2 Sheets—Sheet 1.

E. LINDSLEY.

GAS-LIGHTERS.

No. 188,807. Patented March 27, 1877.

Fig. 1.

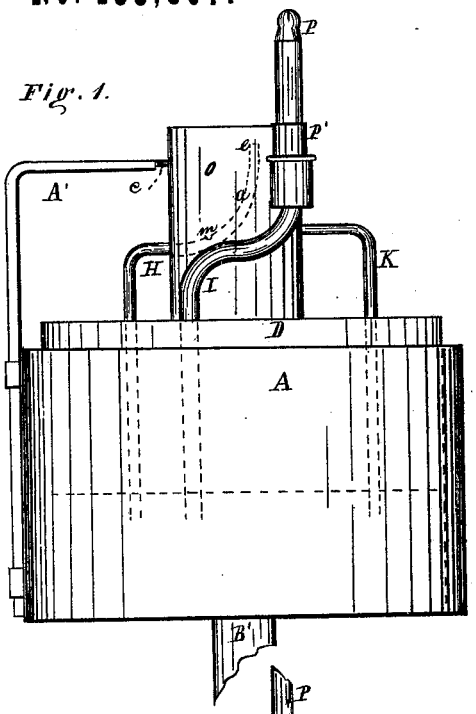


Fig. 3.

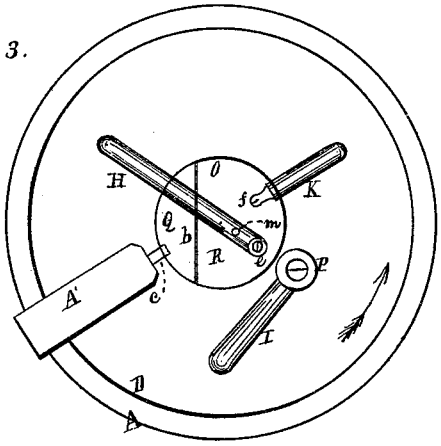


Fig. 2.

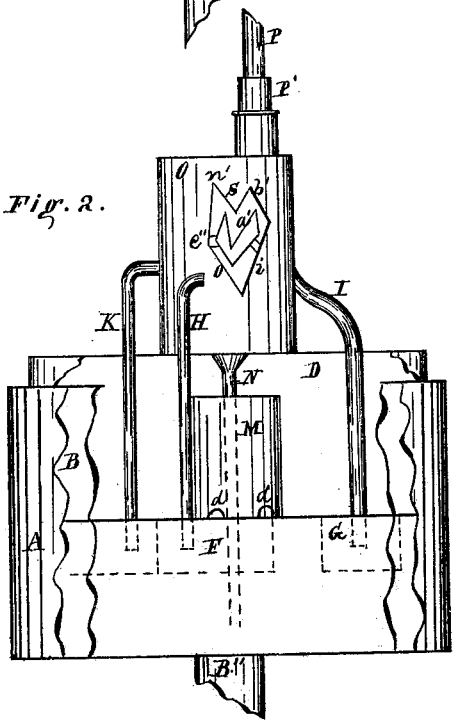
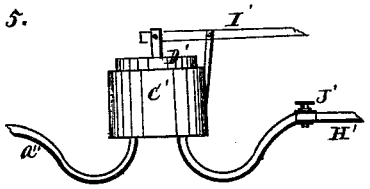


Fig. 5.



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2 Sheets—Sheet 2.

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GAS-LIGHTERS.

No. 188,807. Patented March 27, 1877.

Fig. 6.

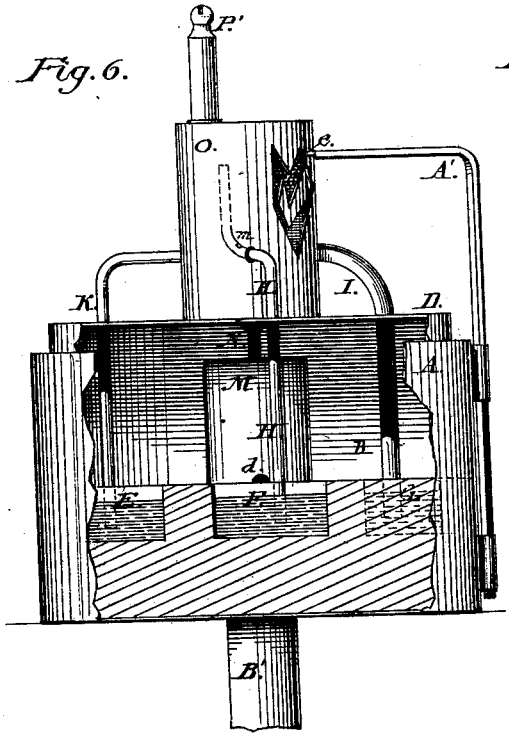


Fig. 7.

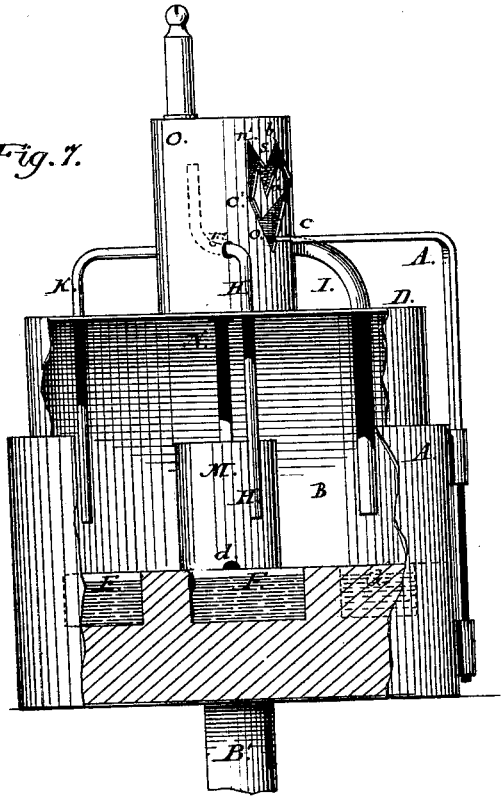
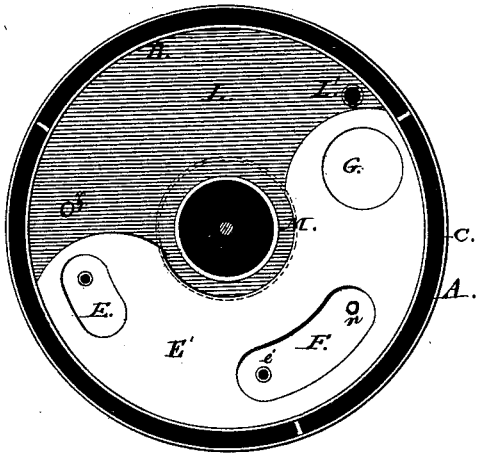


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD LINDSLEY, OF CLEVELAND, OHIO.

IMPROVEMENT IN GAS-LIGHTERS.

Specification forming part of Letters Patent No. **188,807**, dated March 27, 1877; application filed March 6, 1877.

To all whom it may concern:

Be it known that I, EDWARD LINDSLEY, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Gas-Lighters, of which the following is a description, reference being had the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of the device. Fig. 2 is also a side view with portions of the casing shown as broken away, that the inside may be seen. Fig. 3 is a plan view of Fig. 1. Fig. 4 is a plan view of the inside. Fig. 5 will be referred to. Figs. 6 and 7 are perspective views, partially in section.

Like letters of reference refer to like parts in the several views.

The invention above alluded to is an automatic apparatus for the purpose, especially, of lighting street gas-lamps; but which, however, may be used for lighting the gas in dwellings, public halls, and other places wherein gas-light is used.

The apparatus consists of a gas chamber or holder, provided with cells charged with mercury or with other suitable material, into which the ends of gas-pipes are immersed by the vertical movement of a cap for closing or sealing the ends of the pipes, thereby shutting off the gas from burners which said pipes supply. The vertical movement of the cap referred to is caused by an increment of the pressure of the gas, and which vertical movement, at the same time, is attended by a partial rotatory one effected by the joint operation of a finger and cam, substantially as hereinafter more fully described.

In the drawings, A represents an outer shell or tank, within which is a gas-chamber, B. Between said air-chamber and the tank is an annular space or water-chamber, C, Fig. 4. In said water-chamber is loosely arranged a cap, D, Figs. 2 and 6, fitting down over and inclosing the gas-chamber B. On the bottom of said gas-chamber are three cells, E, F, and G, Fig. 4. In the cells G and F the lower ends of the pipes H and I, respectively, are held at such time when the main burner P is not lighted, whereas the end of pipe K descends into the space or depression L, said space being a part of the gas-chamber.

Projecting upward in the center of said gas-chamber is a standard, M, Figs. 2 and 7, into which a guide-rod, N, descends for guiding and steadying the vertical movements of the cap D, to which the rod is attached.

To the top of the cap is secured a cylinder, O, in which terminate the upper ends of the pipes H K. Said pipes pass vertically through the top of the cap on the outside of the cylinder O, which are then turned and passed through said cylinder, as shown in the drawings, in which it will be seen that the pipe K terminates directly inside of the cylinder, whereas the pipe H is continued upward therein, as indicated by the dotted lines *a* in Fig. 1. The pipe I is continued upward on the outside of the cylinder, and terminated above it by a gas-tip, P, of a burner, P′.

The cylinder O referred to is divided into two compartments, Q and R, by a partition, *b*, for the protection of the small jet or burner *f*. In the side of said cylinder O is an irregular cam, S, Fig. 2, in the track of which projects a finger, *c*, Figs. 6 and 7, projecting from the end of an arm, A′, rigidly secured to the side of the tank A, as shown in said figures. The apparatus, as shown in the drawings, is an exaggeration in respect to size as compared with one for practical use, which will be about one-half or one-third less than that shown, with the exception of the pipes, which are about the proper size.

The practical operation of the invention above described is as follows: The apparatus is placed in the center of the lantern or framework of the lamp, and connected to the gas-pipe by the pipe B′, the burner P′ being that for the lamp.

The condition of the apparatus, as shown in Fig. 1, is such as when not lighted—that is to say, the burner P′ is not lighted, (viz., during the day,) at which time the end of the pipe I is in the cell G, and the end of the pipe H is in the cell F, whereas the end of pipe K is in the space L of the gas-chamber. In the several cells specified is placed mercury, or other suitable agent, so much that the ends

of the pipes will be immersed therein when in the cells, and thereby be closed or sealed against the flow of gas into them. The annular chamber C is to be partially filled with water, or with other suitable material, so that the lower part of the cap D will be immersed therein to prevent the escape of gas from the gas-chamber, which is filled with gas from the supply-pipe, to which the apparatus is attached by the pipe B′, the gas passing into the gas holder or chamber through openings in the side of the standard M, as seen at *d*, Fig. 2.

It will be obvious that so long as the ends of the pipes H and I are immersed in the mercury gas cannot pass up into them from the chamber B, either to the burner *e* or to the burner P, whereas gas can pass into the pipe K, for the reason that its lower end is in the depression or space L of the gas-chamber. The gas in said pipe K is lighted at the tip *f*—a very small burner; hence, is produced a small flame, which is allowed to burn during the day, or so long as the larger burner P′ is not lighted.

In order to light said burner P′, which is, in fact, that of the street-lamp, or other gas lamp or light, the pressure of the gas is increased by means of the regulating supply cock or governor regulating the pressure used in the gas-works, which for a few minutes is opened. This increment of gas-pressure through the mains and pipes will elevate the cap D so far as to lift the ends of the pipes H and I out of the mercury, and above the surface E′ of the cells, as seen in Fig. 7, thereby unclosing them to the induction of sag from the gas-chamber.

When the cap is lifted to this position it is then turned partially around in direction of the arrow by means of the cam S and finger *c* referred to. Thus, as the cap continues to rise, by a continuation of the gas-pressure, the finger impinges upon the edge *a′*, Fig. 2, of the cam, which turns it partially around. This rotatory movement of the cap carries the end of the pipe I from over its respective cell, out of which it had just been raised to the space or depression L of the gas-chamber. The pipe I, now filled with gas to the tip P, and also the pipe H to the tip *e*, can now be lighted, and also at the perforation *m* at the bend of said pipe H, Fig. 3.

It will be obvious that the jet of gas issuing from the perforation *m*, by its nearness to the flame of the burner *f* will be ignited and produce an upward flame, which will, in turn, ignite the gas at the point or burner *e*. The flame thus produced at *e* will, by its nearness to the tip of the burner P′, ignite the gas issuing therefrom, thereby lighting the lamp.

This lighting of the burner P takes place during the time that the cap is rising from the point *b′* of the cam (its first position) to the edge *a′*, on which the finger impinges, and by the contact of the finger with said edge *a′* of the cam the cap is pushed around, bringing the pipe I to about the point L′ in the depression or recess L, Fig. 4, of the gas chamber outside of the cell G, in which it was previously held. At the same time the pipe H is turned from its first place, viz., at *e* in the cell F, to *n*, and the pipe K, which was in the space L, at *r*, is now by the same movement carried over to the cell E.

At this particular moment in the process of lighting the lamp the burner P and the gas-jets at *e* and *f* are all burning. The flames at *e* and *f*, however, are to be extinguished. To effect this the extra pressure of the gas used for elevating the cap is taken off. In consequence of this reduction in the pressure of gas the cap sinks. This sinking of the cap plunges the ends of the pipes H and K, respectively, in the mercurial cells E and F, and by their immersion in the mercury the gas is shut off from them, and the flames at *e* and *f* consequently extinguished, leaving the flame at P burning.

In view of the above it will be seen that the general operation of the apparatus is as follows: During the day the condition of the apparatus is such as shown in the drawing, in which it will be seen that the pipe I is in the mercurial cell G and the pipe H in the cell F about at *e′*, while the pipe K is in the space or recess of the gas-chamber, receiving thereform a supply of gas to maintain the flame at *f*, which, as aforesaid, is kept burning through the day or during the time that the burner P is not used or lighted.

To light the burner P by the small flame at *f*, an additional pressure of gas in the mains and pipes raises the cap D, lifting thereby the pipes H and I out of their respective cells F and G. When thus lifted the cap is then turned partially around by the cooperation of the finger and cam, which brings the pipe I to about the point L′ in the recess L of the gas-chamber, and the pipe H from *e′* to *n* in the cell F, and the pipe K at the same time is moved from *r* to and above the cell E. The pipes at this instant are all filled with gas. The flame *f* lights the jet from the perforation *m*, and the flame *m* lights the jet at *e*, and the flame *e*, in turn, lights the main burner P, for illumination.

At this moment all the jets or burners are lighted; but the flames *e*, *f*, and *m* are to be extinguished, leaving the burner P burning. This is done by taking off the extra pressure of gas, causing the cap D to sink and the pipes K and H to be immersed in the mercury of their respective cells, closing them against a further induction of gas, and thereby extinguish the lights *e*, *f*, and *m*, leaving the burner P in full blaze.

To extinguish the light at P, the extra pressure of gas is again put on by the means above referred to. Now, as the cap raises, and is so far raised as to lift the ends of the pipes H and K out of their respective cells, and bring the finger *c* to the point *c″* of the cam, then a motion reverse to that indicated

by the arrow is given to the cap. Said reverse motion is caused by the finger impinging upon the edge *o* of the cam. A further rise of the cap now takes place, and brings the lowest angle of the cam to the finger *c*.

At this time the excessive pressure of gas is removed, and as the cap sinks down the finger impinges upon the edge *i* of the cam, thereby continuing the reverse rotatory movement of the cap, causing the pipe I and pipe K to descend into their respective cells, and become closed or sealed by the mercury the cells contain, and their light extinguished, leaving the small, faint flame *f* burning, to be again used for lighting the main burner P, in the manner as hereinbefore described.

The small burner *f* is relighted, after being extinguished in the manner as above described, by the burner P. Thus, at the time the cap is raised, and thereby the pipes H and K lifted from their cells, they are then all in open relation to the gas-chamber, from which they are at once filled with gas.

The jet *e* is at once lighted by the burner P. The jet *e* in turn lights the jet at *m*, and the jet at *m* in like manner lights the burner *f*. At this moment all the jets or burners are again lighted and burning at the same time. The light at P and that at *e* and *m* are to be put out. This takes place by the reverse rotatory movement of the cap, which brings the pipe I and the pipe H over their respective cells, and the pipe K to the space L of the gas-chamber. Now, as the cap lowers, by the removal of the extra gas-pressure the pipes H and I drop into the mercury, and thereby are closed or sealed, and their respective lights extinguished, whereas the pipe K descends into the space L of the chamber, and continues open, and its light, as a consequence, continues to burn.

In the event the gas-burners used in dwellings, halls, manufactories, &c., are to be lighted by this apparatus, the extra pressure of gas required to operate the cap is supplied by a device shown in Fig. 5, or a modification of the same.

Said device consists of a tank, C′, inclosing a gas-chamber, between which and the tank is an annular water space or chamber, in which is fitted a cap, D′, covering the gas chamber or holder. The device is, in fact, a small gas-holder, and is to be placed between the gas burner and meter, and connected to the gas-pipe by a pipe, *a*″, and H′.

To increase the pressure of gas for operating the lighting apparatus, the cap D′ is forced down into the tank by the lever I′. The gas by this means is compressed, thereby operating the lighting apparatus, in the manner as hereinbefore said. To prevent the increment of gas-pressure thus obtained from reacting upon the meter, a stop-cock, J′, is used to shut off the gas from the meter during the time of lighting the burner or burners. Other device or devices can be employed for producing the gas-pressure alluded to.

It will be obvious that by this apparatus all the street-lamps in a city can be automatically lighted at once, or the same be extinguished without the aid of personal lamp-lighters.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with the annular chamber C, gas holder or chamber B, the cells E, F, and G, in the manner substantially as described, and for the purpose set forth.

2. The pipes H, I, and K, arranged in relation to, and in combination with, the gas-holder B, cells E, F, and G, and cap D, substantially as described, and for the purpose set forth.

3. The cam S and finger *c*, in combination with the cap D, in the manner substantially as described, and for the purpose specified.

4. The pipe I, and one or more pipes for igniting the burner of said pipe I, in combination with their respective cells in the gas-chamber B, in the manner substantially as described.

5. In gas-lighting apparatus, the gas-chamber, having a movable cap, and operated by means of the pressure of gas induced by a compressor or governor regulating the gas-pressure, by which means the pipes connected to said cap are lowered into, and raised out of, cells charged with a medium for sealing the pipes for the purpose of igniting and extinguishing the gas-light automatically.

6. The cam S, finger *c*, movable cap D, in combination with the pipes H, I, and K, cells E, F, and G, gas chamber or holder B, and annular chamber C, substantially in the manner as described, and for the purpose set forth.

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