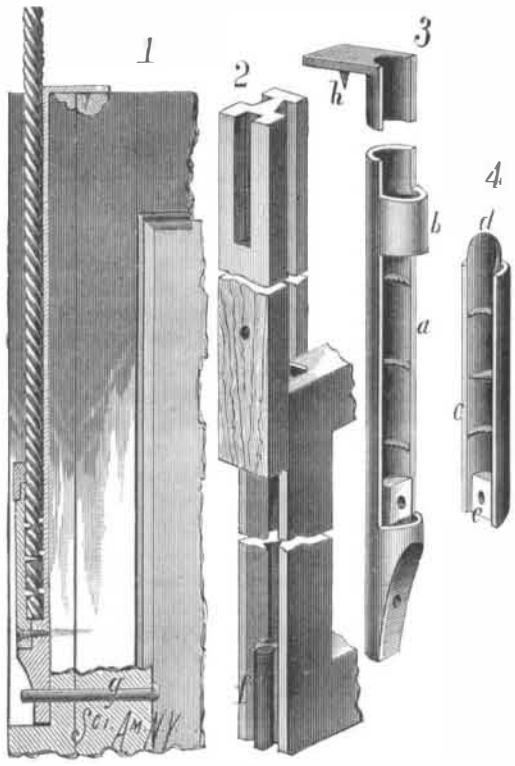
SASH-CORD FASTENER AND WINDOW SASH.

Inventions recently patented by Mr. W. A. Sinsel, of Waukesha, Wisconsin, relating to window sash and method of fastening cord, are shown in the accompanying engraving. The main portion of the fastener, cast of metal in the form of a ribbed trough, is bridged over at *b*, Fig. 3. The end of the cord, being inserted beneath the bridge from its outer end, is drawn in and placed against the ledge at the lower end of the trough. The cap, *c*, Fig. 4, is now placed in position by first inserting the lip, *d*, beneath the bridge,



SASH CORD FASTENER AND WINDOW SASH.

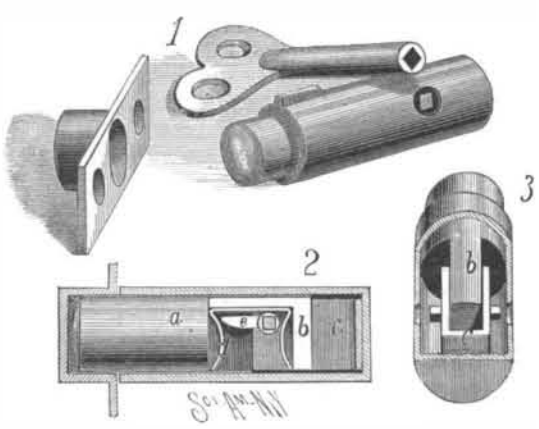
and then pressing the lower end against the body and turning in a screw at *e*. About the center of the trough of the detached part is a spur. The ribs are embedded in the upper and under sides of the cord, and the spur is forced through it, thus firmly securing it without knotting.

In order that the fastener (shown in section in Fig. 1) may be placed in position when the sash is in the window, the shank is made long, and at its top is bent at a right angle to rest on or be mortised into the top of the sash. This offset is provided with a spur which enters the sash. At the lower end of the device is a hole to receive a pin, inserted through the sash from its inner edge inside of the glass.

This device is attached to one side of the sash. A second device, similar to the one described except that the shank is left off and a hole made in the piece just above the bridge for the reception of a screw, is secured to a movable section forming part of one side of the sash, by means of the screw through the upper end and pin through the lower. The movable section is shown in Fig. 2. It may be attached by a tongue and groove, or by a dovetailed joint. To remove the sash from the window it is only necessary to withdraw the lower pins, when the weights will lift the removable cord fastener and the sliding section, leaving the sash free to be taken out of the window frame.

AN IMPROVED LOCK.

In the accompanying cuts representing a lock recently patented by Mr. David Morris, Fig. 1 is a perspective view of the lock, key, and catch; Fig. 2 is a longitudinal section,



MORRIS' IMPROVED LOCK.

and Fig. 3 a view on a plane perpendicular to that of Fig. 2. A portion of the sides of the bolt, *a*, inside of the case is cut away in order to form a flat section, *b*, in which is made a deep and wide notch wherein the wiper, *e*, works to throw and lock the bolt. The wiper is provided with a pivot and key studs, by which it is mounted for support on the stand, *c*, which is attached to the inner end of the lock case. The stand has two upright arms in which the pivots projecting from one end of the wiper work. The wiper swings along the top or open side of the notch in the bolt between the ends. Within the notch is placed the U-shaped spring, *d*, the shanks of which rest against the top and bottom of the notch. It will be readily seen that after the wiper has moved so as to shift the bolt to either the forward or backward position (as in Fig. 2) the spring, *d*, holds the wiper in place against all jarring and prevents it from being turned out by any instrument except the key. The device is simple in construction and effective in operation.

Further information may be obtained by addressing Mr. N. Wright, of Mountville, Ohio.

Underground Telephone Wires.

In an article in a late issue of the *Popular Science Monthly*, by Dr. W. W. Jacques, the author, says: "The American Bell Telephone Company has recently constructed two short lines of underground wires in the business section of Boston, and these give us excellent data from which to judge of the extent of technical practicability and the expense of putting all wires undergound. We have seen that in Paris the retardation and induction are both obviated by the use of double and twisted wires in metallic circuit; it is necessary that all of the wires be in metallic circuit, for, if a metallic circuit be connected with a single line circuit, the disturbances are not removed. If a subscriber in one city wishes to talk with a subscriber in a neighboring city, both cities must have metallic circuit systems and metallic circuits between the two cities. As the two lines constructed in Boston are short, only about one-quarter of a mile each, it was deemed best to use single line circuits, hoping that the induction and retardation on so short lines would not be serious. The system is constructed as follows: Eight wrought iron pipes, 3 inches in diameter, are laid side by side in two rows about 4 feet below the surface. At each street corner is built a brick chamber, large enough to admit a man, and with a cover flush with the street. The cables, of which several kinds are in use, run out from the basement of the central office through these pipes and up the side of buildings to roofs, from which they spread out to the subscribers by means of ordinary overhead lines. Conversation over these lines is not so easily carried on as by means of overhead wires, and it is frequently possible to overhear other conversation. This prohibits further extension of the single wire system underground, for technical reasons. The cost of the piping and chambers is, in round numbers, $50,000 a mile, and these pipes are intended to accommodate one thousand wires. The cost of the cables is from $60 to $150 a mile for each circuit, according to the kind of cable used. In round numbers, we may estimate the total cost for one thousand wires at $150,000 a mile, or $150 a mile per circuit. The cost of piping and chambers would be nearly as great for one hundred circuits as for one thousand, as the cost of chambers and the labor of excavating and filling would be the same; so that the cost for one hundred wires may be estimated at $50,000 a mile, or $500 a mile per conductor. The cost per conductor thus increases enormously as the number of conductors diminishes, so that it would be clearly impossible to follow out the wires of an exchange system in all of their bifurcations."

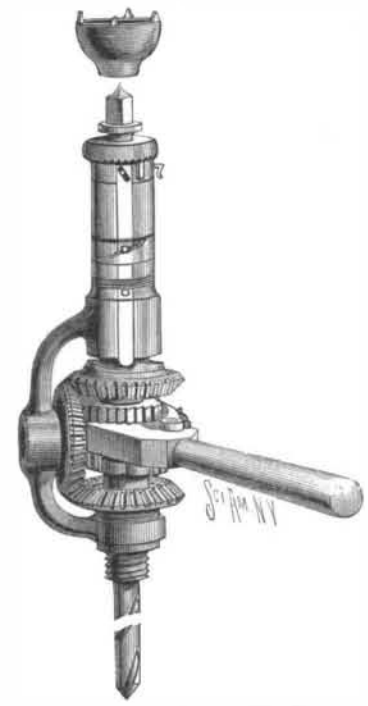
The Supply of Doctors.

The spring graduation exercises at our educational institutions invariably show a full quota of would-be doctors. The "output," if we may so style it, is sufficient to prevent any diminution in the ranks of a profession already well filled, and is quite large enough, even, to provide ample attendance should the nation be so unfortunate as to be visited by a series of plagues. At two New York city colleges there were 202 new doctors sent out on the same day —March 13—of whom 149 were allopathic and 53 homœopathic. Daniel Webster used to say that in the profession of the law there was always "room at the top," but what proportion of these graduates will thus find themselves assured of a lucrative practice, compared with the number that will not do as well as an educated mechanic is likely to do? The latter are always scarce, but the doctors and lawyers seem to be increasing as though the sickness and quarreling of mankind were to be indefinitely multiplied.

IMPROVED RATCHET DRILL.

A continuous rotary motion of the drill is obtained by a forward and backward movement of the lever of the ratchet, and the drill fed automatically at the same time.

The spindle extends through the lower and into the upper bearing of the frame. A screw stem fits loosely in the upper bearing, and its lower end fits into the spindle, whose upper end is formed hollow. The screw stem is prevented from turning by a feather on the frame entering a slot cut in the screw. On the top of the frame is a loose collar, beneath a nut that is formed with ratchet teeth on its under side. A pawl fitted in a recess in this collar is forced upward by a spring so as to engage with the teeth on the nut. Fixed to the spindle above the lower bearing is a bevel pinion, fast to whose hub is a ratchet wheel. Loose on the spindle below the upper bearing is a second bevel pinion having a ratchet wheel on its hub. On the spindle between the ratchet wheels is hung an operating lever, provided with pawls engaging the ratchet wheels, the teeth of which are reversed. A third bevel pinion fitted loosely in the frame engages with the pinions already described, as shown in the engraving. On the frame slides a bar, having its lower end engaging with a cam on the upper side of the upper pinion. The upper end of this bar is furnished with an inclined slot engaging with a pin projecting from the loose collar. The movement of the bar is regulated by a cam sleeve loose on the frame. In the operation of the drill, the lever being moved in one direction, the pawl rotates the upper pinion, and motion is transmitted through the side and lower pinions to the spindle. On its return it operates the lower pinion, keeping up the movement of the spindle in the same direction as before. As the upper pinion moves, the sliding bar is raised, the loose collar turned, and the screw forced up a little. The upper end of the screw is squared to receive a cap for holding the drill.



BREDE'S IMPROVED RATCHET DRILL.

This construction makes a compact and strong tool, in which there is no lost motion, and in which the feed can be easily adjusted.

This invention has been patented by Mr. William Brede, of Honolulu, Oahu, Hawaiian Islands.

IMPROVED TRUCK FOR SUGAR REFINERIES.

The frame of the truck is forked, the two side bars being connected at the front by a cross bar. The sides have short axles for the wheels, and they project back nearly half the length of the box, and terminate in hooked bearings adapted to lift up and hold the box, as shown in the engraving. The box is of rectangular form, and is provided with trunnions at the center of its sides, and with a notched cleat attached to the front end, in which a sliding latch bolt engages. On one of the side bars of the frame there is a toothed wheel pivoted so as to gear with the wheel on the box when the box is resting in the hooked bearings. The wheel on the side bar has a lever by which to operate it for turning the box on its trunnions to dump and to readjust it. The latch bolt is arranged to slide in a case on the tongue of the truck, and has a spring to cause it to lock with the notched

MAVOR'S TRUCK FOR SUGAR REFINERIES.

cleat when the box swings into position, and a lever to detach it when the box is required to dump.

In the usual way of using sugar wagons the boxes have three small rollers upon which they are rolled along the floor; but when they are to be emptied they have to be lifted up, and as the box and its load weigh about nine hundred pounds the services of three or four men are required. But with the truck here shown one man can load the filled box on his truck, roll it to the dumping place, and dump it with less labor than when assisting in the old process.

This invention has been patented by Mr. W. C. Mavor, of Forlorn Hope, La.