Jumping Sheets or Fire Escapes.

An unhappy accident, by which an English fireman was seriously injured while practicing with the jumping sheet, has given rise to something like a revulsion of feeling with regard to their utility. The superintendent of the Manchester Fire Brigade has made inquiries to discover instances of their use in saving lives, during the years in which jumping sheets have been carried by European fire companies, and finds but one instance, in Vienna.

It is only when the person to be rescued is at a small distance from the ground—say, thirty feet or under, he says—that the sheet can be safely used; above that height those who jump run the risk of having their bones broken, while those who hold the sheet are liable to a spinal shock.

To be really serviceable in rescuing fire-beset persons from upper floors, the jumping—or, rather, catching sheet—should, in our opinion, be raised ten, fifteen, or twenty feet from the ground, on strong but somewhat elastic standards. In this way the fall would be sooner broken, the shock would be less, and would be met by the standards and not by human backs, and a longer time and space would be provided for reducing the momentum of the body gradually as it neared the ground.

Compartment Ships.

There is still a very grave doubt expressed in weighty quarters, says the *Marine Engineer*, as to the efficiency of the present much vaunted system of water-tight compartments for securing the safety of vessels after collision or other fracture of the hull. The late losses of the Douro and Yrurac Bat have been severe examples of the utter uselessness of the water-tight bulkheads, in those instances, at least. We fear that in any of the liners or large steamers, the sizes of the midship compartments are so large that they would, when flooded, suffice to sink the vessel beyond the side lights or port holes, some of which are sure to be open. As the bulkheads do not usually extend above the main deck, the water can rise above them and fill the other compartments by the hatch or companion ways, of which some are also sure to be open. In no case, to our knowledge, has a vessel received serious injury to her midship compartments in deep water and lived through it. Again, the bulkheads are by no means of sufficient strength to stand any very great water pressure, when to that is added the shock of waves. There seems little doubt that both the Teuton and the Yrurac Bat sank from this cause, while the Douro foundered from the size of the compartment that was filled with water.

NOVEL INDICATOR FOR WEIGHING SCALES.

We give an engraving of a device for indicating by sound the overbalancing of the scales, so that audible evidence of full weight may be given to purchasers.

An electric alarm is set in operation by means of a circuit closer operated by the arm of the scale beam, which receives the article to be weighed, and a wedge adapted to be moved longitudinally varies the position of the circuit closer with relation to the arm.

In the engraving, A is a box or counter top, within which there is an electric bell, B, of usual construction, together with a battery for operating it.

In the top of the box, A, there is a push button, D, which is held in an elevated position by a spring. This button is connected with the battery by means of a wire, E, and when depressed comes into contact with a wire, F, which extends to the bell, B, and thereby closes the electric current and sets said bell mechanism in motion in the usual way.

On the top of the box, A, over the button, D, is a pair of scales, G, which are so arranged that the depression of the end of the beam, upon which are placed articles to be weighed, will press down the push button, D, and sound the alarm, indicating the overbalancing of the scales, and enabling those interested to know that there is full or over weight upon the scales of the article being weighed.

In order that the vertical position of the push button, D, may be varied to adapt it to the scales, and to render their action certain, the inventor fits the casing of the button loosely in an opening in the box cover, and supports its lower end upon a wedge, H, arranged to move horizontally and longitudinally. The forward movement of the wedge operates to raise the casing, and a rearward movement to depress it. A threaded rod, I, having one end swiveled within the rear end of the wedge, serves to move the wedge longitudinally in either direction, as may be necessary for the adjustment of the push button.

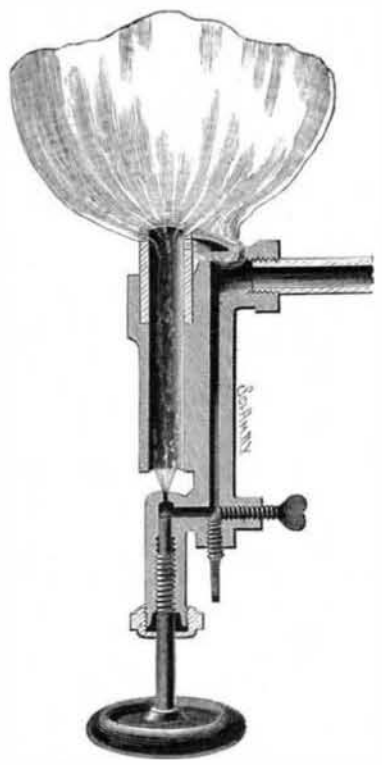
The apparatus not only affords purchasers protection against light weight, but also assists the seller in weighing out articles by giving him warning whenever the necessary amount has been placed in the scales.

This invention was recently patented by Mr. Walton W. Wright, of Cairo, Ill.

NEW VAPOR BURNER.

The engraving shows an improved vapor burner in which the slit in the burner tip is made slightly deeper on one side than the other, so that a portion of the flame which produces the light will be diverted so as to heat the inlet tube, and thus to vaporize the oil. This is done without in any manner interfering with the form of the blaze or the brilliancy of the light produced.

The object of the invention is to dispense with the usual subsidiary jet, and with the tubes which conduct a portion



BLAKE'S VAPOR BURNER.

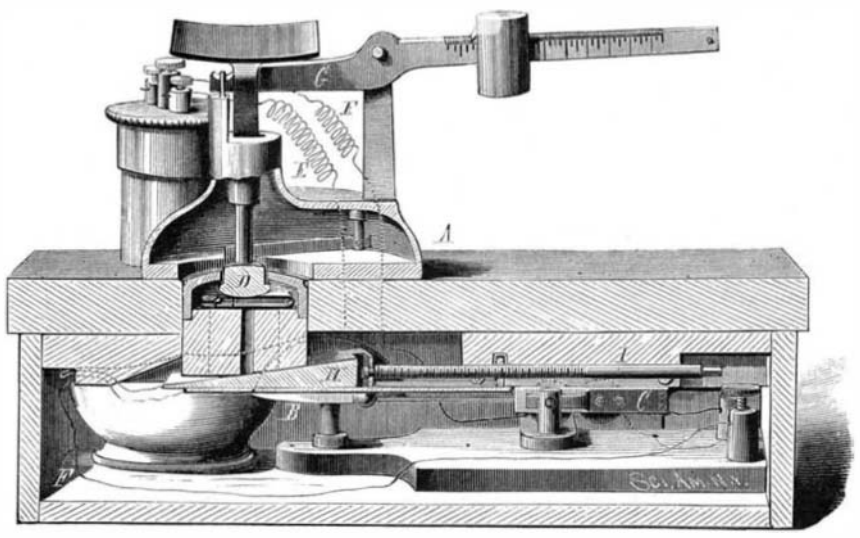
of the gas to another part of the burner for the purpose of forming a subsidiary jet, and thus cheapen and simplify the burner.

This invention was recently patented by Mr. Wm. B. Blake, of Bedford, O.

Progress of the Hudson River Tunnel.

The engineers in charge of the Hudson River Tunnel now pronounce the experiment of boring from the New York side, on substantially the same plan as that resorted to on the Jersey City side, to be a complete success. While they have been coming to this conclusion the work has been carried on at the outlay of much perseverance and, not a little risk, and has been marked by one startling occurrence which has not before been made public.

The New York *Sun* says that the engineer in charge, General Sooy Smith, did not have entire confidence in the plan of working with compressed air in the sandy, loose soil at the New York end of the tunnel. He feared that the air would work its way through the soil, and that the water could not be kept out while the workmen were building the tunnel. He dreaded a repetition of the accident of July, 1880, when by the caving in of a portion of the roof plating on



WRIGHT'S ELECTRIC INDICATOR FOR WEIGHING SCALES.

the Jersey side one of the air locks was jammed and twenty men were drowned. Instead, therefore, of prosecuting the work on the plan which Colonel Haskin, the chief promoter, had so enthusiastically favored from the first, he preferred other and more expensive, though safer, methods, which he claimed would be also more expeditious. Finding that Colonel Haskin and the direction insisted upon proceeding as they had done from the first, he resigned his position and went West.

The occurrence referred to, which seemed almost to justify General Smith's fears, took place on March 31 last, when what is called a blow-out occurred. The compressed air forced its way out of the unfinished end of the tunnel, and this withdrew the force which kept the soft mud and water from rushing in. The men were forced to retire, which they did without accident, and for several days the excavation and the caisson were filled with water. Despair seized upon some of the engineers, and those who had favored old-fashioned methods declared that their predictions had been verified. But by the use of ingenious appliances the compressed air apparatus was again put to work, the water was driven out of the caisson and excavation, the leak was found and stopped, a section twelve feet in length was bricked up and completed, and the work of building the tunnel proceeded as before. The water could not be rapidly driven out through the holes at which it had entered, and a four inch discharge pipe was brought into play. As fast as the water lowered, the joints in the iron plates were made tight. When the water got low enough to enable the workmen to reach the principal leak, under water, that, too, was secured, until at length the whole tunnel was pumped dry, and the men were enabled to work with about the same density of compressed air as before—some twenty pounds pressure to the square inch above a normal pressure.

Several new expedients have been adopted to prevent similar accidents. The soil is so loose and sandy that it was thought best to decrease the size of the plates which are used to build the iron shell of the tunnel in which the brick lining is laid. The plates before used were 4½ feet long by 2½ feet wide. The exposure of so much surface of excavation gave too great an opportunity for the escape of air through the loose soil. Engineer Finch has reduced the size of these plates to one-quarter their previous area. Another precaution is the use of a bulkhead at the working end of the tunnel. This decreases the amount of exposed surface and makes it easier to keep the tunnel air-tight. Heavy bracing is used to support the roof, so that the roof plates may be kept in place until the brick casing is built. All these arrangements have proved successful thus far in enabling the engineers to bore in soft soil, such as has never before been tunneled by the compressed air process. The experience of several years and of the two main breaks has led to constant alertness. The slightest variation in the air pressure attracts attention, and instant search is made for the leak. The brickwork is kept up as close as possible to the iron shell, and the smallest amount of exposed surface that can be made available is kept open.

There have been several changes in the engineers. S. H. Finch, engineer in charge, is in charge of the New York side, and Charles Ward Raymond and Charles W. Clift are his assistants. The New Jersey end of the work was begun in September, 1879, and has progressed 1,000 feet in the longer tunnel and 600 feet in the other. About $400,000 has been expended on the work. It is estimated that the total cost will be about $5,000,000, and that the tunnel will be finished in four or five years. It has been a novel engineering work, prosecuted in spite of the adverse opinions of educated engineers.

Ventilation by Gas.

M. Arthur Morin, Director of the Conservatoire des Arts et Métiers, Paris, has carefully studied, with instructive results, the problem of ventilation by the aid of gas burners. For kitchens already built and provided with stoves of the usual pattern, ventilation may best be effected by lighting a gas burner at the bottom of a sheet iron air shaft. An example is given of a kitchen measuring 10 feet by 13 feet by 11 feet 6 inches high, having a content of 1,490 cubic feet.

It is proved by direct experiment that a common gas burner, consuming only 1½ cubic feet per hour, will create a draught in a sheet iron shaft 9½ inches in diameter and 26 feet high, sufficient to carry off 1,257 cubic feet of air every hour. A greater draught will, of course, be insured by a taller shaft; the delivery of a similar pipe to the preceding, but 52 feet high, being at the rate of 1,780 cubic feet per hour. Thus it is manifest that, with the aid of the ordinary kitchen fire, the air of a kitchen may in this manner be changed more than once an hour, and a constant movement of air toward the ventilating apparatus will be set up, which will effectually prevent all smell escaping by the doors to other parts of the house.

The gas burner need only be kept in action while cooking is going on, or, say, during six hours every day. The consumption of gas would therefore be only 8½ cubic feet daily, or 3,100 cubic feet per year; costing a mere trifle in comparison with the good it would have effected in preventing the dissemination of kitchen odors.

It is observed that the preceding calculation relates to sheet iron air shafts taken through the wall, and carried up to the roof in the open air. If the shafts were made of earthenware pipes, or built into a wall, whereby radiation would be prevented, the delivery of air through it would be much increased.