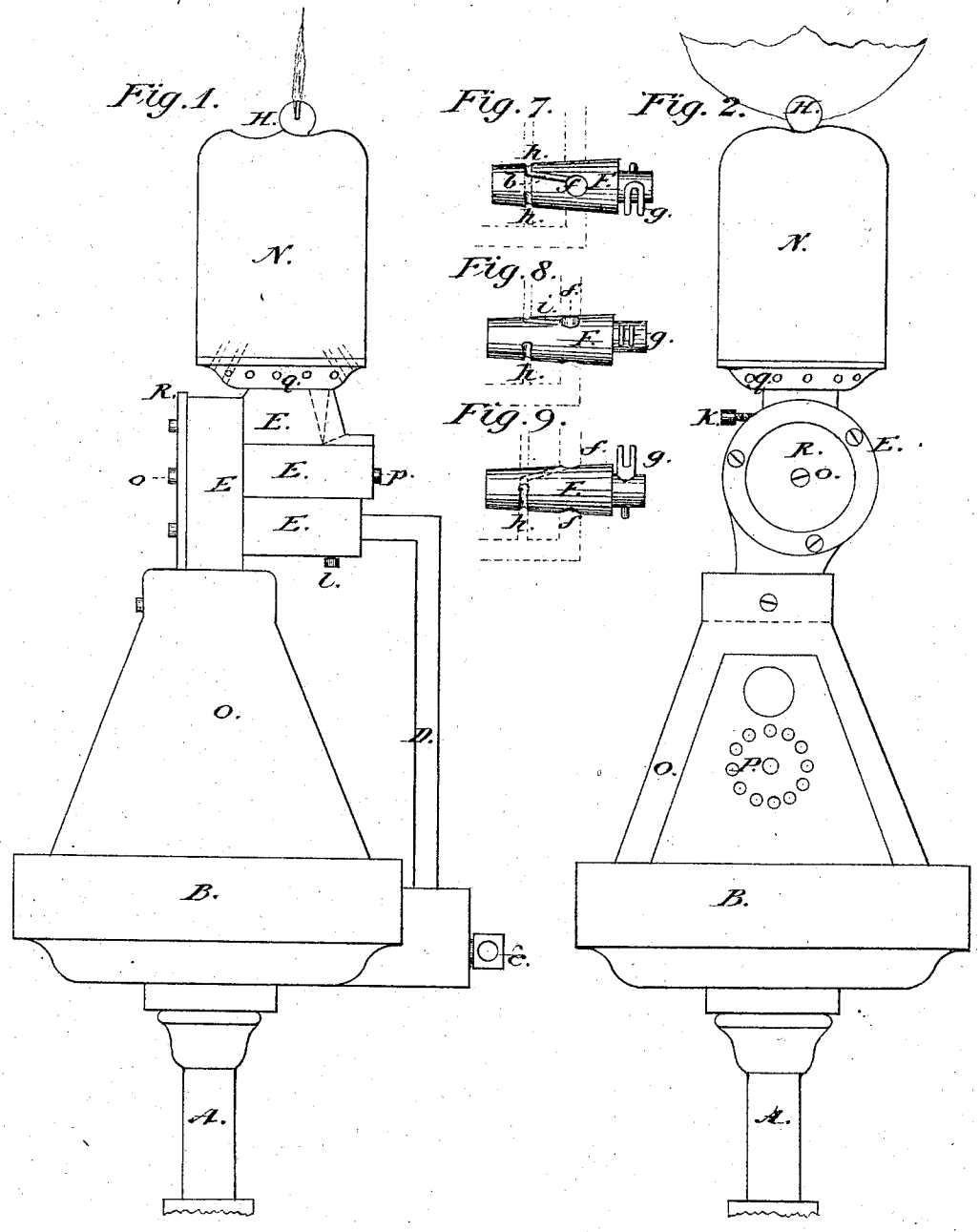
2 Sheets--Sheet 1.

F. KORWAN.

Automatic Gas-Lighting Apparatus.

No. 136,739. Patented March 11, 1873.



Attest;

M. Kirschheimer

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2 Sheets--Sheet 2.

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Fig. 4.

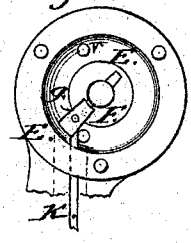


Fig. 5.

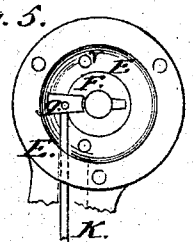


Fig. 6.

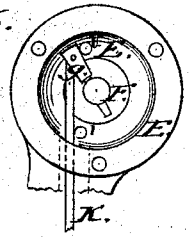
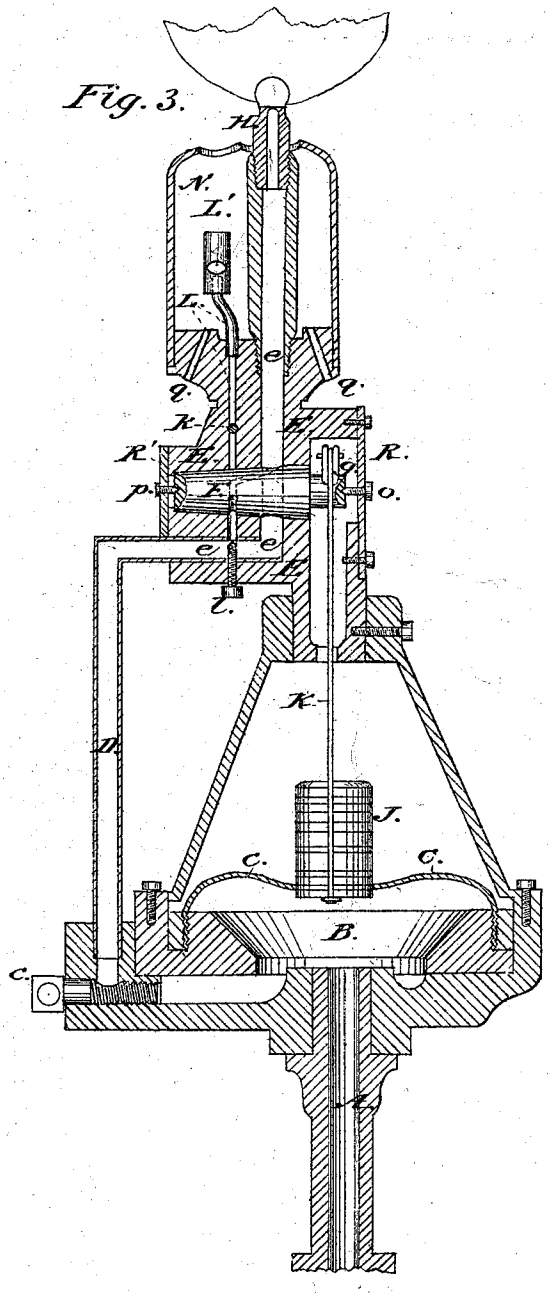


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANZ KORWAN, OF MANHEIM, GERMANY, ASSIGNOR TO HIMSELF AND MICHAEL FLÜRSCHEIM, OF NEW YORK CITY.

IMPROVEMENT IN AUTOMATIC GAS-LIGHTING APPARATUS.

Specification forming part of Letters Patent No. **136,739**, dated March 11, 1873.

To all whom it may concern:

Be it known that I, FRANZ KORWAN, of Manheim, in the Grand Duchy of Baden, in the Empire of Germany, have invented certain new and useful Improvements in Self-Lighting Gas Apparatus, of which the following is a specification:

My invention has for its object to maintain a minute flame in an auxiliary burner, from which the illuminating-burner is ignited; and it consists in the employment of a flexible or movable diaphragm, actuated by the pressure of the gas-supply for automatically opening and closing the cock or cocks of the burner or burners; and in the means provided for regulating the supply of gas to the auxiliary and main burners; in the mode of pivoting and securing the plug of the stop-cock in place, and in the employment of a burner of the Bunsen kind to perform the office of the auxiliary burner.

In the drawing, Figure 1 is a side elevation of my improved self-lighting gas apparatus. Fig. 2 is a front elevation, and Fig. 3 a vertical section, of the same. Figs. 4, 5, and 6 are front elevations of the plug case or barrel E, Figs. 2 and 3, with the plate R removed, showing the different positions which the plug F of the stop-cock assumes in its rotation by the rod K of the diaphragm. Figs. 7, 8, and 9 are side elevations of the stop-cock plug F removed from its barrel or socket, showing the formation of the same and the position its different parts assume while being rotated, corresponding with that seen in Figs. 4, 5, and 6.

As represented in the drawing, A, Figs. 1, 2, and 3, is the tube connecting the apparatus with the gas-supply, which is provided with a cock at any suitable point for regulating the supply of gas to the apparatus or for entirely cutting it off. This cock may be so constructed that when turned partly, or in one direction, the full supply of gas will be cut off, but allow a small portion of gas to enter to supply the auxiliary burner, and when turned fully, or in the opposite direction, the supply will be entirely cut off. When this cock is open the gas enters the chamber B through the tube A, best seen in Fig. 3. The chamber B is closed gas-tight above by the diaphragm C, which is formed, preferably, of animal membrane, and against which the gas exercises a certain pressure. The casing or chamber O above the diaphragm is provided with air-holes P, Fig. 2, forming a vent to the same, and allowing the diaphragm to move freely without receiving any resistance from the air above it, which holes may be protected by a shield against the intrusion of dust, and part or all of the casing may be removed, so that the diaphragm is easy of access for any repairs or for examination. From the chamber B the gas enters the pipe D *e* through the screw-cock *c*, Fig. 3, which regulates the supply of gas to the burners. The pipe D opens into the channel *e*, Fig. 3, in the socket or barrel E of the cock, which channel coincides with the main aperture *f* in the plug F. The diaphragm is tied in the form of a cone and charged with the removable weights J, Fig. 3, which may be augmented or diminished, as required, thus regulating the external pressure thereon. This may also be effected by means of a lever with sliding weights or by springs.

The external pressure upon the diaphragm is so regulated that it is forced up by a certain pressure of gas to which it is adjusted, and remains up while that pressure is maintained, falling only when the pressure ceases or becomes diminished, so that the elevation of the diaphragm may be effected by giving a certain pressure to the gas at the gas-works, or by the opening of a special cock in the building or on the street.

The diaphragm is connected at its center with the connecting-rod K, Fig. 3, which rod is connected with a short lever, *g*, projecting from the plug F, as shown in Figs. 3, 4, 5, and 6, and by which the motion of the diaphragm, when raised by the pressure of the gas, is communicated to the plug, and partly rotates the same, allowing the gas to flow to the large burner, from which it is again cut off by the reverse motion of the plug on the descent of the diaphragm.

It is obvious that a valve, or other equivalent mechanical device by which the intermittent supply of gas to the burners can be effected, may be substituted for the cock E F with like result, and that a diaphragm, rigid,

but movable vertically, may be employed as the actuating medium, though I prefer the flexible diaphragm previously described.

The plug F is hung in pivots, so as to turn on its axis with the least amount of friction. The screws *o* and *p* are fixed in the plates R and R′ that cover the openings at each end of the barrel of the cock, as seen in Fig. 3, and form the pivots on which the plug rotates. These screws terminate in fine points and fit in corresponding minute indentations at the center of the plug, as seen in Fig. 3.

When the diaphragm is in repose the plug F is in the position seen in Figs. 4 and 7, in which position the groove *h* in the plug connects the upper and lower parts of the pipe L, which communicates with the supply-pipe *e* D, Fig. 3, thus supplying gas to the auxiliary burner, and the main aperture *f* is in such position that communication is shut off between the upper and lower part of the channel *e*, so that no gas can pass from the supply-pipe *e* D to the main burner H, but only through the pipe L and groove *h* to the auxiliary burner L′, where the minute igniting flame burns, and which is ignited when the apparatus is first put up. As soon as the diaphragm is raised by the pressure of the gas from below it communicates its motion to the plug by means of its connecting-rod K, and brings the plug into the position shown in Figs. 5 and 8. In this position the main aperture of the plug communicates slightly with the upper and lower parts of the channel *e* and allows a slight flow of gas to the main burner H, while the groove *h* still connects both parts of the small channel or pipe L with the supply *e* D, and the flow of gas from the channel *e* to the auxiliary burner thus takes place without hinderance, while, at the same time, the auxiliary burner receives a further supply of gas from the main aperture *f* through the lateral indenture *i*, and thus an enforced stream of gas flows through the pipe L, which considerably enlarges the auxiliary flame, which at once rises and ignites the gas now issuing from the main burner H.

When the diaphragm has risen to its greatest height the plug will be in the position shown in Figs. 3, 6, and 9, when the aperture *f* assumes a perpendicular position parallel with the channel *e*, Fig. 3, so that a full supply of gas passes to the burner H, and its flame, now lit, attains its normal size. At the same time the groove *h* is put out of all connection with the upper part of the channel L, and the small flame of the auxiliary burner L′ becomes extinguished to be relighted by the large flame when it is in the act of being extinguished by the turning of the plug by the descent of the diaphragm, when the plug again enters into the position shown in Figs. 5 and 8, when the double supply of gas again passes to the pipe L, causing a forced stream of gas to rise from the auxiliary burner L′ and ignite at the large flame of the main burner H, when the large flame is near the point of being extinguished. The small flame now remains lighted after the large flame becomes extinguished, and when the diaphragm has fully descended the plug assumes the position shown in Figs. 4 and 7, and the auxiliary flame assumes its normal size, which is very minute. The flow of the gas through the pipe or channel L is regulated at its lower part by the screw *l*, Figs. 3 and 1, and at its exit at the upper part by the screw *k*, Figs. 3 and 2. The hood N, Figs. 1, 2, and 3, serves as a protection to the small flame from being extinguished by drafts of air, the air necessary for combustion entering through small openings *q*, Fig. 3, underneath it.

It is evident that a different form or construction of cock or valve arrangement, or equivalent of such, through which the gas-supply to one or more burners can be regulated, let on, or shut off, whether lighted by supplementary small flames or any other way, as long as they are in connection with my flexible or movable diaphragm apparatus, might be substituted for the one hereinbefore described without any departure from the spirit of my invention.

In street-lanterns it will be an easy matter to attach a kind of shield under the upper opening, effecting an influx of air sidewise, reducing the danger of being blown out to that of the ordinary street-lantern.

The consumption of gas through the auxiliary flame is exceedingly small, as it always remains extinguished while the large flame is burning. The gas consumed by it during the whole year will not exceed that consumed by an ordinary-sized flame during two or three hours, amounting to a cost of about five cents. It can be yet more diminished by forming an auxiliary burner of the Bunsen kind, by placing a small tube, having lateral perforations, over the small pipe L, as seen in Fig. 3. If the apparatus is to be left out of use for a long period of time, the small flame may be permanently extinguished by the screws *l* and *k*, Figs. 1, 2, and 3. It is not necessary to operate each cock by a separate diaphragm, as a number of cocks may be operated by one diaphragm with equal facility. Space and expense can be saved by letting the large and small pipes of several burners run into one common plug, the distance of the plug from the flames, or the greater or smaller length of the large and small pipes, having no great influence on the flames. This would, for instance, be applicable to chandeliers, several flames of which could be lighted by one common cock. The lamps can be regulated to any desired pressure by an increase or decrease of the external pressure of the weights on the diaphragm, so that by an increase or decrease of the pressure of the gas the lamps can be lighted by a cock common to several lamps, or by the main cock of the gas-works without needing to operate personally each separate lamp. If the pressure at the gas-works exceeds the pressure to which the diaphragm has been adjusted, the apparatus can be so arranged that the effect of the increased press-

ure upon the flames will be counteracted by a decreased influx of gas. This may be effected in the following manner: The stop *v*, by which the plug is held in perpendicular position, is set a little to the right, the effect of which is that, as the diaphragm rises higher under an increase of pressure, the plug is turned further to the right, thereby diminishing the aperture or channel through which gas is supplied to the large burner, thus insuring a uniform supply to the burner under a variable pressure. This apparatus is particularly adapted for city illumination and for public buildings, where the common process of lighting each burner by the hand is to be avoided.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. One or more cocks, valves, or their equivalents, actuated by a flexible or movable diaphragm, C, operated by the pressure of the illuminating-gas supply, which can be regulated by weights J, or their equivalent, for the purpose of igniting and regulating one or more gas-jets.

2. The combination, with the tube L of the auxiliary burner, of the screw *l* for regulating the influx, and the screw *k* for regulating the efflux, of the gas, as set forth.

3. In combination with the described gas-lighting apparatus, a screw-cock, *c*, for regulating the flame at H under increased pressure, substantially as set forth.

4. In combination with the diaphragm C, actuating the stop-cock of a gas-lighting apparatus, the pivot-bearings *o p* for overcoming the friction on the plug, substantially as set forth.

FRANZ KORWAN.

Witnesses:
W. PRENTISS WEBSTER,
W. KANLEN.