

A NEW STEAM CAPSTAN.

The steam capstan represented in the annexed engraving (which we translate from the *Revue Industrielle*) has lately been constructed by the Marcenelle and Couillet Company, of Belgium, for use in the mining districts. In order to remedy accidents to hoisting engines and cables, it has been customary to provide auxiliary apparatus at every mine. The present machine, being portable, answers the same purpose for several mines, and thus a considerable saving is effected in cost of apparatus. It consists of a vertical tubular boiler of sufficient size to supply steam to the two horizontal engines which are connected to the driving shaft. The latter is geared to the drum shaft by heavy gear wheels, and carries a brake pulley, the brake of which consists of a steel plate encircling the entire periphery of the wheel, and it is loosened or tightened by a hand lever. The body of the carriage and wheels are of iron, and are very strongly built.

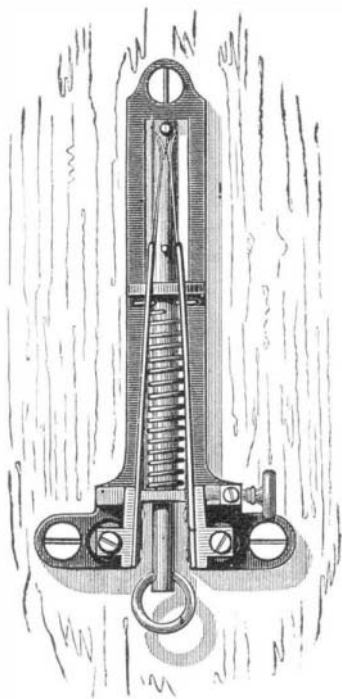
The machine is capable of lifting a load of 3,300 lbs. from a depth of from 1,500 to 1,800 feet, by means of a cable 6 inches in diameter and weighing about 4 lbs. per running yard. The cable is of galvanized iron wire, and contains a hempen core in which a number of copper wires are placed. These connect with a battery and with an electric bell near the engineer, so that they serve as a telegraph by which the workmen can signal when to hoist or lower. The total weight of the apparatus is about 14,000 lbs.

A New Way of Outlining Theater Scenery.

In the London theatres, scenic artists are now largely availing themselves of photography and the magic lantern as aids in the production of mimic representations of places where the action of plays is supposed to occur. In historical dramas, such as one based on the history of Joan of Arc, for example, the artist, instead of drawing on his imagination for a group of mediæval houses to represent the market-place at Rouen, procures a large photograph of the actual locality. This, by means of the oxyhydrogen light, he throws upon the canvas, the image being suitably enlarged in size. Then he follows the outline, and has an accurate picture. The realistic effect of scenery produced in this way is said to be wonderful.

A NEW ELECTRIC FIRE ALARM AND BELL PULL.

The annexed engraving (which we select from *Les Mondes*), represents a new and simple fire alarm apparatus, which, when acted upon by heat, causes an electric bell to ring, and

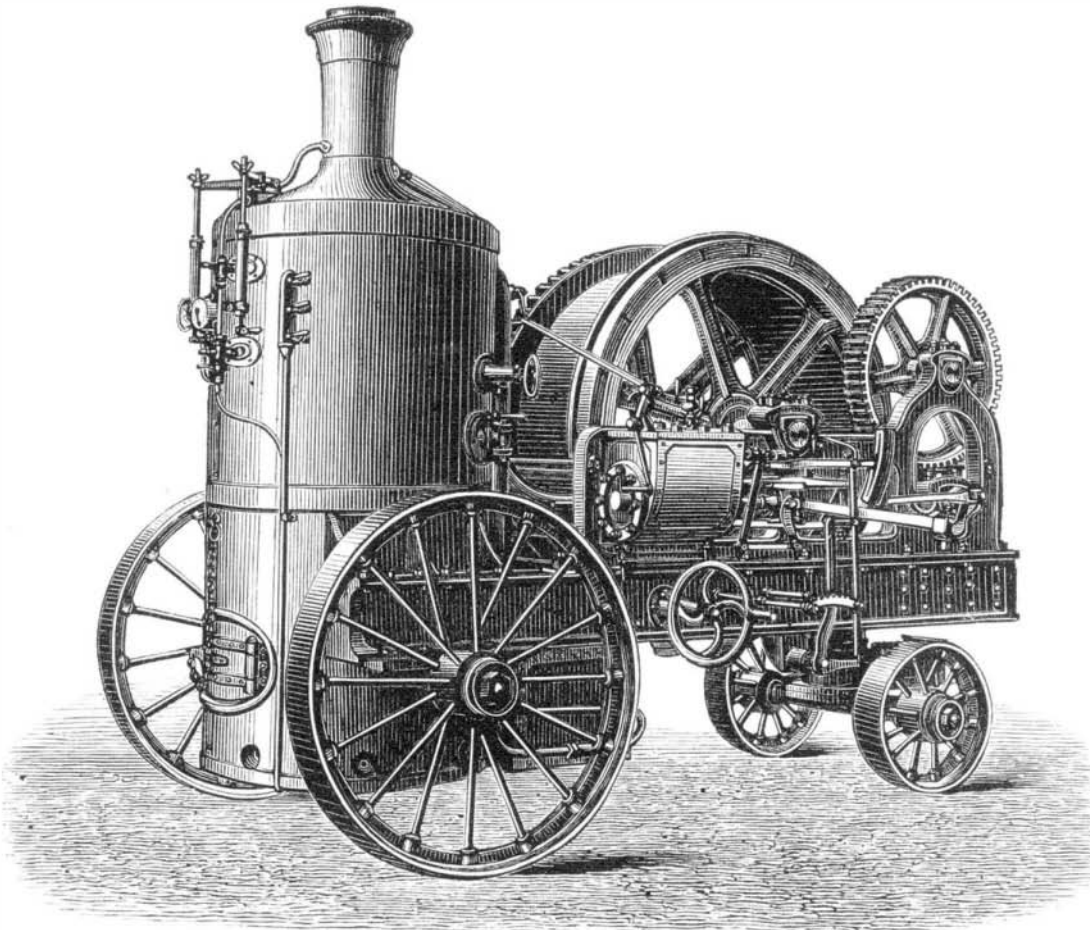


which may ordinarily be employed in lieu of the common press button. In houses and hotels where electric bells are altogether used for purposes of communication, this little device provides a fire alarm wherever a bell-button is located, the locality of the fire being, of course, indicated by the prolonged ringing of the bell.

A plate of metal, secured by three screws to the wood-work or wall of the room, receives the conducting wires from beneath and at the base of two metal columns. To the latter are attached two thin elastic plates of metal, which form an acute angle with each other. They are prolonged upward by a sheet of steel which covers them outside the

angle. The more dilatable metal being thus placed outside, the tendency of the plates on becoming heated is to curve inward, and thus contact is established at the summit of the angle, the current passes, and the gong, elsewhere located, sounds.

In the vertical axis of the supporting plate slides a rod, to the lower end of which a ring is attached, and to the upper end of which is secured a metallic index, which, when the rod is pulled down, comes in contact with the elastic plates which are separated otherwise by an ebony band

**STEAM CAPSTAN FOR MINING PURPOSES.**

on the rod. This movement (from up, down), is effected by an ordinary bell-cord attached to the ring, and a spiral spring serves to carry the rod back to its normal position after the pull has ceased. The apparatus may be adjusted so as to be very sensitive, and yet it cannot be put out of order by hard pulls on the cord. The set screw shown on the right, touches one of the elastic plates, and so adjusts it with reference to the other that contact between the two will occur at any thermometric degree of heat. A needle fixed on the head of the screw traverses a dial on the inclosing box of the apparatus. It is merely necessary to set the needle to the graduation in the dial corresponding to the degree of heat at which an alarm is desired. This ingenious device is the invention of M. Gaulnier, of Paris.

To Obtain the True Meridian.

In all of the recent works on surveying, it will be found that Alioth, the first star in the handle of the Dipper, is designated as being directly opposite the pole, from Polaris, the north star. There was a time when such was the case, but now it is far from being correct.

The first published account of this method which we have been able to find, is in a revised edition of Abel Flint's work on surveying, published in 1833, which states that this method was communicated to the compiler, with permission to publish, by Moses Warren, of Lynn, Conn. It appears that this mode of reckoning had been in use among surveyors for some time previously; but we have not been able to find by whom or when it originated.

In 1800, Alioth was opposite Polaris; but a retrograde movement of the latter, of about 20' a year, has caused Alioth to be, at the present time, 25' ahead and brings Mizar, the second star in the handle, within 5' of being opposite to the north star; so that, in fifteen years more, Mizar will be exactly opposite. Polaris is on the meridian 25' after Alioth has passed the perpendicular, and 5' before Mizar reaches it. C.

Printing Photographs on Glass.

M. Siegwart, in the *Polytechnisches Journal*, directs the operator first of all to secure an image by means of gum, honey, etc., and bichromate of potash, and to dust this hygroscopic picture with red lead powder. The red lead image is then burnt in; and the more soluble lead glass thus obtained, is treated with concentrated nitric acid, whereby a dull, white image is produced, which may be viewed as a transparency.

Hang up the Lantern.

No one should ever place a light or lantern on a barn-floor, or on a shop-floor where there are shavings. It is a very easy thing to upset a light so placed, and the result is likely to be the conflagration of the building. It is much more prudent to place hooks here and there about the premises, and have it understood that they are solely to hang the lan-

tern upon, and that other things must be kept off them. An unprotected light should not be allowed in a barn under any circumstances. If the kerosene lamp had been hung up and not placed where a cow could kick it over, the burning of Chicago, and the consequent loss of millions of dollars, would not have happened.

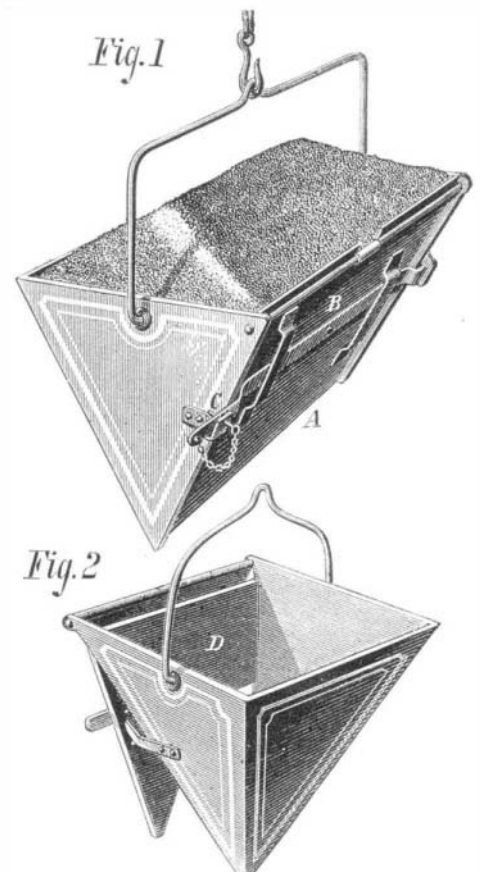
THE WILLES AND ROWE LIGHTNING DUMPER.

We illustrate herewith a new dumping bucket, which is excellently suited for loading and unloading carts and other

vehicles, vessels, etc., when the same are used for transporting any substance which may be dumped without injury, such as earth, stone, coal, and grain. The invention will also be found useful in building operations, for handling mortar and concrete. It consists of a receptacle, triangular in section, and shaped either as shown in the engravings, or in forms slightly modified therefrom. This is suspended by a looped bail from the sides, as shown. One side, A, Fig. 1, is secured to a rod which enters apertures in the adjacent ends, so that said side, A, is pivoted or hinged above so as naturally to swing open, and thus allow the contents of the vessel to escape. To the middle of side A, is pivoted a bar, B, the motion of which is limited by long keepers, and the extremities of which, when the side is closed, fall into hooks on the ends of the bucket. One of these hooks turns upward, the other downward, so the bar, B, by being simply turned on its pivot, becomes engaged with them. It may then be fastened (so as not to be dislodged by any chance shock), by a pin passing through the bill of one hook, as shown at C. Of course, while the earth, etc., is in the bucket, the side, A, is kept closed; but

when it is desired to dump the contents, the pin, C, is removed, the bar moved out of the hooks, and the side, A, is at once forced open by the weight of the material above it, which is thus discharged.

In the bucket shown in Fig. 2, a partition, D, is used inside the swinging side, A, so that the orifice made by the opening of the latter is thus rendered smaller. This arrangement is best suited for buckets used for sacking grain, where the discharge is made into a comparatively small aperture.



Patented through the Scientific American Patent Agency, December 5, 1876. For further particulars relative to sale of State and County rights, address Messrs. Willes & Rowe, care of C. W. Stayner, Attorney, Salt Lake City, U. T.

New Investigations on Ruthenium.

M. Saint Claire Deville has recently noted that hyperruthenic acid (RuO_4), when heated to about 212° Fah., explodes violently, disengaging immense quantities of ozone. The same occurs if the metallic acid is placed in a very hot flame; and the fact is the more striking as it is well known that, under ordinary conditions, a temperature of from 318° to 414° is necessary in order that ozone may be disengaged.