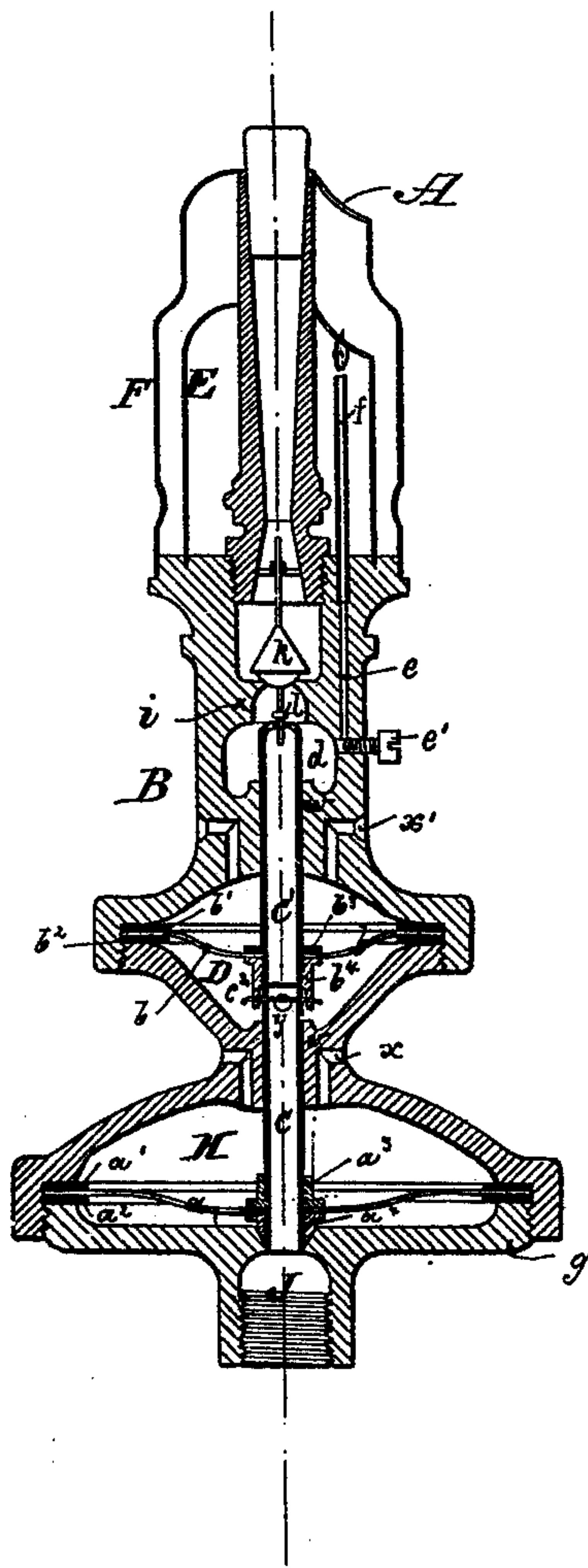


C. WESTPHAL.  
Lighting Device.

No. 221,758.

Patented Nov. 18, 1879.



Witnesses:  
*Alfred Lyons*  
*H. Wickert*

Inventor:  
*Christian Westphal*  
*per Henry & Rader*  
*Attorney.*

# UNITED STATES PATENT OFFICE.

CHRISTIAN WESTPHAL, OF FRANKFORT-ON-THE-MAIN, GERMANY.

## IMPROVEMENT IN LIGHTING DEVICES.

Specification forming part of Letters Patent No. 221,758, dated November 18, 1879; application filed July 16, 1879.

*To all whom it may concern:*

Be it known that I, CHRISTIAN WESTPHAL, of Frankfort-on-the-Main, in the Empire of Germany, have invented a new and Improved Self-Acting Apparatus for Lighting Gas, of which the following is a specification.

The invention consists in the manner of lighting any number of gas-burners by means of the pressure of the gas, acting upon two diaphragms of different surfaces, inclosed in two separated chambers, by the action of which the gas is admitted or excluded from the burner.

In the accompanying drawing, which shows a vertical section of the apparatus, A represents the usual burner attached to a suitable casting, B, in the lower part of which two chambers, D and H, are formed, and attached at its central end, J, to the usual gas-pipe.

Through the lower chamber, H, a pipe, C, passes, having at its lower end a valve,  $a^4$ , attached, fitting into a suitable seat in the bottom plate,  $g$ , and closing the cavity J. This pipe C is fitted (capable of moving) tight in the partition  $v$ , between the chambers H and D. Above this pipe C a pipe, C', extends through the partition  $w$  into the upper part of the casting B.

The pipe C' is connected to the pipe C by means of a pin, C<sup>2</sup>, attached to projections, and a nut,  $b^4$ , attached to the bottom of the pipe C', and passing through an opening,  $y$ , in the upper end of the pipe C, a little larger than said pin C<sup>2</sup>.

In the chambers H and D diaphragms  $a$  and  $b$  are arranged, secured at their outer circumferences between metal plates  $a'$   $a^2$  and  $b'$   $b^2$  respectively. The central part of the diaphragm  $a$  is attached to the pipe C by means of the nuts  $a^3$  and  $a^4$ , and the central part of the diaphragm  $b$  is attached to the pipe C' by means of the nuts  $b^3$  and  $b^4$ .

By the arrangement of these diaphragms  $a$  and  $b$  the chambers H and D are divided in two parts. In the top of these chambers holes  $x$   $x'$  are made to allow the admission of air into the same above the diaphragms.

In the casting B a partition,  $i$ , is made, with a central opening, in which the valve  $k$  is arranged, capable of closing said opening. The valve-stem of this valve  $k$  has a suitable guide

at top, and is guided at its lower end in the top end of the pipe C'. The lower part of this valve-stem is provided with a nut or projecting collar,  $l$ . By this valve  $k$  a third chamber or cavity,  $d$ , is formed, which is connected through a passage,  $e$ , with a small tube,  $f$ , arranged on the side of the burner A and reaching nearly to the top of the same. The size of the passage  $e$ , and consequently the amount of gas which shall pass through the same into the tube  $f$ , is regulated by a screw,  $e'$ .

The apparatus, as shown in the drawing, represents the position of all parts during daytime when the pressure of the gas in the gas-house is reduced to its minimum. This low pressure of gas passes then through the pipes C and C' into the chamber  $d$  through the passage  $e$  into the tube  $f$ , where, when the apparatus is first started, the gas is ignited, burning as a very small flame, which is protected against the influences of the air by suitable caps E F.

By means of the valve  $k$  resting in its seat in the partition  $i$  the gas is prevented from entering the burner A.

Through the opening  $y$  the gas can continually pass under the diaphragm  $b$ , but the reduced pressure of the gas during daytime cannot move this diaphragm, with all its connecting parts, on account of the small area or surface exposed. As soon as the gas-pressure is increased in the evening the same forces the diaphragm  $b$  upward, moving thereby the pipe C to bring the valve  $a^4$  from its seat, and allow thereby the gas-pressure to act likewise against the under surface of the diaphragm  $a$ . At the same time the end of the pipe C' has come against the collar  $l$  on the stem of the valve  $k$ , and has moved this valve  $k$  clear of its seat to allow the gas to pass into the burner A, which will then be ignited by the naturally-increased flame at the end of the tube  $f$ . The pipe C' will be moved upward till the end comes in contact with the top of the cavity  $d$ , whereby the passage of gas into the passage  $e$  and tube  $f$  will be closed and the flame at the end of this tube will extinguish.

By the upward moving of the diaphragm  $a$  we obtain the pressure of the gas to act against the combined surfaces or area of the diaphragms  $b$  and  $a$  for the purpose of holding up the same, and all parts connected and in-



fluenced thereby, and this increased surface will hold the parts all in their proper position, even after the pressure of the gas is again reduced to what is called the night-pressure.

Any required surface of the diaphragms which may be necessary, on account of the different height or position from the gas-house of the lamp or burner, can easily be regulated by the inner diameters of the binding-rings  $a'$   $a^2$  and  $b'$   $b^2$ , so that all, irrespective of their height or position, will act simultaneously.

When the pressure of the gas is reduced in the morning below the minimum of the night-pressure, the diaphragms will begin to fall, opening first a free passage of gas through the passage  $e$  into the small tube  $f$  when the then escaping gas at the top of this tube  $f$  will be ignited from the flame of the still burning gas at the end of the burner  $A$ , and then the further dropping of the diaphragms will allow the valve  $k$  to fall into its seat and prevent any further flow of gas into the burner  $A$ , when the same will be extinguished. The dia-

phragms  $a$  and  $b$ , with their respective tubes or pipes  $C'$  and  $C$ , will then fall until the valve  $a^4$  closes the outlet of the gas below the diaphragm  $a$ , and the several parts will remain then in the position represented in the drawing during the day, or until the pressure of the gas is again increased whenever required.

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

The pipe  $C$ , attached to a diaphragm,  $a$ , and provided with a valve,  $a^4$ , at its lower end, and an opening,  $y$ , near its upper end, connected to a pipe,  $C'$ , attached to a diaphragm,  $b$ , and the valve  $k$ , arranged in a suitable casing provided with a burner,  $A$ , passage  $e$ , and small tube  $f$ , the whole being combined and arranged to operate, substantially in the manner and for the purpose herein described and set forth.

CHRISTIAN WESTPHAL.

Witnesses:

LOUIS BASSE,  
ALBRECHT KOHN.