease, and 1 think we contracted it from using sand paper, as it is altogether on the hands. I have had it two months, and have had two of our best doctors here at work on me, but without success. What they give me to use are washes for the hands, which apparently drives it
away for a few days; but just as soon as I commence to work, out it comes again. I have been using carbolic acid and glycerin, bathing the hands in trong salt brine, nitrate of lead, and sulphuret of potassium ; the latter ap grateful to you if you could get, from some of your eminent physicians in New York, a radical cure. I think some medicine should be taken to purify the blood, but both the doctors I have seen do not give me any.-C. N.

## Gutures to Correspundents.

## PEOLAL NOTLA-This column $\frac{18}{}$ destgned for the general interest and in

 struction of our readers, not for gratutitoous repties to questions or a purelybusiness or personal nature. We woill publish such inquiries, Roween, when pata for a
and Personal.'

## LL reference to back numbers must be by volume and paje.

J. D., and others.-Multiply together the area of the piston in inches, the mean boiler pressure in pounds per square inch, the length
of the stroke in feet, and the number of strokes per minute; divide bv of the stroke in feet, and the number of strokes per minute; divide b
33,000 and you have the horse power of your engine.
To R.P.P.-There are positive and negative poles to the induced currents of the electrical machines that you speak of. As to
method of manufacture, consult books on electricity. It is not new to place a wheel at the bow of the canal boat, nor to have side pieces ex tended forward to prevent lateral movement of swell or
plan was illustrated in last volume of SCIENTIFIO AMERICAN.
W. S. M.-The clearest and most dense ice will keep the longest and produce the most refrigeration. Placed in water, the tem
perature produced by two cubes of ice, one of porous other of dense clear ice, will be the same. But the clear ice will refriger ate a larger quantity of water than the porous ice.
Milk Soured by a Thunder Storm.-Milk, beer, and other fluds turn sour by oxygenation. After a thunder storm there is al ways
in the air a considerable excess of ozone, which is oxygen in its most ac tive condition, re ady to attack any matter that can be affected by it. -D . B., of N. Y

Proportions of Steam Engine.-D., query 5, page 26, i is informed that James Watt determined that the condenser and air pump should each have one eighth the capacity of the cylinder. In more
modern practice, however, the air pumps are made larger, especially in modern practice, however, the air pumps are made larger, especially in
marine engines. Some engineers also make their condensers larger, bu
the practice is not justified by any economical result. -D. marine engines. Some engineers also make their condensers larger, bu
the practice is not justified by any economical result. Dimensions of Belit-Query 7, page 416, Vol. XXVI.-W J. S. can ascerta'n the width of belt required'for his purpose by calcula-
tion from the speed of his driving pulley. A belt one foot wide running
at the speed of seventy feet per minute will develop one tion from the speed of his driving pulley. A belt one foot wide running
at the speed of seventy feet per minute will develop one horse power; belt three inches wide, to develop the same power, must run of course a 280 teet per minute.-T. L., of Mass.
Gilding on Glass.-In answer to J. F., query 5, page 416 Vol. XXVI., I would say that gilding on glass is done by the use of what
is termed a water size, made by the use of some mucilaginous substance, is termed a water size, made by the use of some mucilaginous substance,
such as the white of eggreduced with water. I conclude that Euglish such as the white of eggreduced with water. I conclude that Euglish
gelatin is best, but great care is necessary not to make it too strong; and
it shoul it should be perfectly clean. therefore straining it through thin muslin is First clean the glass perfectly with alconol ; then apply the sizing with a
fiat camel hair brush, and immediately lay the gold leat: Stand the flat camel hair brush, and immediately lay the gold leaf. Stand the
glass on edge and aliow the surplus size to settle from under the gold
out your designs on paper and transfer by the use of some sharp pointed instrument, pricking through the paper; then paint your design on top of the gold; asphaltum varnish is a good material for that purpose. When
that is dry, wash off the surplus gold, and shade the letters or other design with paint of any color desired and let it dry. If you desire a colored ground, then paint the whole surface with the color desired. Expertence is necessary forthis class of work.-R. F., of Mass.
Ocean Cables.-H. F. H., query 1, page 416, Vol. XXVI.The Atlantic cables mostly lie at the bottom of the ocean, but there are
many stretches between the submarine mountain peaks. The specific ble $c$ sin ea. - Е. H. H., of Mass
Cement for Letters on Glass.-To J. F.-This is fre quently made by diluting white of egg with water to a suitable degree o
fluidity, and adding a little carbolic acid to prevent decomposition, and then flitering. Paint the glass by means of a badger hair brush, allow it to partially drv, and apply gold or silver leaf, and allow it to become thoroughly dry. Now put on the stencil plate. and with a needle poin mark out, down to the glass, the letters or design. Then put the whole plate into a shallow dish of tepid water, and by means of a stick, finger or finger nail, etc., rub off the extraneous metal, and you will have you fect brilliancy.-E. H. H., of Mass.
Slack Coal and Sawdust.-To J. F. T.-Mix them toge ther with enough gas tar to stick and make into bricks. A machine like the would probably answer, especially such a one as would press the mas into a mold, and not such as would drive out the stuff in a stream then to be cut with wires. This last style of machine would inevitably make very poor work, but by the former you would get, I think, a splenof Mass.
Slack Coal and Saw Dust.-J. F. T. can burn all his saw dust forfuel if he has proper grates and has a good draft to his fire box $I$ am sawing green hemlock with a five feet circular saw, and burn ever bit of sawdust made. I use no coal or extra fuel. - N. J., of N. Y. titing Steel Augers, etc.-To A. V., query 10, pag 354. Vol. XXVI.-I would say, first, that the diameter should vary wit
the diameter and pitch of thread, and should be about two inches fo threads from 24 to 32 , three inches from 16 to 24 . The number of revolu tions should be from 12,000 to 16,000 per minute, and a pulley $2 \times 2$ (on steel arbor running in Ba bbitt boxes) will be large enough to run it. A.
v. will find he will have to harden his cutters and temper to a straw color in ordes to have them stand.-C. M. P., of Mass.
Test for Zinc.-To J. B.-The simplest method for an amateur to employ is probably to evaporate a gallon of water to dry
ness, put the residue on to a platinum wire, and moisten with a solutio of protonitrate of cobalt. Apply the blowpipe flame, and the little mas will yield a green colored a ppearance if zinc be present. Other mean of testing are adopted, but to any but a professional will be found com plicated. The presence of flve grains in a galion would eventuall prove injurious, but it would probably be only after a lengthened use
such water. The antidote for acute zinc poisoning is the exhibition of an emetic, and afterwards the drinking copiously of albuminous fluid an large doses of tannin or oak bark tea, etc.-E. H. H., of Mass.
United States Coinage.-To F. R. E., query 16, page 10.Copper cents were issued first in the year 1793 and ceased in 1857. In 1815, there were none coined. The half cents made their first appearance
in 1793, and were discontinued in 1857 . In 1798, 1801, 1812 to 1824 inclusive and 1852 there were none coined except a few patern pieces in 1813 , 183 1840, and the eight succeeding years, and 1852. The eagle head nickel were first issued in 1857, and in 1859 were supplanted by the Indian head

## qerent gmeticam and forcign catents.

## Under this heading we shall publis. nent home and foreign patents.

horse Shoe Nail Clinoher.-Wm. H. Lyman, Springfield, Mo.-Man firorts have hitherto been made to construct this tool so as to afford the reatest leverage to the hand of the smith, to avoid side strain upon the ail. Some clinchers have one of these advantages and some another, but one have hitherto combined them all. This clincher has the following aid antages: 1st: It is constructed so as to take off all side strain from the fastening screws or pivots and thus to allow none of the parts ever to lose
their true relative position to the others. 2nd: It is provided with double everage jaws, so that the grip of one hand will easily and accurately clinc rom slipping and causes it to rock on the nail head. The effect of these several advantages is to give the smith complete control of the horse's foot, whil e is Deing shod to enable him always to turn off perfect work, and with furnish him with a Harvester Reel.-George S. Grier, Milford, Del.-The invention con sists in supporting an adjustable reel by means of a pivoted crank shaft,
which passes through the hollow shaft of said reel and moves up or down with it.
Fire Kindler Case. - David W. Thompson, St. Joseph, Mo.-The inven on consists of a screw capped can tor holding the oil and kindler, so that the former is prevented from spilling or waste in the event of the can being the can while the can is being handled; at the same time the kindler the can while the can is being han
always saturated and ready for use.
Rossing Machine. - Charles Gilpin and James T. Hill, Cumberland, Md The invention consists in causing the knife of a rossing Cune to chan ween the rolls, and in the peculiar arrangement of devices by which this newiaea is carried out.
Peanut and Coffer Polisher, - Benjamin F. Walters, Norfolk, Va.-The opper, so that coffee or peang a rotary and stationary brush with a feed opper, so that coffee or
Circle for Carriagh.-Edwin Wilson, Prattsburg, N. Y.-This inven tion relates to an improved method of connecting the reach, front axle, attached to a three armed plate or strap which rests upon the circle. The
arl straight part of the circle is attached by clips and yokes to the axle. The ing bolt is attached to the upper side of this straight part, and passes hrough thestrap and the head block. The whole is strengthened by braces Coverivg Tubular Fabrics with Rubber.-William H. Bates and
Hugh Faulkner, of Leicester, England, assignors to Ezra Thomas Sawye Hugh Faulkner, of Leicester, England, assignors to Ezra Thomas Sawyer or East Hampton, Mass. - This invention relates to a new machine for ap elastic gum to tubular fabrics that are to be made water tight. It is more particularly adapted to, and intended for, the manufacture of rubber hose butmay also be used for other tubular fabrics. The tube to be covered has core placed within it and is joined at the ends. It is passed over two solution, drying cylinders, and an annular scraper until the covering is hick enough.
Watre Wheel.-James P. Lamoree, of Mexico, N. Y.-This inventio diametrical pairs, and are thrust in and out as they rotate. It consists in djusting the throw of the buckets so that the maximum protrusion thereo takes place at different points, which is accomplished by means of a shaft axle and axis which are arranged adjustably in a rectangular slot in the
ymiddle part of each pair of buckets.

Provecrive.-John Rigncy, of WestPoint, N. Y.-In this invention a com-
position or soft meatal cap is applied to the rear end of the projectile in such position or soft metal cap is applied to the rear end of the projectile in such
a manner that its sides are torced over a conical part of the shot and ex. panded into the grooves of the gun when thesame is fixed. The cap is coninto corresponding zigzag grooves formed on the end of the projectile.
These grooves areso formea to torevent the back ward escape f the etuds,
but they admit their forward movement when the cap is driven forward by but they admit
the explosion.
Cuntiv $\triangle$ tor.- William C. Percy, of Bayou Sara, La.-This invention furnishes an improved plow for cultivating cotton and corn, especiallion of une
when it is desired to simply 1 losen and pulverise the soil and destroy the When it is desired to simply loosen and pulverise the soil and destroy the
weeds without turning a furrow. The plow, which is made pointed, is curved forward so ast of form the arco of a circle e ten in inches in diameter. The
middle
 ast the body of the plow. The curvature and the opening cause the plow to
pass asily through the ground and destroy the weeds, stir up and loosen the pass easily through the ground and
soil, and leave itloose and level.
Woon Fuluring.- Frank Seabury, of Yarmouth, Me.,. assignor to himself,
John S. Seabury, Ammi D. Seabury, Adolphus Grant, and Nicholas Grant, John S. Seabury, Ammi D. Seabury, Adolphus Grant, and Nicholas Grant,
of same place.-In varnishing or otherwise finishing wood the varnish sinks into the grain and it is is imposishle to make a aevel surface by using varnish alone. If the wood is oiledithe grain is left open, and in use fills with dirt.
To remedy this various illings are used ; but all have to be colored to imi-
 same color of filling 1 is used for the whole piece. To obviate these difflcul-
ties the inventor employs the substance known as terra alba. It is finely ground or powdered, mixed with oill, and applied in the ordinary manner. ground or powderea, mixed with oil, and applied in the ordinary manner.
This filing is ransparent, ooes not injure the eolor of the woon, alow ail
the shades ot tolor and the grain of the wood to show, and, at the same time, the shades ot color a
Laspr Chimney Cleaner.-Adelbert Austin Ford, of North Abington, Mass.- This invention reatest
consists in con an in improved lamp conimney cleaner, and cattached a swab and wiper. The swab is mate of manilla and fasteneo ot o
 length by a saw, and the wiper is simply a square piece of paper or cloth, so
folded or crimped that it enters the silts, and is then folded down by turning the stem with one en and and hololidng the wiper loosely with the other. A thimble slides loosely on the stem, and is crowded up on to the wiper to
hold it in place. The thimble is made slightly tapering so that it does not tear the paper while gathering and confining it tightly to the stem.
STove Prpe DA Mprp.-Charles Reed, of Beaver Dam, Wis.-This inven-
tion supplies a selt cleaning damper for stove pipes. It consists of a metal
 fit into the slots of the digk and nearly close them. These are mounted on
the same axis, sot hat the bars may be turned down through the slots and the the same axis, so that the bars may be turned down through hesiots an a
passage opened. The turning is effected by thumb screws, which are so arpassage opened. The turning is fected bed thumb screws, which are so ar-
ranged that the grate may be turned alone, or the grate and diik together. Nor Lock.-Rasselas G. Peterson and Jonathan Coulter, of Perryville, for other purposes, and consists in the une of a hook in connection with a
grooved nut and recessed fish plate by means of which the nut is locked. The nut on its inner face has a number of grooves. The plate is also grooved or recessed close to the aperture which admits the bolt, the recess being L-
shaped. When the nut has been screwed on to the boot as far as necessary, and until one of its grooves is in line with the longer part of the recesss, the and until one of its grooves is in line with the longer part of the receess, the
hook is inserted in the recess and pushed under the nut into the troove, The
nutis then slig ghty unserewed, carrying a projecting ear of the hook into nut is then slightly unscrewed, carrying a projecting ear of the hook into
the L -shaped recess. The hook in this position properly locks the nut, as the L -shaped recess. The hook in this position properly locks the nut, as
during a jar or motion of any kityd the tendency of the nut to become unscrewed will only the more firmly apyly the hook to its place and insure the
lock.
Bridgr.-Reuben L. Partridge, of Marysville, Ohio-This invention furnishes an improved brige which is simple e th construction, light, and strong
ind consists in the construction following: $\boldsymbol{T}$ The upper and lower chords are made in two sections. The ends of the ties or posts are securely bolted to
and between the sections of the chorde,and stand at.an angle of sixxy degrees and between the sections of the chorde, and stand at.an angle of sixty degrees
with the horizontal plane. The main braces are arranged in pairs, and stand at an angle of forty-five degrees wach the
two braces of each pair are parallel with each other, pass upon opposite two braces of each pair are parallel with each other, pass ppon opposite
sides of the ties or posts, aud are bolted at their middle parts to the middle part of the said ties or posts. The ends of the braces rest against iron toot
pieces wilch are interposed between the ends of the braces and the ties and pieces Which are interposed between the ends of the braces and the ties and
chords. The sides of the foot pieces are fanged so that the ends of the braoes rest squarely
on the ties or posts.
WIND WrexL.--James J. Hoses, of Cape Girardeau, Mo.-This invention
relates to a new self regulaths windmill the motion of thich does not vary relates to a new self regulating windmill, the motion of wiich does not vary
with the strength of the wind, but is always steady, It consists in surround ing the fana or whenel, with an an urigight stationary cylinderer which is provided
with about eight large openings throug which the wind is admitted to the with about eight large openings through which the wind is admitted to the
fan. Each opening is furnished with a gate which is pivoted vertically near the middde in such a manner that the eind when strixingit has a tendency to
close it. It in is also furnished with a weighted close it. It is also furnished with a weighted lever which tends, on the
other hand, to keep it open. In this way, aided by other attachments, the wind is admitted to the fan in quantity proportionate to the work to be
done.
Stretr Cars.-John Stevenson, of New York city.-This well known
 improvements in their construction which consist as followss: The frrst in -
vention relates to securning the metalice connection between the running vention relates to securing the metallic connection between the running
gear and the body of the car, which 18 accomplished by interposing rubber gear and the body or the car, which 18 accomplished by interposing rubber
or other elastic material between the parts so as to reduce the discomfort or other elastic material etween the parts so as or reauce the discomfort
experienced by passengers rom the noiss of the wheels, the clatterno of
the parts, and the tar occasioned by applying the brakes. The next im.
 provement consists in maknys the axre journal without a shoulder and plac
ing a spring hene at its end, by which arrangement, as the ear is forced
from side to side throush inequalitities in the track, the concussions are re. from side to side through inequalitites in the track, the concussions are re.
Hieved by means of the spring check. The third invention provides means 11eved by means of the spring check. The third invention provides means
for securely holding anf fascenng the caps of car axte jourana booxes and
the tourth improvest the construction ot car trakes so as to simplify the same

Mowing Machins.- Benjamin Attwood, of Stanstead, Canada.-This inYention furnisisens an inpmoved reaper and mower which in simplete in in in-
struction, light, strong, and durable, not liable to get out of order, and struction, liight, strong, and durabue, not liable to get out of order, and
which readily adaptst tisesf to inequalities of the e urf face of the ground, has a very light side dratt, and consists in a peculiar arrangement of a lever suspension har, and brace bar,in combination with the
frame, by means of which these objects are attained.
CAR CoupurscG.-Samuel G. Northrop, of Wilmington, N. C.-This inven.
tion turnishes an improved car coupling which is simple in construction and is ad husted to couple itself when the cars are run together. The cavities of the bumper heads of of the car are arivided int two compartments by
horizontal partitions. The coupling ins pass down through the bumper horizontal partitions. The coupling pins pass down through the bumper
heads and through the coupling link or bar which enters the lower com-
 car when the cars are run together. The thinner end of the link has a slo car when the cars are run together. The thinnere end of the link has a slot
ormed through it to receive the coupling pin. In each partition, at therear side of the hole through which the conpling pin passes, is formed d recess to
reeeive the lower end of the pin so as to hold it suspended whtle the cars reecive the lower end of the pin so as to ohold it suspended whtle the cars
are being run together. The recesses support the pins with their lower Levers are pivoted to the sides of dropinto their holes when pushed out. Levers are pivoted to the sides
the bumper heads at the rear edge of the horizontal partitions. Their up.
per ends per ends are bent forward, so as to nearly touch the coupling pins when to
position to couple the cars. As the cars are run together the forward end of

 ings, which is simple in construction and effective. Two short rollers are
placed endto end upon a shaft which is attached to the centers of thelower sides of three longitudinal bars. The lower sides of the bars are beveled towara their ends, so as to prevent them catching upon the ground. They
are connected at their ends and at their center by cross bars. The centra
 king bolt or pivot to receive a swinging bar or bolster upon which the
building reests while being moved, and to which are attached two or more
 place beneath the building. To the under side of the end parts of the bols-
ter arepivoted the ends of bars or straps by which the bolster is rigidy con. nected to the framework of the truck when adjusted. This construction enables the truck to be adjusted with respect to the direction in which the
building is to be moved, or to change it without disturbing the connection builang is to be moved, or to change it
between the bolster and the building.
 of Philadelphia, Pa.-This invention turnishes an improved cooler for pre-
erving and transporting butter, milk, lard, and other articles. It consists of an oval cooler which is strensthened by hoops. At the ends are ice chambers, and along the esides, Whitchare made double, is packed iome suit.
able non-conducting material. The cover, which is in two parts, hinged, is able non-conducting material. The cover, which is in two parts, hinged, is
also made double, and the cooler has a false bottom, both of which are flled with similar material. The waste water is conducted so as to run off freeis hrough a stop cock.
 saccharine juices,and in extracting nearly all the crystallizalle sugar the of in contained, by means of the hydroffuosilicate of ammonia, or the double
fluoride of silicium and ammonium, or other double fluoride contaning fluoride of silicium and ammonium, or other donble fluoride containing
silicium, whereby more or less insoluble precipitates are formed, whose silicium, whereby more or less insoluble precipitates are formed, whose
presence in the saccharine juices would have prevented the crystallization of a certain quantity of sugar; and, also, in the atter treatment of the preates.
 Lebbeus W. Lathrop. of same place.-This invention consists of an im-
roved arrangement of spparatus for working a spool carrier in a continu. us rotary course; the combtration, which includes several ingenious con trivances, and mode of operation would hardly be understandable from a
verbal description.
Wardrobe Bureat.-John H. F. Lehmann, of New York city.-This inonstructed as to serveea variety of purposese. It may be used as a bureau or expanded into a wardrobe, and admits of service as a writing desk also. Aprarates for Draining and Cooung Stari-Branch Tanner, of by means of wixich sugar may be cooled and strained readily and and in.
no expensively. An open case or cooler is mounted on trunnions so that it can be turned upside down, and in this the hot cooked sugar is placed and
allowed to stand uncoovered untilit is cooled. Then perforated tubes with equally distributed throughout, after which a straining cover is fastened on
the top oftte case, and the same turned over. The molasses isthus allowed tescape through the tubes and strainer and the sugar is retained.
STop Morion for Knirtive Machins.-Thomas F. Wynn, or Atlanta,
Georgia.This invention has for its object to provide an improved stop Georgia.-This invention has for its object to provide an improved stop
motion for looms and knitting machines of the elassin which the motion of the machine is arrested, immediately on the breaking of a thread, by means mediate mechani Ton consists in the arrangement of certain wires, rotary rings, and othe connected parts, whereby a simple, inexpensive, but efflcient piece of me-
chanism is produced.
MrdicaL Couroond and Disinfrgotant.-Joseph Walton, of Newark Ohio.-This invention furnishes an improved medical compound for driv ing away mosauitos, filies, ett. from the person or house. It is a disin-
rectant and prevertive, especialy in cases of cholera, small pox, etc., and
is
 one ounce; aarbolit acid, twelve ounces; aqua ammonia, ten drams; and
salt soft water, eight drams. Honss Powrr.-William G. Halbert, of Columbus, Miss.-This invention is an improvement in horse powers. Some distance belowthe main wheel
are fitted, through the shaft, cwo radial beams, each of which is somewhat longer than the diameter of the wheel and is slotted at both ends. The noer end of each draft beam is, by an inclined brace, connected with the
nder side of the wheel, while near its middele it s , by a pin or bolt, connected with the end of one of the radial beams. The pin plays in the slot
of the radial beams. The four ends of the two beams may in this manner be connected with as many draft beam on or evers.. Be this an arrangememant condide
erable leverage is obtainad, the power increased and equalized, and the nachine made more valuable.
Mill Piok.-Frank Kortick, of Mendota, ill.-This invention relates to certain improvements in mill plcks, which consist in holding the movable
blade firmly in position between two jaws, one of which is rigid and the other a spring jaw, which latter is pivoted to the further end of the former so as to allow of its swinging laterally. The blade is frrmly lod ged against
steps in the rigid jaw, from one to another of which it is shifted as it wears out. The hande 18 provided with pivoted clamps by which the set ot the pick may be adjusted.
Broom axd briss Holdrr.-George b. Cunningham, or Northampton, aass,-The object of this invention is to improve the machinery employed in the manufacture of brooms and brushess, it consists ot a holder for the
broom or brush handle which is used while putting on the corn and which does not injure the handle. It is constructed of a tube, from the interior
dircumference of which at one end project spring wires circumference of which at one end project spring wires with jaws at their
ends. A cap is screwed on to the end of the tube and compresses the jaws more and more as it is further screwed on. The broom or brush h
inserted in the tube and held by the compressed jaws as described.
Stran Evaine-John Donnelly, of Hudson, N. Y., assignor ot one hal Class of steam enginesin which rotary motion is established by the cros head or a projection thereon acting against spiral ribs on a cyllinder; ; and
tonsists
arst it consists, first, of a ajointed piece on each of the flanges or ribs, with a
spring which rises and allows the cross head to pass from one rib to the
 one to the other of the cylinders to reverse the motion, the cylinders being
arranged for driving in opposite directions. It also consists of a brake for arresting the motion. which is formed by a cam wheel on the driving shaft
and a secondary steam piston arranged to be forced against the wheel, and a secondary steam piston arranged to be forced against the wheel,
said secondary piston being in the end of the steam cylinder opposite to the main piston.
Railway Gate.-George A. Kristie and Samuel Horn, Fort Seneca, signed to be operated automatically by means of a spirally grooved o langed roller, arranged so as to be acted on by the wheels of the locomo
tive. The roller is placed outside the track, but is secured to the rail, and is connected to the pivoted gate by a link, or bar, which, when the gate
closed, assumed a vertical or inclined position over the roller. In this wa great leverage is obtained on the gate, and it can be raised rapidly an without liability to injury.
atmosperic Water elevator.-Frederick Baldwin, Janesville, Wis consin, assignor to Alexander Graham, of same place.-The object of this
invention is to obtain a self acting water elevator or conveyer, which is operated entirely by air pressure derived from a roservoir of compressed
water chambers, foate, and automatic valives, all arranged to subserve the
desired purpose, in the most economical and practical manner.
 connecting the front end of the platform of the common two wheeled hand
trucks used in stone yards to a front truck which is provided with gear for readily hitching thills to it and unhitching them, whereby all the ad van tages ombined with those of a horse truck, foot of the stone, throwing the stone over on to to ita and then tiliting the stone and platiorm back on the wheels, may be performed in the same way
with the horse truck that it is done by the hand machine, by simply detach. With the horse truck that it is done by the hand machine, by simply detach-
ing the platrorm from the front truck. After the stone is loaded, the front
and rear trucks con be nd rear trucks can be again connected.
Watre ElequTor.-Eli Deaver, of Rokeby, Ohio.This invention re 1ates to a novel arrangement of a slididng delivery trough with a well curb.
With the exception of an opening through which the bucket passes into and out of the well, the curb is is closed at the bottom. The sliding delivery
the the trough is composed of a spout and an enlarged part which is designed to
cover the opening. The spout is made of sumfelent leos th to cover the opening. The spout is made of sumflelent length to protrude
through the side of the curb, and when the bucket is to be lowered it is drawn out os as ouncover the opening. So soon as the bucket is again
devented the trough is pushed in drawn out so as ou uncover the opening. So soon as the bucket is again
elevated, the trough is pushed in and the bucket lowered to allow it to rest
in the trough and occasion the delisery of itse in the trough and occasion the delivery of its contents by means of a valve
in its bottom. By this arrangement tulting or lateral movement of the its Dottom. By this arrangement tilting or lateral movement of the
bucket is obviatee; the trough spout does not protrude when water is not eing drawn, and no filth can get access to the well
Mold for Casting and Chiluing Sherigh Srors.-Volney A. Butman,
Ironton, assignor to himself and V. L. Benjamin, Fond du Lac, Wis.-In this invention the improvement consists in ofrming the lower part or nowel of the flask with a cast iron bed mounted on wheels, whose surface is so shaped
as to give the reaqisite curved form to the shoes cast as to give the requisite curved form to the shoes cast upon it. The sides of
the nowel are cast separate and frmmy fastened the nowel are cast separate and frrmly fastened to the bed by meansof bolts.
The ends are made detachable, being held by means of hooks to the projectThe ends are made detactabhe, being hell by means of hooks to the project
ing side pieces. This st for the purpose of preserving the flask, as, if the ends
are made in one with the bed the are made in one with the bed, they are very apt to crack oft in ansting. The
pattern used hed have at their
 corresponding apertures in the bed. The dowels serve the double purpose
of keeping the patterns in place and of core prints. In the process of castof keeping the patterns in place and of core prints. In the process of cast-
ing, the metal is chilled as it comes in contact with the bed, and the shoes y made ready for service.
StiLL-Allan M. Ring, St. John, N. B.-This invention provides a simple, water, to be used in connection with a galley for generating the steam. The worm tub is constructed of an inner and outer cylinder, and the condensing coil, which 18 of lead pipe, extends from the top of the inner one
downward about two thirds of the way, where it discharges into a narrow downward about two thirds of the way, where it discharges into a narrow
space between two inclined plates which traverse the remaining portion of
 condenser is also provided, and is furnished with shelves underneath to poort a boller and lamp if required.
Livrimevr.-William H. Wagoner, of Hurd Post oftle, Pa.-This inven. bout, of alcohol siment which is compounded of equal parts, or there
 combinng with the ordinary machinery for paper making (where the pulp is taken from the vat and delivered to the apron continuously) a spool in such a manner as to be drawn in between the two layers of pulp as they
are delivered to the endless apron, thus forming an improved fabric or paper and warp threads. Weft threads are also added by means of shit he and tivemplos
Cuviriva Tor.-Abel Merrill, Ingersoll, Canada.-This invention furnishes
an improved cultivator which is light and easily drawn and runs steadily an improved cultivator which is light and easily drawn and runs steadily
and smoothly. The frame is in the shape of a right-angle triangle, the beam and smothly. The frame is in the shape of a right-angle triangle, the beam
forming the hypothenuse of which carries the plows. The lower edge of each plow wh bent outward so as to form a share, and the inner edge is bent
upward and attached directly to the side of the beam. The forward edge upward and attached directly to the side of the beam. The formard edge
of this part serves as a coulter, and is noteched or silit so as of orma g gard by means of which rubbish is turned aside and not allowed to obstruct the
plow. The gang of plows is adjustable and can be set to work at any required depth, or entirely raised from the ground.
Ironing Table.-James T. Plowman, Sr., Baltimore, Md.-The object of this invention is to furnish a cheap, convenient. and durable table for iron-
ing, which may be used for other purposes ; and it consists in providing the ordinary framework of a table with a top which is in three pieces. The two
side pieces are fastened down to the side pieces are fastened down to the frame and the middle piece is arranged
to be drawn out from between them so as to torm an extension leaf to be used in ironing. To prevent weights placed on the leaf overbalancing the table, the opposite end is tastened to the floor with a hook.
 by which an arm attached to one of the rods that connect the lathe of a loom with the crank shaft is made to operate the shuttle binding levers in such
manner as to retain the shuttle when driven into the box until the time for ing it arrives.
bedstead Fastening.-T. w. Moore, New York city.-In this invention ode of attaching the cast fastening plate to the rails of bedsteads, the fastening plate is let into
the inside of the rail by cutting away the rail at the end, so that the joint end of the rail will be even with the post. A recess cut in the rail receives
the hub or center, which serves to hold the plate securely in place. Orifices the hub or center, which serves to hold the plate securely in place. Orifices
are made through the plate, which, in fastenng the plate to the rail, receive Cor pins, and serve to hold the plate.
Carriage Running Gear. - William Hemme, of Michigan Valley, Kansas, attached to the under side of the wagon body. The hounds connected with the axles are joined at their extremities by means of a sliding swivel and
pivot. This uncture forms a knuckle joint for the two axles, by which they are caused to move simultaneously when the wagon is turning a cor ner into such a position that the front and hind wheels run in the same
tracks. An extension rod is connected with each axle, and adjusted so as to prevent too much play in them.
Carriage Curtain Fastener.-Timothy D. Marsh, of Jèrsey, O.-This
invention furnishes an improved cam or lock button hole for carriage curtains and other similar uses. The locking button hole is composed of two metallic plates, one of which is attached to the curtain, and the other is so which it is connected by a ring. They are each pierced with a hole, a little which is connected by a ring. They are each pierced with a hole, a litlee
on one side of the center, which is large enough to freely pass over the cur-
tain knob. The fastening is made by turning the movable plate until the curtain.
Brase
brake Mechanism for Sewing and other Light Machinery.-John
M. Cayce, Franklin, Tenn.-The invention consists in providing the needle M. Cayce, Franklin, Tenn. -The invention consists in providing the needle
cam of a sewing machine with an adjustable sleeve and spring brake where by the needle can be made to pause within or without the fabric; and also,
in providing a speed regulator which is very delicate, easily graduated, in providing a speed regulator which is very delicate, easily graduated,
governs the period of retardation, and determines the stoppage of machine. Cigar Mold.-Isaac Guthman, Morrison, Ill.-The invention is a ciga mold in three pieces, hinged together, and consisting of
grooved bed plate and two quadrantally grooved covers
Process of Desicoating and Seasoning Lumber.-James F. Gyles, Chicago, Ill.-The invention consists in desiccating green lumber by apply
ing pressure on a line at right angles to the grain thereof and gradually changing said transverse line of pressure by keeping the lumber in motion between two pressure surfaces.
Machinery for Desiciating and Cutiting Lumber.- James F. Gyles combining tools and machinery for tonguing, desiccating, and cutting lum
ber into lengtas, whereby green lumber may be sawed, dried tong ber into lengthe, whereby green lumber may be sawed, dried, tongued
orooved, sád applied to fmmediate usie.

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Mattress and cushion tacker, Watson and Phillips
Mattress, frame for wire, G. C. Perkins.
Medical compound, J. C. Hassell.
Medical compound, J. Wiley.....
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Medical compound, M. D. Britten.........
Metals, machine for routing, H. Cottrell.
Metals, machine for routing, H.
Mirror, toilet, W.F. Patterson.
Miter machine, L. Henkle.
Mowing machines, track clearer for, W. J. Andrews
Musical tone index, W. H. Clarke.
Musical instrument, W. Standing, Sr.
Nail clincher, horseshoe. W. H. Lyma
Nest, wood bird's, J. A. Deknatel...
Oil from cotton waste, etc., apparatus
Oil from cotton waste, etc., apparatus for separating, A, N. Cole.
Ore concentrator, M. Hungerford........................... Ore separator, F. Cazin.
Packng for stationary joints, metallic, I. J. Saunders
Paper pulp, apparatus for straining, L. Hollingsworth
Paper, suction box of machines for the manufacture of, F. Curtis
Paper, manufacture of printed sand and emery, w. Adamson..
Pavement, wood, J. Defoe..
Pavements, manufacture of slabs for, R E. Stevens...................
Pavements, etc., composition for forming blocks for, J. C. Tucker
Pea nut and coffee polisher, B. F. Walters.
Pitcners, lining metal ice, Wilbur and Tyler
Plane, rabbet, G. M. Darley
Planter, corn, D. H. Gobin
Plow, R. D. Porter.
Plow, E. T. Bussell.........
Plow, gang, M. W. Barris.
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Printing, copper plate, W. Conisbee.
Pump, M. J. Althouse...
Pump, force, J. L. Kitchen
Pump, foree and vacuum, J. O. Joyce
Rail and chair, self actiog expansion, w. Close
Railway, inclined, J. G. Taylor
Railway switch, J. P. Herron.
Railway rail splice, J. P. Herron
Railways, apparatus for removing snow from, C. T. Geslain Refrigerator, R. M. MacMunn
osing tark magnetic passenger, W. H. Mumbe
Wiedersum and Hill
Safe, milk, H Haskin...
Sash holder,J. C. Robie...........
Saw sharpener. gin, J. McBride
aw clamp, T. L. Kenworthy.
awing machine, w. H. Doane..
Scaffold, T. Anderson.........
Scale, spring, J. E. Thomson....
Scraper, revolving road. W. Pin
Scraper, revolving road. W. Pinn...........
Screen, mosquito and fly, J. W. Boughton
Seat, stump joint jump. J. D. McAuliff.
Sewing machine.S. W. Ward well, Jr.
Sewing machine, J. Lamb.
Sewing machines, motor for, W. A. Greenleaf
ewing machines, needle grinding attachment for, J. N. Wilkins ewing machines, treadle for, A. Brill...
Ships, etc., ref rigerator chamber for, J. F. Bald win
Shoes, hook or clasp fastening for, J. W. H. Doubler
Signal alarms, motor tor, J. Walk
Signal, railway, Townsend, Chamberlain, and Walker
Spark arrester, R
Spittoon, J. Hillin
stove bottom, D. Schuyler (reissue)
Stove, aar, C. L. Holbrook.
Stove, cooking, J. Barnes....
Stove, cooking, J. F. Quimb
Stove, heating, S. D. Vose
Stove pipe thimble, E. J.
Stove pipe thimble, E. J.
Straw cutter, T. Hazard.
Sugar, apparatus for making, J. Guardio
Table, sewing machine, W. P. Uhlinger
Telegraph, printing, T. A. Edison.....
Telegraph, printing, J. P. Humaston.
Tents, folding frame for, F. A. Guthrie
Thermostats and fire alarm signal box, Rosenbusch and Kreitz. Thill coupling, J. Lawb.
Thrasher and separator, grain, J. H. Shireman
Thrashing machine, J. Hemingway
Ticket, fare, T. A. Jebb
Ticket, fare, T. A. Jeb
Tobacco, treating smoking, w. A. Wright (reissue)
Torch, G. Brueck
Toy money box, ........
Tucking attachment, T. M. Farrand.

## Valve, double acting supply, P. Harver

Vehicle wheels, hub for, P. Jones
vehicle wheels, hub for, D. Davis
Vehicle wheels, A. J. Caywood
Vehicles, spring brace for, steele and Hodgin
Vehicles, spring brace for, steele and Hodgin

Ventilator for buildings, J. O'Ne
Vessels, propelling, C . A. Reed.
Vinegar, process for the manufacture of, A. H. Lo
Vise, lathe, J. B. Low...........
Wagon brake, w. D. Johnston.
Wagon bodies to perches, connecting, s. G. Rowe
Wagon, lumber, J. Skeen............
Wagon seat support, J. H. Fellow
Wagon seat support, J. H. Fellow
Washer, clothes, H. J. Noyes.
Washer, elastic, D. Dittman.
Washing machine, R. Brooks.
Washing machine, D. C. Fisher
Washing machine, c. Turner...
Watch case spring, J. L. Wlison
Water pipe, pressure regulator for, J. Johnson
Waters, apparatus for the manufacture and bottling of, o. Kropff
Windmill Windmill, M. J. Althous
Windmill, O. B. Knapp
Wood, transferring the natural grain of, J. R. Cross.
DESIGNS PATENTED.
5,967.-Militart Shoulder Knot.-D. C. Hall, Boston, Mass.
5,968.- Rail For Hat Rack. - D. Heald, Milford, N. H. 5,969.-Tеа Рот.-C. Hodgetts, Brooklyn, N. Y. 5,970.-Finger or other Ring.-F. W. Martin, Springfield, Mass. 5,971.-MONument.-J. M. Martin, Cleveland, O.
5,972.-LeGAL Blank.-J. B. Shaw, Brooklyn, N. Y.
5,972.-Legal Blank.-J. B. Shaw, Brooklyn, N. Y.
TRADE MARKS REGISTERED.
874.-Pig Iren.-Bay State Iron Company, Boston, Mass.
875.-Plate metal.-Bay State Iron Companv, Boston, Mass.
876.-Lard.-R. Bullymore, Buffalo, N. Y.

8i7. - Whisky,-M. Crichton, Baltimore, Md.
878 to 880 .-Boors.-Friedman, Bros., Memphis, Tenn., and Boston, Mass,
881.-White Lead, etc.-F. S. Pease, Bulfalo,
882.-CHocolate.-H. L. Pierce, Boston, Mass.
883.-Ginger Ale.- Vincent, Hathaway \& Co., Boston, Mass.

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APPLICATIONS FOR EXTENSIONS.
Applicatlons have been duly filed, and are now pending, for the extension
of the following Letters Patent. Hearings upon the respective applications
are appointed for the days hereinafter mentioned:
17,236.-Coupising.-W. and C. Sellers. September 4, 1872.
21,554.-Inkstand.-S. Darling. September 4, 1872.
,556.-Knitting Machine Nerdle.-J.K. and E.E. Kilbourn. Sept.4, 1872 ,572.-Canal Boat.-J., S., and J. McCausland. Sept. 4, 187
,603.-Tumpering Steel_-R. G. Gardiner. Sept. 11 ,

21,745.-Sewing Machine.-C. O. Crosby. Sept. 25, 1872 .
21,756.-Centrifug al Pump.-W. C. Hibbard. Sept. 25, 1872.
21,712.-Hиу Raке.-G. Whiteomb. September 18, 1872.
21,856.-Cutting Staves.-W. Steele. October 2, 1872.
21,991 .-Safety Steam Boiler.-F. Stebbins. October 2, 1872.
EXTENSIONS GRANTED.
20,631,-Evaporating Case Juice.-D. M. Cook.
20,692.-Grinding Mill:-B. A. Beardsley
20,719.-Harvester.-W. F. Ketchum.
20,719.-Harvester.-W. F. Ketchum.
20,736.-Fire and Burglar Proof Safe
20,775,-Sewing Machine.-L. R. Blake. Sharts.
20,777.-Railboad Car Seat and berth.-Z. Cobb.
20,815.-Sausage Filler,-J. G. Perry.
20,837.-Pressing St raw bonnets, etc.-H. E. West. EXTENSIONS REFUSED.

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\text { 20,Zis.-HAND DRILL.-H. H. Packer, Mass. } \\
\text { DISCLAIMER. }
\end{array}
$$

30,509.-Bell Attachment.-A. E. Taylor.
Inventions Patented in England by Americans
[Compiled from the Commissioners of Patents' Journal. $]$ From June 14 to June 17, 1872 , in
H. Garey, East Weymouth, Mass.
Cut Nails.-J. H. Garey, East Weymouth, Mass.
harvesiting Machine.-S. Johnston, Brockport, N. Y. (Two Patents.) Iron.-W. Selers, Philadelphia. Pa
Iron and Strel.-T. S. Blair, Pittsburgh, Pa.
Seasoning Wood.-G. M. Wells, Boston, Mass.

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