A. P. BELL & & T. THORP.

APPARATUS FOR LIGHTING AND EXTINGUISHING GAS AUTOMATICALLY.

No. 180,526. Patented Aug. 1, 1876.

Fig. 1.

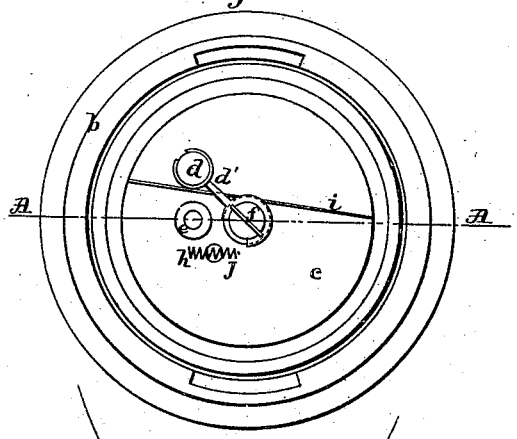


Fig. 2.

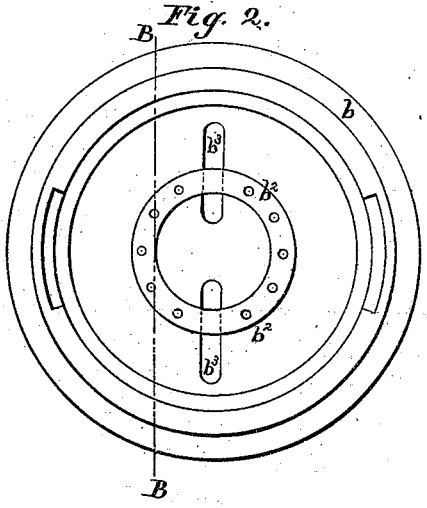


Fig. 3.

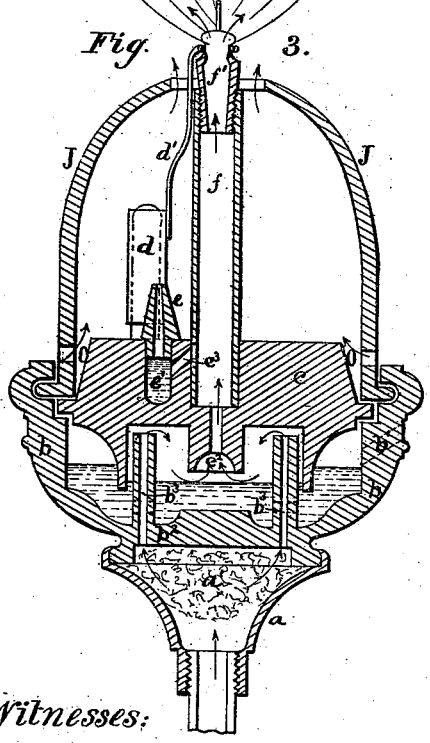
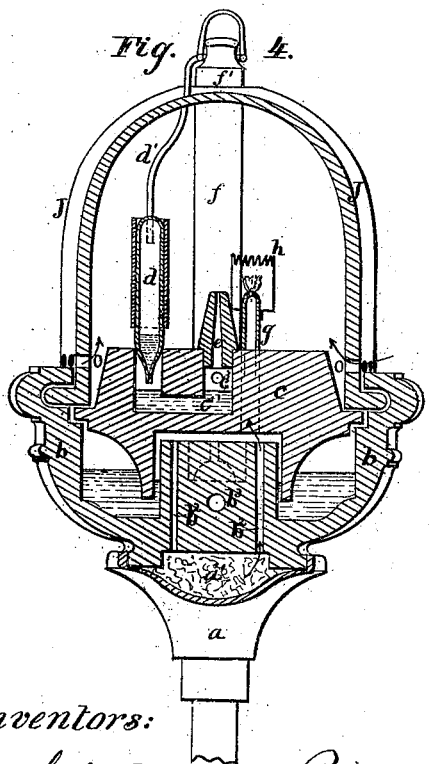


Fig. 4.



Witnesses:

W. B. Barlow Manchester
Richd Hughes Manchester.

Inventors:

Asahel Pilkington Bell
Thomas Thorp

UNITED STATES PATENT OFFICE.

ASAHEL P. BELL, OF MANCHESTER, AND THOMAS THORP, OF WHITEFIELD, NEAR MANCHESTER, ENGLAND.

IMPROVEMENT IN APPARATUS FOR LIGHTING AND EXTINGUISHING GAS AUTOMATICALLY.

Specification forming part of Letters Patent No. **180,526**, dated August 1, 1876; application filed June 7, 1876.

To all whom it may concern:

Be it known that we, ASAHEL PILKINGTON BELL, of Manchester, in the county of Lancaster, architect, and THOMAS THORP, of Whitefield, near Manchester, England, aforesaid, architect, have invented a new and useful Improved Apparatus for Lighting and Extinguishing Gas Automatically; and we hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawing, forming part of this specification.

The nature of our invention consists in a new and improved apparatus for lighting and extinguishing gas-lamps automatically by the difference in pressure in the gas-mains.

Figure 1 is a plan of the apparatus, with the bell removed. Fig. 2 is a plan, with the bell and center-piece removed. Fig. 3 is a sectional elevation through the line A A in Fig. 1; and Fig. 4 is another sectional elevation through the line B B in Fig. 2.

a is a metal cap, secured to the gas-main, and *a'* is wool or other fibrous material to act as a filter for the gas. *b* is a receptacle, made of earthenware, or other suitable material containing mercury, the level of which is regulated through the hole b^1. (See Fig. 3.) The gas from the main passes into the receptacle *b* through the vertical holes b^2, all of which may be left open, or some may be closed according to the differences of pressure in the gas-main. The horizontal passages b^3 are to allow the mercury to pass from the outer to the inner chambers of the receptacle *b*. The center-piece *c* fits in a recess in the receptacle *b*. The center-piece contains a chamber, c^1, for mercury, and this chamber has an orifice, above which is the hollow cylinder *d*, and a second orifice, in which the burner *e*, for the flaring-jet, is fixed. At the lower side, and in the center of the piece *c*, is the pipe-mouth valve c^2, through which the gas passes into the tube *f*, which is provided with the ordinary burner *f'*. The hollow cylinder *d* is fixed to a metal shell suspended to the burner *f'* by the wire *d'*, and a loop of platinum wire, connected thereto, is carried over the burner. Near the flaring-jet burner *e*, and the tube *f*, is the small burner *g*, above which is the coil of platinum wire *h*. This burner *g* is always in communication with the gas in the main, and if the gas from the burner *g* is put out by accident it will be instantly reignited by the heated platinum wire *h*. The partition *i* is placed between the cylinder *d* and the burners, as shown in Fig. 1. The whole apparatus is protected by the bell J, which is also made of porcelain or other suitable material, and the lower edge of the bell is perforated to admit air to support the combustion of the burners *e* and *g*. The bell J is connected to the receptacle *b* by a bayonet-joint, so that it may be easily removed to examine or repair the parts.

The mode of operation is as follows, and the drawing, Fig. 3, represents the parts in the positions they occupy when the pressure of gas is at its maximum, and the gas from the top burner *f'* is alight; whereas in Fig. 4 the parts are shown in the positions they assume when the gas-pressure is at its minimum, and the gas is shut off from the top burner.

It will be seen, on reference to Fig. 3, that when the gas is at its maximum pressure it depresses the mercury in the center compartment of the receptacle *b*, thereby uncovering the valve c^2, and allowing the gas to enter the tube *f*. A small portion of it passes through the aperture c^3 to the burner *e*, and this portion of gas is then ignited by the jet *g* and platinum wire *h*. The flaring jet from the burner *e* then ignites the gas issuing from the burner *f'*. When the cylinder *d* is heated by the wire *d'* passing through the flame the inclosed air expands and expels the mercury, which falls into the chamber c^1 and closes the aperture c^3, and shuts off the gas from the burner *e*.

As soon as the pressure in the gas-main is reduced, the mercury rises in the center of the receptacle *b* and closes the valve c^2, thereby extinguishing the light; the cylinder *d* then cools, and a partial vacuum is formed within. A portion of the mercury from the chamber c^1 then rises into the cylinder, as shown in Fig. 4, thereby uncovering the passage c^3 to admit the gas to the flaring-up burner *e*, when the pressure in the main is sufficiently increased to open the valve c^2. If the flame from the

burner f' should be extinguished by a gust of wind, or other accident, the cylinder d will become cool, as above described, and when cool the mercury rises within it to uncover the aperture c^3. A portion of gas then flows to the flaring-up burner e, which is ignited by the burner g and platinum wire h, thereby igniting the gas from the burner f', as before described.

By means of this invention the whole of the lamps in any district may be lit at night and extinguished in the morning automatically, whereby lamplighters are dispensed with.

Having thus stated the nature of our invention and described the manner of performing the same, we declare that what we claim herein as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in an automatic lamplighter and extinguisher, of the mercury-vessel b, communicating with the gas main, center-piece c, main burner-tube f, jet-burner e, igniting burner g, platinum wire h, hollow cylinder d, and platinum wire d', connected with the main burner-tip f', all constructed and relatively arranged as herein set forth, for the purpose specified.

2. The center-piece having the mercury-chamber c^1 and opening c^3, in combination with the main burner-tube f and the jet-burner e, as and for the purpose specified.

3. The combination of outer vessel b, having a series of bottom openings, b^2, and passages b^3, and containing mercury, with the pipe-mouth valve c^2, as and for the purpose set forth.

4. The combination of the outer detachable casing or shell J, having air-inlet openings at the bottom, and burner-openings at the top, with the bottom vessel b, center-piece c, and burner f, as and for the purpose specified.

In testimony whereof we have hereto set our hands before two subscribing witnesses.

ASAHEL PILKINGTON BELL.
THOMAS THORP.

Witnesses:
H. B. BARLOW,
RICHD. HUGHES,
Both of Manchester.