

TORPEDO BOAT FOR THE ITALIAN GOVERNMENT.

We annex engravings of a torpedo boat recently constructed for the Italian Government by Messrs. Yarrow & Co., of London. It is 100 feet in length by 12 feet 6 inches beam, dimensions which have been found by actual experience to give thoroughly sea-going qualities. As evidence of this it may be mentioned that two similar boats were navigated across the Atlantic last year as well as ten to the Mediterranean, all of which reached their destination in perfect safety.

It may be observed that the stability of these boats has on several occasions been carefully tested with a view to a reduction of beam so as to obtain finer lines and better speed, and it has been found the breadth of 12½ feet must be maintained to secure a range of stability necessary to make them thoroughly safe in any weather, which is clearly a primary consideration in a sea-going torpedo boat. The official trial of the above boat was made last December in the presence of the Italian authorities, when a mean speed, with torpedo apparatus all completely fitted on board, was obtained of 22.48 knots, which we believe is the highest speed hitherto officially recorded. The forward part of the boat is protected, as will be seen, by a turtle back terminating at its after end with the conning tower, an arrangement always adopted by the builder since they constructed the Batoum, which was the first boat of this class built. This turtle back is found of great value when encountering rough weather, at the same time giving very ample room for the working of the torpedo gear below.

Messrs. Yarrow & Co. attach very considerable importance to the curvature of all the plates in the hull which may have to bear compression, a thin flat plate possessing but little strength to resist that strain; for this reason they invariably adopt a curved form of deck, the platform for walking on being along the central portion. The curved deck has the additional advantage of causing the water which may come over the boat to freely flow off.

There are two ejecting tubes, which are snugly housed under the turtle back, and the bow of the boat is so arranged that the forward ends of the tubes are completely inclosed within the vessel's lines, it having been found from experience that if the tubes project when the vessel is pitching the waves striking them cause a serious shock, as well as offering a greatly augmented resistance. This arrangement enables a man to get down in the fore peak and examine the tube ends, which otherwise it would be impossible to obtain access to.

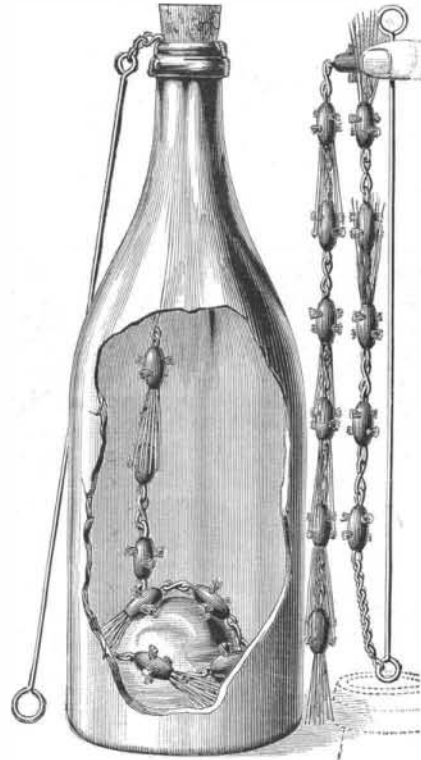
The steering of all these boats is effected by means of two rudders, one aft as usual, and one drop rudder forward, as originally introduced by Messrs. Yarrow & Co.; these are worked by steam, and under the control of the steersman in the conning tower. The upper part of the funnels are bent slightly aft, as shown, for it has been found that in very rough weather, when everything is screwed down tight, the only way the water can obtain access to the hull is down the funnels. This fact alone will give some idea of the boisterous weather which they have at times encountered. The engines, which are of 16 inches stroke, during the trial made 480 revolutions per minute, *i. e.*, 1,280 feet per minute, which our readers will be aware is an exceptionally high piston speed; nevertheless no sign of abrasion has ever been visible, which is the more remarkable considering that no oil under any circumstances is allowed into the interior of the engines, because even a very small quantity of lubricant finding its way into the boiler causes rapid deterioration and increases to a remarkable degree the amount of steam space necessary to avoid priming. The effect of even the smallest quantity of grease or oil as tending to cause priming was formerly exemplified to a remarkable degree in torpedo boats when it was the custom to use lubricants to the pistons and slide valves. It was found that the boiler when new and supplied with only fresh water, or, still better, distilled water, at first not showing the slightest indication of priming, would, after a few hours' continuous steaming (by which time a little grease could find its way through the condenser and feed pumps), commence priming to such an extent as frequently to bring a trial to a premature end.

This boat is the first which has been fitted with a patent arrangement for preventing the fire from being extinguished should water gain access to the stokehole or boiler compartment, which in face of the present machine guns is a contingency to be looked for.

The arrangement is exceedingly simple but effective. The fact is the ash-pan is simply continued up round the sides of the firebox to above the sea outside, and secured water-tight to the barrel of the boiler, the fire-door at the same time being tolerably water-tight.

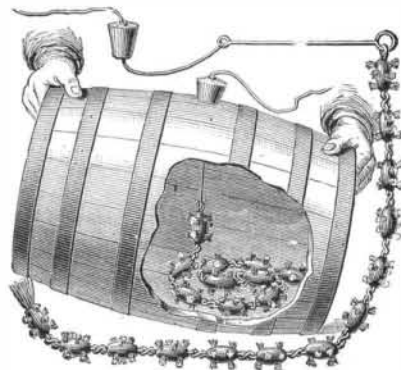
It will be easily seen that if the water gain access under

speed, it naturally follows that the steaming powers of the boat would enable it to run from forty to fifty knots under the conditions assumed; while, on the other hand, had this new arrangement not been provided, immediately the fire is extinguished the boat would be quite helpless, and the pumping power, which so long as there is a supply of steam is very considerable, would be stopped.—*Engineering.*



NEW BOTTLE CLEANER.

ordinary circumstances to the stokehole or boiler compartment, it would not have many inches to rise before it would reach the level of the bars, which are kept as near to the bottom of the boat as possible, so as to avoid raising the center of gravity. It will be clearly understood with this new arrangement the water could rise up in the stokehole to the



BARREL CLEANER.

level of the sea outside, and still the fire would be untouched and the supply of air would likewise not be interfered with. The steaming power of the boat will therefore continue so long as the fire lasts, and as these boats when running have about 12 cwt. of fuel on their bars, and as it is found by experiment that 2 cwt. is sufficient to run an hour at a ten knot

NEW BOTTLE CLEANER.

We give an engraving of a bottle and cask cleaner, which is very simple and effectual. It has proved itself in actual practice to be capable of quickly and thoroughly cleaning bottles of all shapes and sizes, also jugs and casks. For very small vials the inventors have produced a special size of cleaner, which will economically clean vials from one-half ounce upward.

The cut represents the "rapid bottle cleaner" in use. This device is simple in its construction, and can be operated by any one. It fills a want long felt, and is valuable in family use as well as by the trade. It does away with the old and dangerous method of cleaning with lead shot, in which operation several shot will often fasten in the bottom of the bottle, and through neglect or trouble in getting them out be allowed to remain there.

The barrel cleaner is operated mainly in the same manner as the bottle cleaner described above. The balls are introduced through the bung without reversing, the bung closed with the stopper, and the barrel shaken as in operating with a chain. It is obvious that these balls, weighing a quarter of a pound each, and furnished with stiff brushes on all sides, will do the work thoroughly and effectively.

The bristles are forced by the weight of the balls into the smallest crevice of a barrel or the narrowest corner in the bottom of a bottle. No lead deposits need be feared from the device; the balls are made from a composition metal which will not corrode. The machines are especially useful in bar-rooms, apothecaries' stores, wholesale stores, and in all establishments where liquids or liquors are barreled or bottled.

The invention, as will be seen by reference to the engraving, consists of a series of metal balls or blocks connected together by links and provided with a series of bristle or wire brushes. One end of the chain of balls is connected with a rod, by which it is introduced and withdrawn from the bottle or barrel. The cleaning is effected by shaking the chain about in the bottle or barrel with water or some suitable cleaning fluid.

For further particulars in regard to this useful invention address Rapid Barrel and Bottle Cleaning Co., Rhinebeck, Dutchess Co., N. Y.

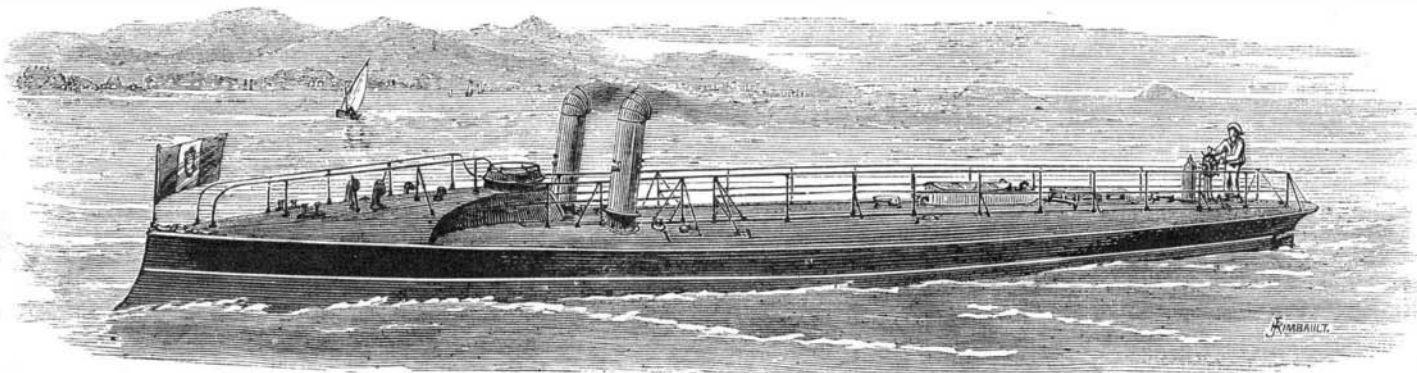
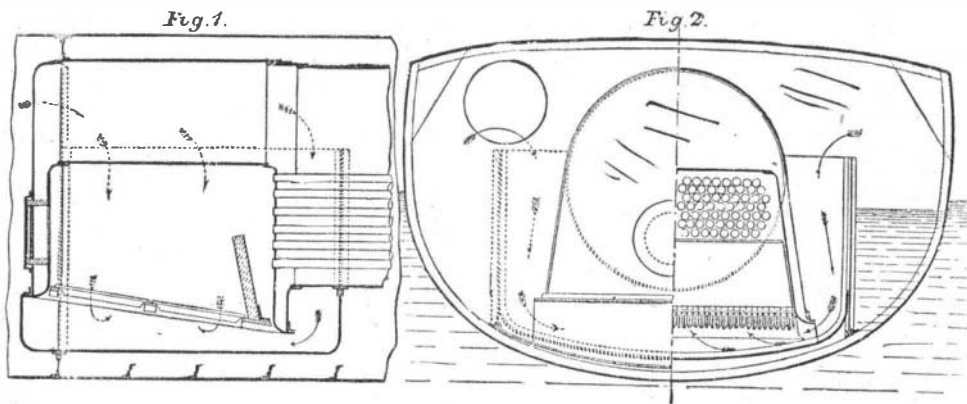
Process for Photo Printing Plates.

Mr. J. Traill Taylor, in a letter from New York to the *British Journal of Photography*, describes the following mode of making photo printing plates, practiced by Rev. H. Goodwin, of Newark, N. J.:

The leading feature in Mr. Goodwin's engraving process consists in a reversal of the methods hitherto employed, as will be seen from my description. Let us suppose that a metal plate—zinc, for example—is to be prepared for typographic printing; the surface having been polished is coated with sensitized albumen or gelatin and dried. It is next exposed to light under a transparency, not a negative. An engraving, a piece of music, or any drawing or pen and ink writing on a sheet of paper having nothing on the back may be reproduced by this method. This is then pressed into close contact with the plate, which is now exposed to light.

It need scarcely be remarked that this operation will be greatly aided by first rendering the paper as transparent as possible, by some of the known means of doing so, in such a manner as not to affect it permanently—*e. g.*, sponging over with benzole or any of the volatile oils. Having been exposed, the plate is next inked and developed by water in the manner well known to workers in similar processes. The parts corresponding to the blacks of the writing are now seen to have been laid bare, all the whites being coated with the insoluble albumen and ink, which layer is strengthened and made acid-resisting by dusting powdered rosin upon the

plate, the rosin adhering only to the inked portion. The surplus having been dusted off a sufficient degree of heat to just fuse the rosin is then applied. The plate is next dipped for about a minute in a dilute solution of perchloric



NEW TORPEDO BOAT FOR THE ITALIAN GOVERNMENT.

ide of iron in order to dissolve away all trace of albumen that may have been left on the surface on the portions that ought to be laid bare, and also to prepare such parts to receive the next application. This consists of a solution of asphalt in turpentine applied with a dabber of cotton wool, by which also the ink that previously covered the remainder of the surface becomes removed, leaving the albumen. This is followed by another application of the asphalt solution, after which the surface is inked, and then the plate is immersed in any solvent of light hardened albumen, such as dilute hydrochloric acid, which etches the plate. This latter operation is aided by the application of a tuft of cotton wool, which removes from the plate the loosened or partially dissolved albumen, leaving the surface better exposed to the action of the etching fluid. After such treatment the plate is ready for being printed from. Some impressions I have seen, produced by the process described, were quite equal to the original printing, which served as the *diché*. By the substitution of a lithographic stone the process becomes a purely photolithographic process. When the plate is to be worked in connection with type, as in ordinary letterpress printing, the etching must be carried to a depth sufficient to protect the whites from the inking roller. If instead of a positive or a transparency, a negative be employed, the resulting engraved plate will be an intaglio suitable for being worked at the copper plate press.

NOVEL WINDOW BLIND OPERATOR.

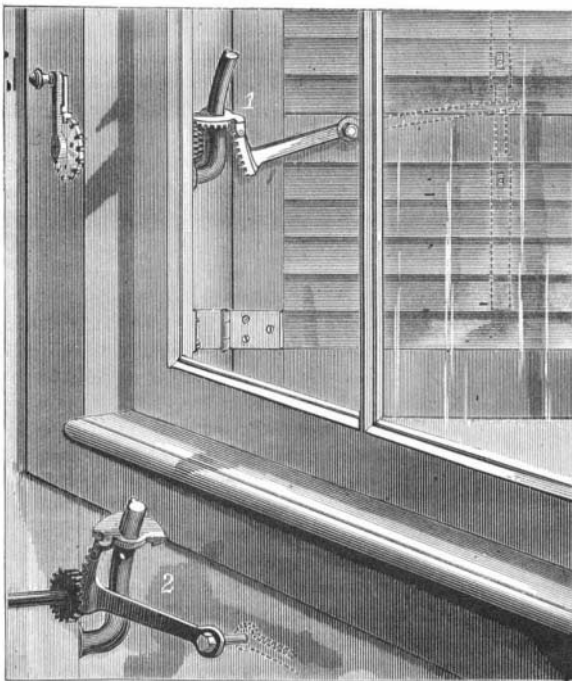
The engraving shows a new window blind operator, recently patented by Mr. Bela G. Merrill, of Geneva Lake, Wis. This apparatus is arranged for opening and closing the window blinds by means of a crank attached to the inside of the window jamb. The slats of the blinds are opened and closed by the same mechanism without altering its adjustment, and by the same crank used to open and close the blinds.

A shaft extends through the window jamb from the inside to the outside, and is provided with a toothed stop disk, which is engaged by a latch inside of the jamb, to stop the shaft in any desired position. The outer end of the shaft is provided with a spur pinion and a bevel pinion, which are cast together in one piece.

A curved pintle, attached to the exterior of the window jamb by a bracket, is in the axis of the blind hinge, and supports a segment of a toothed wheel, so that it revolves on it just below the lower end of the feather which extends along its side. This wheel has a slot in it which allows it to rise on the curved portion of the pintle when the notch coincides with the feather.

The segmental toothed wheel on the pintle has a toothed arc depending from a point a little beyond one of the ends of its toothed portion. This toothed arc is formed on the end of a lever pivoted to the middle rail of the blind, with an arm inside the shutter connected with the blind slat opener and closer.

By turning the crank so as to close the blind, and by continuing the motion of the crank afterward, the toothed arc



MERRILL'S WINDOW BLIND OPERATOR.

will be raised, lifting the segmental wheel out of gear with the bevel pinion, allowing the shaft to be turned so as to open and close the blind slats. By turning the crank in the reverse direction the toothed arc will be thrown down out of gear and the segmental wheel will descend into gear, with the pinion again ready for opening the blind.

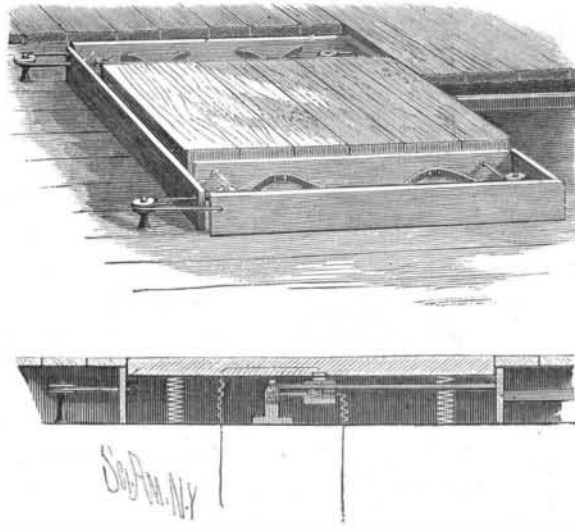
With this device the window blind can be opened and closed without opening the window, and it may be locked securely in any desired position, and by an ingenious connection between the upper and lower slat rods, the upper portion of the slats may be opened while the lower slats are closed.

A FIFTY GALLON BOTTLE.—A bottle of fifty gallons capacity, the largest ever blown in this country, was lately made at Millville, N. J.

NOVEL BURGLAR ALARM.

The annexed engraving represents a burglar alarm platform to be placed in front of the vault or safe to be protected, so that an alarm may be given when they are approached. The device is so constructed that when the platform is stepped upon an electric circuit is operated, which gives an alarm at the distant point. In the engraving the apparatus is shown partly in section. It will be placed in front of the safe or vault on a level with the floor, of which it really forms a part. It covers sufficient space so that a person cannot come within a certain distance of the safe without stepping upon it and giving the alarm.

The platform is supported on spiral springs, and during the day, or when the safe or vault is in ordinary use, movable side and end bars will be moved inward by cords running over pulleys and connected with a sliding frame which



MATNEY'S BURGLAR ALARM PLATFORM.

is moved by a rod extending to some convenient point near the platform. These bars are provided with pins which support the platform, so that it is not depressed when stepped upon. When the safe or vault is to be protected the bars will be released, when they will be moved outward by the springs, leaving the platform free to move. The operation of releasing the bars also releases the lower electrical contact and breaks the circuit, so that when the platform is depressed it completes the electric circuit and gives an alarm at a distant point. Should the rod used to place the platform in its inoperative position be moved the electric contact is made and the alarm is given, so that it is difficult or impossible to tamper with the device or get it in an inoperative condition.

This ingenious device has been patented recently by Mr. W. D. Matney, of Harvel, Ill., who should be addressed for further particulars.

Gradients for Sewers.

In many towns, especially those situated on the sea coast or estuaries, it is very difficult to obtain a fall sufficient to prevent deposit in the sewers. Those who have to carry out new drainage works, says the *Building News*, ought to know the experience of engineers on this question, and we, therefore, give a few figures that may be useful. Mr. B. Latham, C.E., in his "Sanitary Engineering," says "that, in order to prevent deposit in small sewers or drains, such as those of 6 in. and 9 in. diameter, a velocity of not less than 3 feet per second should be produced. Sewers from 12 to 24 inches diameter should have a velocity of not less than 2½ feet per second, and in sewers of larger dimensions, in no case should the velocity be less than 2 feet per second." Of course, small sewers require a greater fall than large ones. For 4 inch pipes a greater velocity than 3 feet per second may be given. Mr. Bailey-Denton, in his work, states that for ordinary sewage a mean velocity of 150 feet per minute is required, and this opinion agrees with that of Mr. John Phillips, of the Westminster district. Mr. Hawksley and Sir Joseph Bazalgette both think a velocity of two miles per hour, or 176 feet per minute, necessary when running three-quarters full. When running half full, 165 feet is sufficient, and 146 feet when one-third full, according to the latter authority.

The following may be observed as safe falls for circular drains running half full: For 4 inch pipes, a grade of 1 in 36; 6 inch pipes, a grade of 1 in 60; 9 inch, 1 in 90; 12 inch, 1 in 200; 15 inch, 1 in 250; 18 inch, 1 in 300; 36 inch, 1 in 600; 48 inch, 1 in 800. Mr. Wickstead's table of inclinations gives rather flatter gradients. These gradients cannot be obtained in some towns without deep cuttings, which would make the outfall preposterously deep. Pumping has to be resorted to in some towns, where these gradients are impracticable, unless some other means of projecting the sewage by pneumatic action, as in Shone's system, be adopted. The volume of sewage must be sufficient also besides the gradient to insure self-cleansing.

CHICAGO is the greatest lumber market in the world. The single item of sawed lumber received there in 1881 would lay an inch flooring fourteen feet wide round the earth at the equator. The amount of lumber manufactured in the three States of Michigan, Wisconsin, and Minnesota during 1881 would lay such a floor fifty feet wide.

New Bleaching Process.

The *Textile Manufacturer* describes a new process for bleaching manufactured cottons, especially cotton on bobbins. The cotton is placed in a closed reservoir lined with lead. The reservoir is about 10 feet long, 7 feet broad, and 5 feet deep, and can hold 300 pounds of cotton. A rubber tube connects the reservoir with an apparatus in which about three cubic yards of chloroform vapor are set free by using sulphuric acid on a mixture consisting of one part quicklime, one part chloride of lime, one part spirits of wine or acetic acid, and four parts water. The vapor is conducted into the reservoir, where for about two hours a pressure of two atmospheres is put on the cotton, after which the bleaching is accomplished. Afterward a mixture of hydrogen, carbonic acid, and sulphuric ether, produced in a Wolff bottle, is passed over the cotton, and in fifteen minutes all smell has left the bobbins.

A Lily with 145 Blossoms.

An uncommonly fine specimen of the Easter lily of Bermuda was lately brought to this city from Jamaica. It bears 145 blossoms, nearly all of which are in full bloom. The stalk, about one inch in diameter, is thickly infoliated with long leaves for its entire length, about three feet. Nestled in a cluster of these dark green wrappings at the summit of the stalk are closely grouped the stems of its numerous funnel-shaped blossoms, which fall over it in a cloud of white and yellow perianths, forming a hemispherical mass of flowers of about one foot radius. No specimen, it is said, has ever been seen in this latitude with over 100 blossoms. A specimen with 90 blossoms took the first prize at the Horticultural Exhibition in this city, May 3.

A Notable Steel Chain.

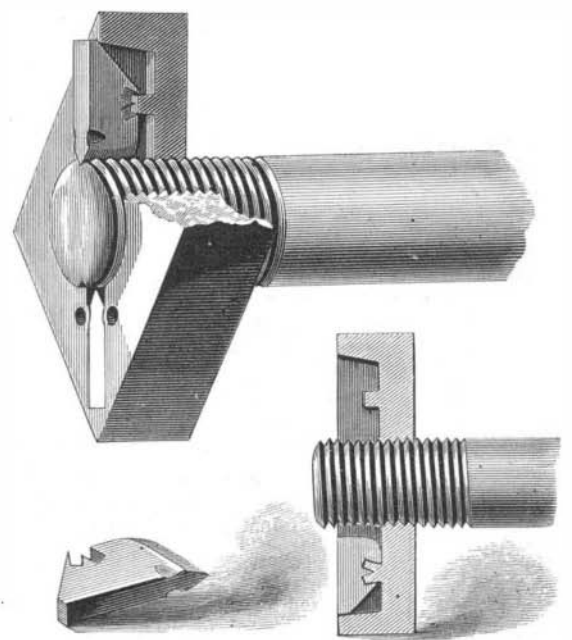
There has lately been made at Hull, England, a chain of Siemens steel, 180 yards long, containing more than 3,200 links, held together by about 850 steel pins. It is intended for lifting purposes, has an estimated strength of 60 tons, and is thought to be the largest chain of its kind ever made.

The Corinth Canal.

The ceremony of turning the first sod on the line of the proposed Corinth Canal was performed by the King of Greece, April 5. The canal will connect the Gulf of Corinth with the sea of the Archipelago, and considerably shorten the route from the western parts of the Mediterranean and the Adriatic Sea to Athens and the ports of the Ægean Sea.

NEW NUT LOCK.

The engraving shows a novel nut lock recently patented by Mr. Joseph H. Burrows, of Boise City, Idaho Territory. In this invention the nut is provided with one or more recesses, having in the bottom a transverse ridge. The keys fitting these recesses have their inner ends sharpened and their outer ends beveled. They have on their inner edges



BURROWS' IMPROVED NUT LOCK.

two diverging recesses having a sharp pointed nose or wedge between them, and when the key is forced into one of the recesses of the nut the sharp inner edge cuts into the thread of the bolt, preventing the nut from turning, and the wedge on the inner edge of the key splits the projection in the bottom of the recess in the nut, and forces the parts of this projection into the recesses in the inner edge of the key, thus holding the key securely in the recess with its edge embedded in the threads of the bolt, as shown in figure.

In some cases the inventor still further secures the keys by making indentations by means of a center punch, or otherwise, so as to force the metal of the nut over the top of the key.

This nut lock holds the nut so securely that it cannot jar loose or be turned except after the removal of the key. The device is exceedingly simple and is readily applied.