A Smokeproof Fireman's Cap.

That a woman has been successful in inventing a cap for use by firemen in going through rooms filled with smoke, should be encouraging news to women inventors generally. According to the Syracuse Standard, it appears that Mrs. John H. Miller has invented such a cap, described as follows :

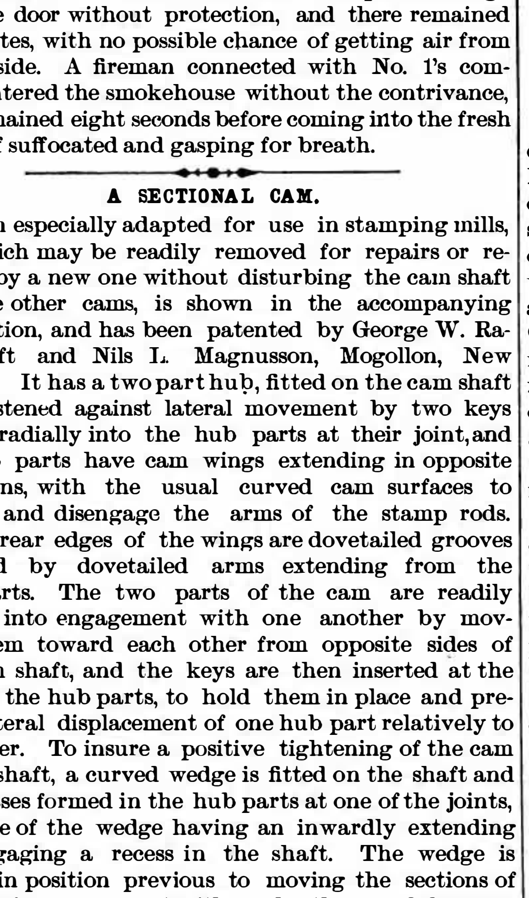
The cap is made of fine strips of asbestos conformed to the shape of the head. It is held fast in place by a rubber band, making it airtight. Its weight is only sixteen ounces, and it is so constructed as to enable a person to carry it on the arm without inconvenience. There is a strip of mica before the eyes ; so no inconvenience is suffered in this respect. A silk sponge, through which no smoke can enter, but which permits the ingress of air in plentiful quantities, fills an aperture for the mouth, and when properly adjusted the cap is so simple that its efficacy is apparent at a glance.

When it is understood that firemen are unable to remain in a smoking building longer than three or four minutes at a time, an invention of this character, which enables a man to grope about in a stifling atmosphere for an hour, certainly reduces chances of losing life through suffocation to a minimum.

A practical trial of the cap was given in Syracuse which worked perfectly. Mr. Miller, the husband of the inventor, put on the cap and entered a smokehouse so densely filled with smoke that it was impossible to go near the door without protection, and there remained 35 minutes, with no possible chance of getting air from the outside. A fireman connected with No. 1's company entered the smokehouse without the contrivance, and remained eight seconds before coming into the fresh air, half suffocated and gasping for breath.

A SECTIONAL CAM.

A cam especially adapted for use in stamping mills, and which may be readily removed for repairs or replaced by a new one without disturbing the cam shaft and the other cams, is shown in the accompanying illustration, and has been patented by George W. Ravenscroft and Nils L. Magnusson, Mogollon, New Mexico. It has a two part hub, fitted on the cam shaft and fastened against lateral movement by two keys driven radially into the hub parts at their joint, and the hub parts have cam wings extending in opposite directions, with the usual curved cam surfaces to engage and disengage the arms of the stamp rods. In the rear edges of the wings are dovetailed grooves engaged by dovetailed arms extending from the hub parts. The two parts of the cam are readily moved into engagement with one another by moving them toward each other from opposite sides of the cam shaft, and the keys are then inserted at the joint of the hub parts, to hold them in place and prevent lateral displacement of one hub part relatively to the other. To insure a positive tightening of the cam on the shaft, a curved wedge is fitted on the shaft and in recesses formed in the hub parts at one of the joints, the base of the wedge having an inwardly extending lug engaging a recess in the shaft. The wedge is placed in position previous to moving the sections of the cam in engagement with each other, and by pressure against the working surfaces of the cams the wedge and the cam sections are made tight on the shaft in proportion to the pressure exerted. Communications relative to this invention may be addressed to Thomas F. Cooney, of Cooney, New Mexico.



RAVENSCROFT AND MAGNUSSON'S SECTIONAL CAM.

Death of Sir Robert Grove.

The Right Hon. Sir William Robert Grove, D.C.L., LL.D., F.R.S., died in London on August 2. He was born in Wales in 1811. He was educated at Oxford and became a lawyer. Being temporarily prevented by ill health from following his profession he turned his attention to electricity, and in 1839 invented the powerful voltaic battery which bears his name, and the gas battery.

A NEW LIGHT FOR PHOTOGRAPHERS.

BY C. F. TOWNSEND, F.C.S.

Four hundred candle power for 10 cubic feet of gas burnt per hour, costing one farthing ! Noiseless, powerful yet soft, absolutely steady ! What more can a photographer or anybody else desire in the way of gas lighting ? My attention was called to the new lamp by a brilliant illumination appearing through the doorway of the workshop at King's College, where, like a good photographer, I was devoting my spare time to the mysteries of cabinet making. The light seemed too bright for incandescent gas light, and yet not cold and ghost-like enough for the electric arc ; so my picture frames were neglected, and I proceeded to the engineering shops whence the light was coming. Here I saw a number of what appeared to be large incandescent gas mantles, mounted on cylindrical copper tubes screwed into the ordinary gas pendants. The brilliancy of the light, however, showed that something unusual was at work, for the large machine shop was as bright as day. In a few minutes I was introduced to M. Caton, the inventor, who was superintending the experimental installation. With the greatest courtesy and much enthusiasm, M. Caton explained the principles on which his invention, " La Lampe Caton," was based, and invited me to call on him in Leadenhall Street, where I had an opportunity of going into the question more thoroughly.

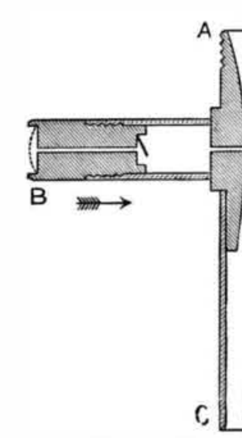


Fig. 1.—THE ASPIRATOR.

Before describing the new lamp further, a few words about the principle on which the incandescent gas light works will make the account of the light more intelligible. A Bunsen or other similar burner, in which a mixture of air and gas is burned, is non-luminous. To produce luminosity it is necessary to have solid particles of some kind in the flame. A candle is luminous, because one zone of the flame contains solid particles of carbon, which are raised to a white or yellow incandescence by the intense heat. The hotter the flame, the greater will be the quantity of light given off by the incandescent body. In the ordinary incandescent burner, the mantle, composed of a fine network of infusible substances similar to lime, takes the place of the carbon particles of the ordinary candle or luminous gas flame. The actual flame that plays on the mantle is non-luminous, the light being emitted by the incandescent material in the mantle. Now, if instead of allowing the gas to burn with a mixture of the air it can drag in through the air holes in the burner, and the air surrounding the flame, sufficient air is forced into the flame to burn the whole of the gas without calling on the outside air to supply any, the intense local heat of the blowpipe flame is obtained. That is the principle of M. Caton's lamp : the mantle is kept at an intense heat by a blowpipe flame.

The secret of success in the new burner is that the gas and air are mixed perfectly before reaching the flame, and consequently the combustion is perfect. Another most important point is that the gas and air travel at the same rate, so that there is no noise or flickering.

This desirable end is attained by causing the air and gas to pass through a spiral tube, or series of tubes, whence they issue thoroughly mixed. It is essential to success that the tubes should be cut to a particular pitch or angle, which the inventor has determined. To a lanternist this mixture of gas and air before reaching the burner will seem dangerous in case of lighting back, but the mixing tubes are safeguarded by wire gauze. Even without this the inventor declares that the quantity of air and gas actually mixed at one time is too small to cause an explosion. In cases where the burner has been damaged accidentally, a slight puff has followed and the gas has been blown out ; nothing more.

The air necessary for combustion is supplied by a small injector, worked by water pressure. For a large installation a metal one would be required, but where only a few lamps were used a glass one, such as is commonly used in chemical laboratories, would be sufficient. The cost of the metal injector would be £1 perhaps, and that of the glass one a few shillings. To this must be added the cost of a few feet of iron or compo piping, as the case may be—a comparatively small item. The cost of the water power required is insignificant. For five 400 candle lamps, eight gallons of water per hour at the ordinary high pressure of town services would be ample. Water is charged by meter at 6d. per 1,000 gallons, so that the water for a light of 2,000 candles would only cost 1d. for twenty-four hours.

The temperature of the flame is 1,800° Centigrade (3,270° F.), so that no chimney can be used with the lamp. Paradoxical as it may appear, the heat produced is less than that given off by burning the same quantity of gas in any other way. Although the local heat is intense, the total quantity given out is comparatively small, because so much of the energy of the flame is converted into light. M. Caton wishes it to be clearly understood that he only claims the lamp, and is willing to use any mantle on the market. Purchasers, therefore, need have no fear of infringing existing patents. The price of the lamps has not been fixed at present, but it will probably not exceed 2s., to which must be added the cost of the mantle. Lamps of all sizes are made, to give light from 25 to 400 candles ; the small lamps having the same efficiency as the large ones.

What struck me as the great advantage of the lamp from a photographic point of view was its remarkable diffusiveness. There were no heavy shadows anywhere. Even right under the lamp no appreciable shadow of the pipe could be seen. The light seemed to proceed from the lamp horizontally, to be diffused softly and evenly by the walls. The inventor took me behind a heavy piece of machinery, where with almost any other lamp would have been deep shadow, and it was like being in diffused daylight. Reading was perfectly easy, and colors could be distinguished quite as well as in daylight.—The Photogram.

NOTE.—The two accompanying illustrations show the principle of the water pressure injector. Fig. 1 is a sectional view. The water falling vertically through the small opening draws the air inward through the side duct and carries it into the bottle. Fig. 2 shows the whole apparatus, the pressure of the column of water passing out at the bottom of the bottle, and the flexible tube is the pressure exerted on the air in the bottle above the water, which is used to give a gentle air blast with the gas to the burner.—EDS.

A Lighthouse with no Lantern.

The most extraordinary of all lighthouses is to be found in the Hebrides, Scotland, on Armish Rock, Stornoway Bay—a rock which is separated from the Island of Lewis by a channel over 500 feet wide. On this rock a conical beacon is erected, and on its summit a lantern is fixed, from which, night after night, shines a light which is seen by the fishermen far and wide. Yet there is no burning lamp in the lantern and no attendant ever goes to it, for the simple reason that there is no lamp to attend to, no wick to trim, and no oil well to replenish.

The way in which this peculiar lighthouse is illuminated is this, says the Marine Record : "On the island of Lewis, 500 feet or so away, is a lighthouse, and from a window in the tower, a stream of light is projected on a mirror in the lantern on the summit of Armish Rock. These rays are reflected to an arrangement of prisms, and by their action are converged to a focus outside the lantern, from where they diverge in the necessary direction." The consequence is that, to all intents and purposes, a lighthouse exists which has neither lamp nor lighthouse keeper, and yet which give as serviceable a light—taking into account the requirements of this locality—as if an elaborate and costly lighthouse, with lamps, service room, bed room, living room, store room, oil room, water tanks, and all other accessories were erected on the summit of the rock.

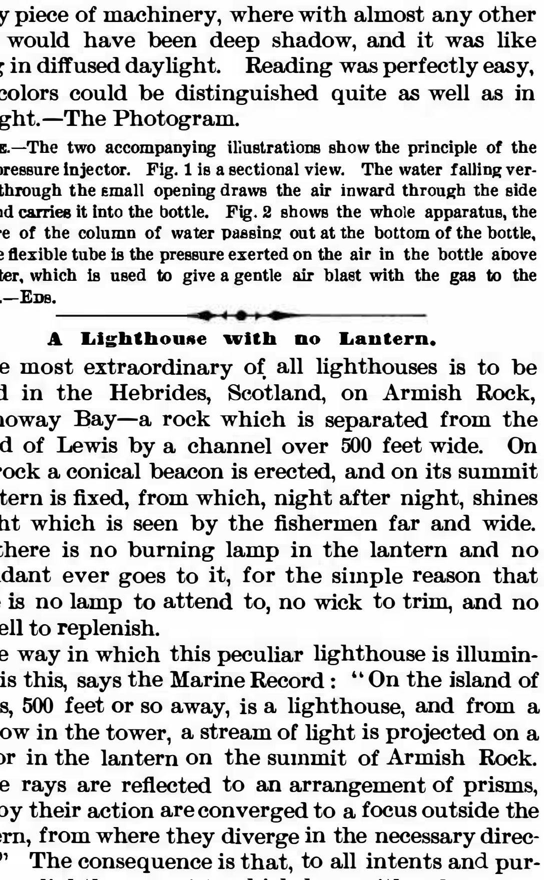


Fig. 2.—ASPIRATOR ARRANGED FOR PRODUCING A BLAST.

Dr. John Haldane, lecturer on Physiology at Oxford University, is one whose labors would appear to deserve more than passing recognition. In his experiments to discover a means of preventing the loss of life among miners, resulting from underground explosions, he actually inhaled carbon monoxide for seventy-one minutes, with the result that vital energy was nearly extinguished, and life would have flown had not oxygen been speedily administered.