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 *cliché*. 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.

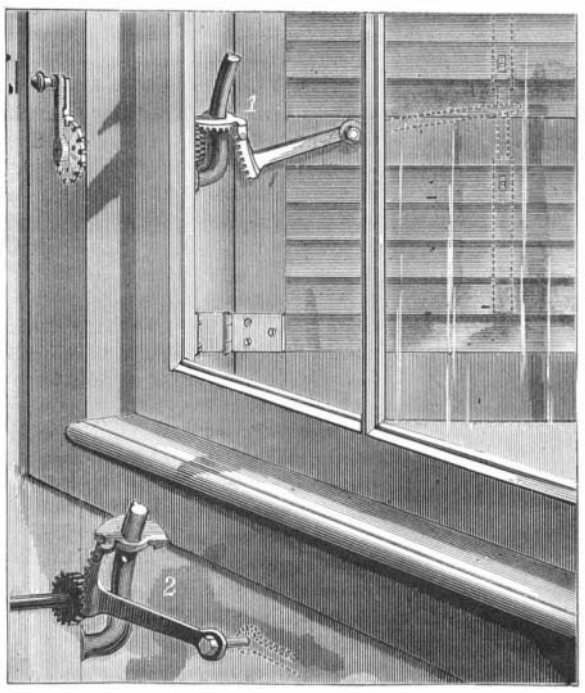
The engraving shows a new window blind operator, recently patented by Mr. Bela G. Merrill, of Geneva Lake, Wis. This apparatus is arranged for opening and closing the window blinds by means of a crank attached to the inside of the window jamb. The slats of the blinds are opened and closed by the same 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 tootbed 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.

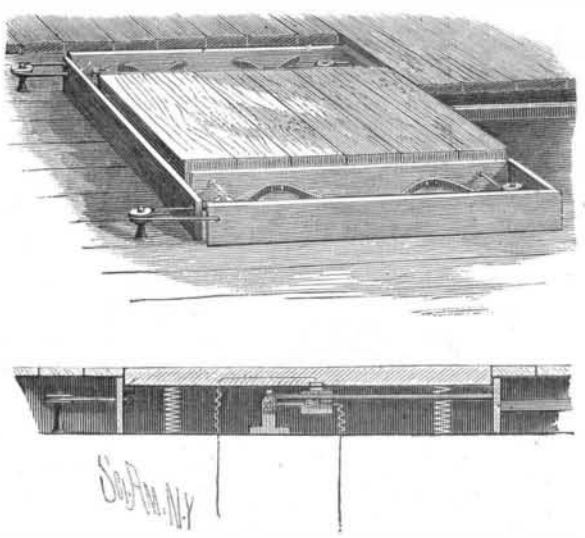
With this device the window blind can be opened and closed without opening the window, and it may be locked securely in any desired position, and by an ingenious connection between the upper and lower slat rods, the upper portion of the slats may be opened while the lower slats are closed.

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 att he 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.

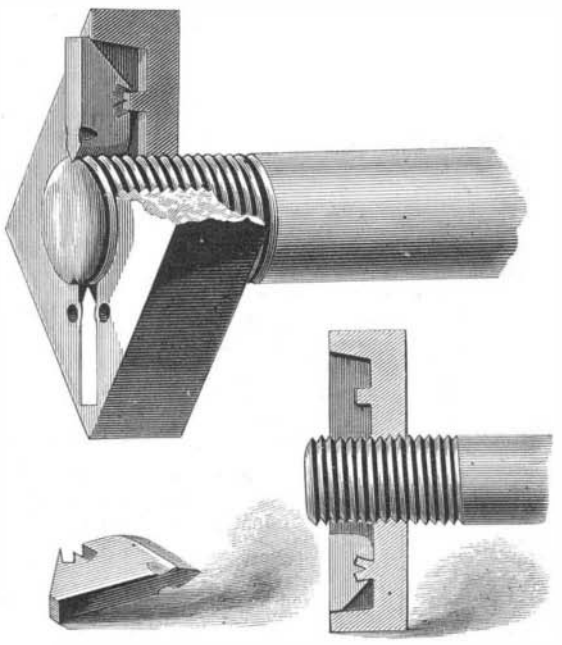
There has lately been made at Hull, England, a chain of Siemens steel, 180 yards long, containing more than 3,200 links, held together by about 850 steel pins. It is intended for lifting purposes, has an estimated strength of 60 tons, and is thought to be the largest chain of its kind ever made.

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.