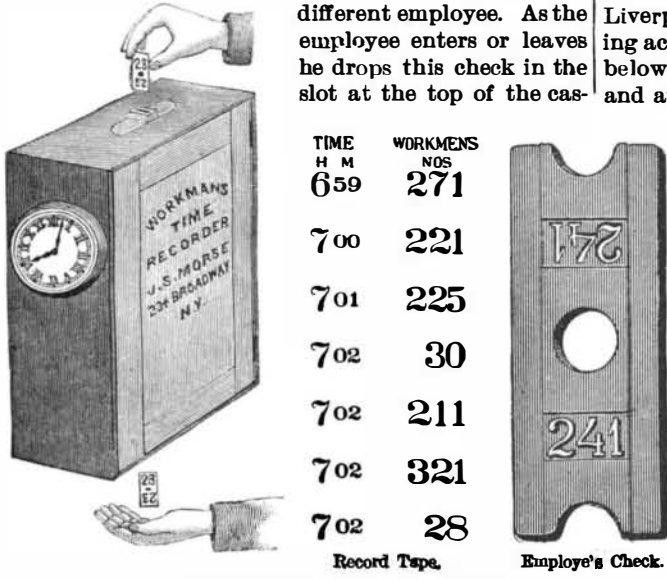


RECORDING TIME OF EMPLOYEES.

A time recorder for registering the exact time of arrival and departure of employees is now offered by the American Watchman's Time Detector Co., J. S. Morse, treasurer, No. 234 Broadway, New York City, and is herewith illustrated. The instrument is placed in some convenient position near the common entrance, and each employee is provided with a small check having a raised type figure on the side, as shown, each separate number representing a different employee. As the employee enters or leaves he drops this check in the slot at the top of the cas-

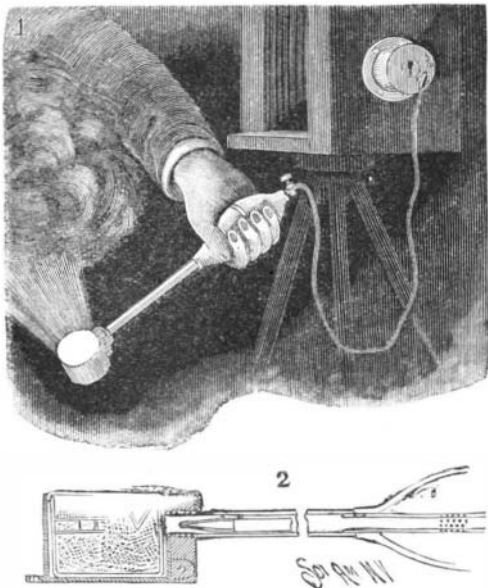


EMPLOYEE'S TIME RECORDER.

ing, and the passage of the check through the machine trips a hammer which causes an impression to be made on a tape of the number and the exact hour and minute, the employee almost at the same time receiving the check as it drops out of the machine. The machine is automatic and the checks may be passed through it at the rate of over a hundred a minute, so that the operation causes practically no delay to the workmen passing in or out. The device is adapted for use in large offices and salesrooms, as well as in factories and establishments of all kinds, the record tape affording such evidence of the time of arrival and departure of employees as to preclude all dispute. The machine has been in successful operation for about three years.

A PHOTOGRAPHIC FLASH LIGHT APPARATUS.

An instantaneously operated flash light apparatus, so connected with a pneumatic camera shutter that the latter may be timed relative to the flash to expose a plate only during the time of the explosion, is shown in the illustration. It has been patented by Mr. Albert F. Mallick, of Jamestown, North Dakota. Fig. 1 represents the operation of the apparatus and Fig. 2 is a sectional view of the flash light device. A rigid tube with perforations covered by an elastic hand bulb has at one end a stop cock and a flexible tubing connection with a pneumatic shutter, there being on the other end of the rigid tube a collar to which is hinged a flash light powder box holder. In the holder is fitted a removable powder box containing an anvil for receiving a percussion cap, as shown in the sectional view, there being in the side of the box radial slits converging to a center opposite the center of the anvil. In the tube is a tubular pneumatic hammer, pointed



MALLICK'S FLASH LIGHT APPARATUS.

on the end next the powder box, and with its conical end apertured. On the under side of the cover of the powder box is a bent piece of metal, against which the hammer strikes in its forward movement, forcing the cover from the box before its contents are exploded. The stop cock regulating the flexible tubing connection with the pneumatic shutter may be so nicely adjusted as to cause the shutter to open by the compressed air the instant the hammer moves for-

ward to discharge the flash light powder, this being effected by the compression of the bulb. The air forced through the hammer itself intensifies the illumination and assists in consuming the smoke. After the flash light is discharged, the powder box may be removed and replaced by another.

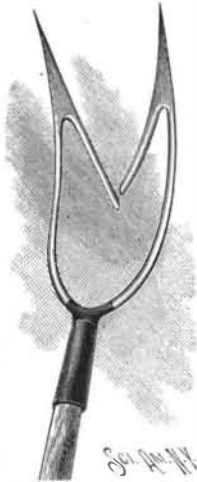
Tunnel Ventilation.

In the important matter of ventilation, the method resorted to in the tunnel beneath the Mersey at Liverpool is claimed to present one of the most striking achievements. Extending as does this tunnel deep below the bed of the Mersey to the solid red sandstone, and approached at either end by elevators of seventy and ninety feet lift, it was foreseen that ventilation was a necessity of the gravest character. The tunnel is large enough to avoid the piston action, its cross section being several times that of the trains, and at and near the middle of the tunnel are openings to a smaller side drift or tunnel running alongside of the main tunnel to the shore end, where is fixed a large fan, the result being that air constantly enters at the stations, which are thus swept clear of all foul air. A train starting in pure air at the station follows the air traveling in the tunnel up to the center, and any change of air between train and tunnel is thus less than it would be if the air in the tunnel were not moving. Past the tunnel center the train begins to travel against the moving air, by which time the air in the train will be more or less fouled by the passengers, and the

ventilation due to train motion then begins to increase. The first air entering from the tunnel to the train is perhaps as good at that time as the air in the train, and, as the train proceeds, it meets purer air at every foot forward, and when it reaches the station is in air of surface quality again.—*New York Sun.*

A COMBINED PITCHFORK AND BAND CUTTER.

The implement shown in the picture may be conveniently used for pitching a sheaf of grain to the feed table of a thrashing or other machine, and then to cut the band on withdrawing the fork. The improvement has been patented by Mr. Francis Duggan, of Odessa, Delaware. Extending inwardly from the fork are curved knives, whose ends do not quite meet, but form a passageway for the twine or band, the front edges of the knives being smooth, while the rear edges are their cutting edges. When the operator takes up a sheaf with the fork, the twine passes through the passageway to the rear of the knives, and in withdrawing the fork either of the knives may be used to cut the band, the fork being then used in the usual way to spread the grain as it is fed to the machine.



THE "DUPLIX" SLIDE RULE.

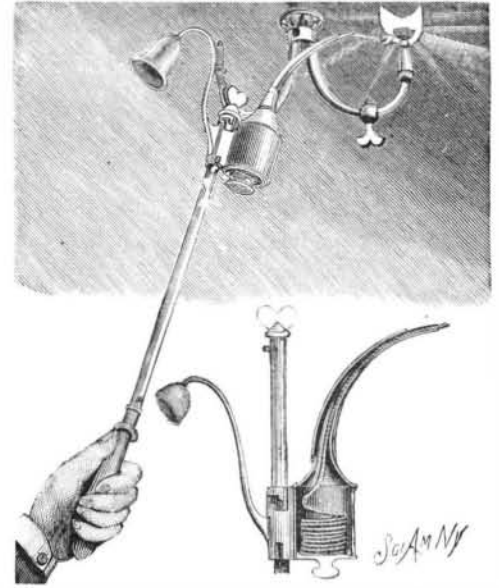
A rule in many respects similar to the Mannheim slide rule is shown in the illustration. It is the invention of Mr. William Cox, and is manufactured by Messrs. Keuffel & Esser, of New York City. A distinguishing feature is that the slide itself is of the same thickness as the rule, and has its two faces flush with those of the rule. The rule and slide are fully graduated on both sides, scales, A and D, being alike on each side of the rule, whereas scales, B and C, on the slide are graduated on the upper face in the usual way, like A and D, but on the under face in reversed order, the initial indices being on the right hand, and the scales progressing toward the left, as shown in the figures.

The indices of the scales of one face coincide with those of the other side, and a metallic runner, encircling the whole rule, enables coinciding points on any scale of either face to be at once found. This improvement simplifies considerably the working out of many complex calculations, besides allowing of such computations as $a \times b \times c = x$, $\sqrt{a^2} = x$, etc., to be performed with one single setting of the slide. In a descriptive manual the inventor gives fuller particulars, as well as the practical solution of many formulæ and problems, the working of which is greatly facilitated by the use of the rule.

THE Croton aqueduct in New York surpasses all modern engineering efforts of this kind.

A GAS LIGHTER OR EXTINGUISHER.

This light, simple and durable device, patented by Mr. Rudolph Geissler, of Nos. 52 and 54 Lafayette Place, New York City, affords a ready means of manipulating the key of a gas fixture. The lighter slides upon a standard having at its lower end a handle and at the upper end a key to turn the key of the gas fixture, and comprises a receptacle adapted to hold oil, alcohol, etc., from which extends upward a curved wick tube,



GEISSLER'S GAS LIGHTER OR EXTINGUISHER.

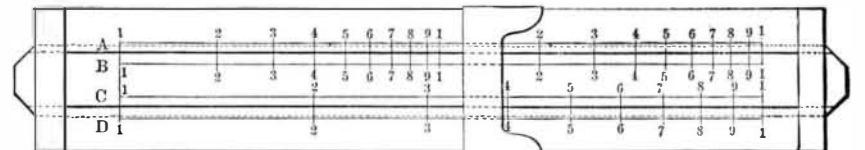
as shown in the sectional view. An oppositely extending curved arm carries a bell-shaped extinguisher, especially adapted for extinguishing the flame of a candle. When it is desired to use a wax taper for lighting purposes, the bottom of the receptacle may be screwed upon the body to permit of its ready removal for the introduction of the taper. The lighter and extinguisher may be removed up and down on the standard and has a locking connection therewith near the top and bottom, a pin in the standard fitting in a bayonet slot of the sliding sleeve to hold the lighter and extinguisher in the desired position.

Blackening for Sheet Iron.

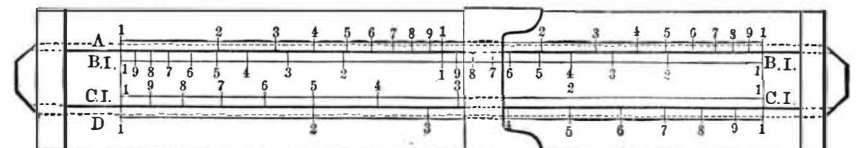
The simplest method to blacken iron is to heat it with oil, especially linseed oil. The objects are first rubbed or painted with oil and then heated to such an extent that the oil is burned off. The surface produced in this manner is coal black and gives the objects a black coloring which will withstand the highest temperature. After the application is thoroughly dried, the objects can be rubbed with benzine or with a solution of soda.

In order to procure a black asphalt lac for iron, melt 8 pounds of asphalt in an iron kettle, gradually adding 12 pints of cooked linseed oil, 1 pound of litharge, and 1/2 pound of sulphate of zinc. The whole mixture should be allowed to boil for three hours. Finally, 1 1/2 pounds of black amber is to be added and the mixture carefully boiled for two hours longer. It is advisable previous to using this mixture to thin it somewhat by the addition of oil of turpentine.

THE torsion braided wire spring mattresses manufactured by the Weston & Wells Manufacturing Co., 1110 to 1116 Noble Street, Philadelphia, are well calculated to promote healthful and comfortable sleep, not only in hot summer weather, but throughout the year. This mattress is softer and more comfortable than one made of hair, as it conforms to the



Front or Upper Face.



Back or Under Face.

THE "DUPLIX" SLIDE RULE.

slightest movement of the body, and it cannot become heated, as each movement of the body changes the air beneath. It is made in two styles, No. 1 being a series of torsion springs which will not break down or get out of order, covered with a slip case of ticking and a quilted covering of fine curled hair, while No. 2 is made of a single layer of torsion springs upholstered in fine hair and alike on both sides. The mattress, in each case, complete in itself.