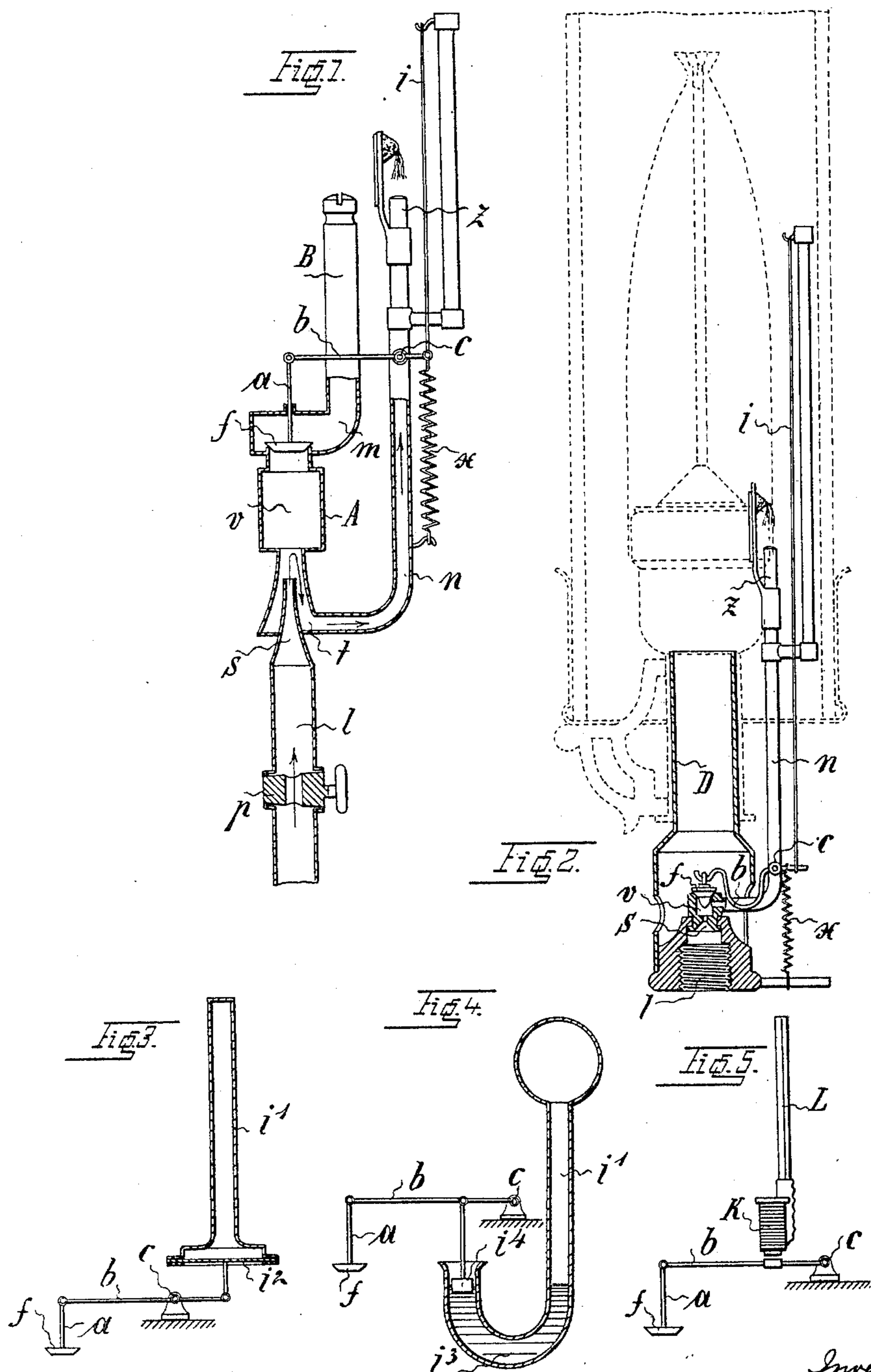


(No Model.)

A. FRANKE.
AUTOMATIC GAS LIGHTING DEVICE.

No. 581,707.

Patented May 4, 1897.



Witnesses,
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Henry O. H.

Inventor,
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By Henry O. H. atty

UNITED STATES PATENT OFFICE.

ADOLF FRANKE, OF BERLIN, GERMANY, ASSIGNOR TO THE DEUTSCHE GAS-SELBSTZÜNDER-GESELLSCHAFT, GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF SAME PLACE.

AUTOMATIC GAS-LIGHTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 581,707, dated May 4, 1897.

Application filed January 2, 1897. Serial No. 617,790. (No model.)

To all whom it may concern:

Be it known that I, ADOLF FRANKE, a subject of the German Emperor, and a resident of Berlin, Germany, have invented certain new and useful Improvements in Automatic Gas-Lighting Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The invention has for its object the provision of means whereby the supply of gas to the igniter-burner is automatically prevented after the main burner has been ignited.

In igniter-burners having igniting-bodies which are made incandescent by the gas streaming from the burner, and thereby produce an igniter-flame which ignites the main flame, it is necessary to extinguish the igniter-flame as soon as the main flame is ignited, while the igniter-flame must be again ignited as soon as the main flame is extinguished from any cause. Heretofore it has been customary to employ for this purpose a cut-off device in the supply-pipe to the igniter-burner, which device is operated by a body arranged within reach of the main flame as soon as the heat of the main flame causes the said body to expand. It has also been proposed for this purpose to employ as the body within reach of the main flame a thermo-electric couple which sets up an electric current in such a manner that the cut-off device is operated through the medium of an electromagnet. It has furthermore been proposed to combine this cut-off device with a second cut-off device arranged in the supply-pipe of the main burner in such a manner that the latter is not opened until the igniter-flame is ignited and has heated the body arranged within reach of it.

This invention has relation to an arrangement such as last described, a type of which forms the subject-matter of an application for patent of J. Canellopoulos, of even date with this, Serial No. 617,776, and wherein a

positive cut-off, as a valve for the igniter gas-passage, is provided, which is avoided by my invention in that the flow of gas from the supply-pipe to the igniter-pipe is controlled by the flow of gas to the burner, and the supply of gas to the igniter-pipe is thereby automatically cut off. This I attain by so arranging the gas-passages to the burner and igniter, respectively, that the flow of gas to such burner will set up a suction in the igniter-pipe and thus prevent gas from flowing through the same; but that my invention may be better understood I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a burner constructed according to my invention. Fig. 2 is a view of an incandescent burner having my improvements applied thereto. Figs. 3, 4, and 5 are elevations showing different forms of valve-operating devices.

Referring to Fig. 1, the gas-pipe *l*, which can be closed by means of the cock *p*, is formed at its end with a nozzle *s*, which projects into the suction-chamber *t* of the valve box or casing *A*. The chamber *v* of this casing is normally closed by the valve *f*. The rod *a* of the valve *f* is connected by means of a lever *b* with the stretched metal wire *i*, which is suspended within reach of the ignition flame *z* and also of the main flame, (not shown,) and which is of such a length that when cold it keeps the valve *f* closed. The gas-pipe *n*, which supplies the igniter-burner *z* with gas, branches from the suction-chamber *t*, while the pipe *m* for feeding the main burner *B* passes from the upper end of the valve *f*. When the cock *p* is opened, gas flows through the nozzle *s* into the chambers *t* and *v*, and as the valve *f* is closed it passes through the tube *n* to the igniter-burner *z* in the direction indicated by the arrows. Gas issuing from the igniter-burner becomes ignited in the usual manner and heats the wire *i*, so that the latter expands and enables the spring *x* to open the valve *f*. The latter is opened slowly on account of the slow elongation of the wire *i*, so that a small quantity of gas flows to the main burner *B* through the pipe *m*. As soon as the gas issuing from

the main burner becomes ignited by the flame of the igniter-burner z the wire i is further heated, so as to effect the complete opening of the valve f . The strong suction which is
 5 now set up at the outlet of the nozzle s prevents the gas from entering the chamber t and the tube n , feeding the igniter-burner. By this means the supply of the gas to the igniter-burner is cut off and the igniter-flame
 10 is extinguished without the necessity of employing a cut-off device in the supply-pipe to the igniter-burner. This arrangement can be considerably simplified when used in combination with an incandescent gas-burner.
 15 In this case the nozzle arranged in the mixing-tube D of the incandescent gas-burner, Fig. 2, can be replaced by a nozzle similar to that shown at s , Fig. 1. If, as shown in this figure, the valve f is made sufficiently large, it suffices to cause the nozzle s to open into an enlarged space or chamber v , from the side of which the pipe n , supplying the igniter-burner, opens.

Instead of operating the lever b or the valve
 25 f by a solid body i expanding under the action of heat, a liquid or gaseous body can be employed, which evaporates or expands under the action of the heat of the flame of the main burner and opens the valve f . When employ-
 30 ing such a liquid or gaseous body, the said body is arranged in a vessel—for instance, a tube i' , Figs. 3 and 4—which is placed within reach of the igniter-flame and of the main flame. The tube i' is rigidly closed at one
 35 end, and at the other end by means of a diaphragm i^2 or a liquid i^3 —such, for instance, as quicksilver—which on the evaporation or expansion of the body inclosed in the tube acts upon the cut-off device in such a manner that
 40 the passage of the gas to the main burner is opened as soon as the body expands from the heat of the igniter and of the main flame.

In Fig. 3 the diaphragm i^2 acts, for instance, upon the shorter end of the lever b , and in
 45 Fig. 4 a float i^4 , connected with the lever b , is shown. In like manner a thermo-electric couple L , Fig. 5, can be arranged within reach of the igniter-flame and of the main flame, the said couple setting up, under the heating
 50 action of the flame, an electric current which operates the cut-off device through the medium of an electromagnet K , excited by the said current.

I am aware that the use of an expansible
 55 fluid or the use of a thermo-electric couple is not new, and I do not desire to herein specifically claim such.

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

1. The combination with a main gas-burner, an igniting-burner in communication with the gas-supply for the main burner and a cut-off device adapted to automatically open the
 65 supply of gas to the main burner after the igniting-jet has been ignited of a supply-pipe for the igniting-burner so arranged that the

gas flowing to the main burner sets up a sucking action in the neighborhood of said pipe, substantially as and for the purpose set forth. 70

2. The combination with a main gas-burner, an igniting-burner in communication with the gas-supply for the main burner and a cut-off device adapted to automatically open the supply of gas to the main burner after the
 75 igniting-jet has been ignited, of a suction-chamber connected with the supply-pipe for the main burner and a supply-pipe for the igniting-burner connected with said chamber, substantially as and for the purpose set forth. 80

3. The combination with a main gas-burner, an igniting-burner in communication with the supply-pipe for said main burner, and a cut-off device adapted to automatically open the supply of gas to the main burner when the
 85 jet from the igniting-burner has been ignited and to automatically cut off the supply of gas to the igniter-burner through the flow of gas to said main burner, for the purpose set forth.

4. The combination with the gas-supply
 90 pipe and the main and igniting burners in communication with said pipe; of a cut-off device controlled by heat from the main and igniting burner flames to automatically open the supply of gas to said main burner when
 95 the igniting-jet is ignited and thereby produce suction to prevent gas from flowing to the igniting-burner, for the purpose set forth.

5. The combination with the gas-supply
 100 pipe, the main and igniting burners, passages leading from said pipe to said burners respectively, and a normally-closed valve in the main-burner passage; of an expansible body within the influence of heat from the igniting and main burner flames controlling said valve
 105 and causing the same to open under the influence of heat from the igniting-burner flame and to remain open under the influence of heat from the main burner, and means for setting up suction in the passage leading to
 110 the igniting-burner to cut off the supply of gas thereto when the passage in the main burner is open.

6. The combination with the gas-supply
 115 pipe, the main and igniting burners, passages leading from said pipe to said burners respectively, and a normally-closed valve in the main-burner passage; of an expansible body within the influence of heat from the igniting and main burner flames controlling said valve
 120 and causing the same to open under the influence of heat from the igniting-burner flame and to remain open under the influence of heat from the main burner, and an injector-nozzle in the gas-supply pipe leading to the
 125 main burner and at right angles to the passage leading to the igniting-burner, substantially as and for the purpose set forth.

7. The combination with the gas-supply
 130 pipe, the main and igniting burners, a gas-chamber interposed between said burners and supply-pipe, and passages leading from different points of the chamber and in different directions to said main and igniting burners

respectively; of a normally-closed valve in the passage leading from the aforesaid chamber to the main burner, said valve being controlled by heat from the igniting and main burner flames so as first to open said passage when the igniting-burner jet is ignited, to then keep said passage open under the influence of heat from the main-burner flame, and thereby produce suction in the passage to the igniting-burner to prevent gas from flowing

thereto, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ADOLF FRANKE.

Witnesses:

W. HAUPT,
HENRY HASPER.