F. ROSSBACH-ROUSSET.

APPARATUS FOR CONTROLLING GAS BURNERS FROM A DISTANCE.

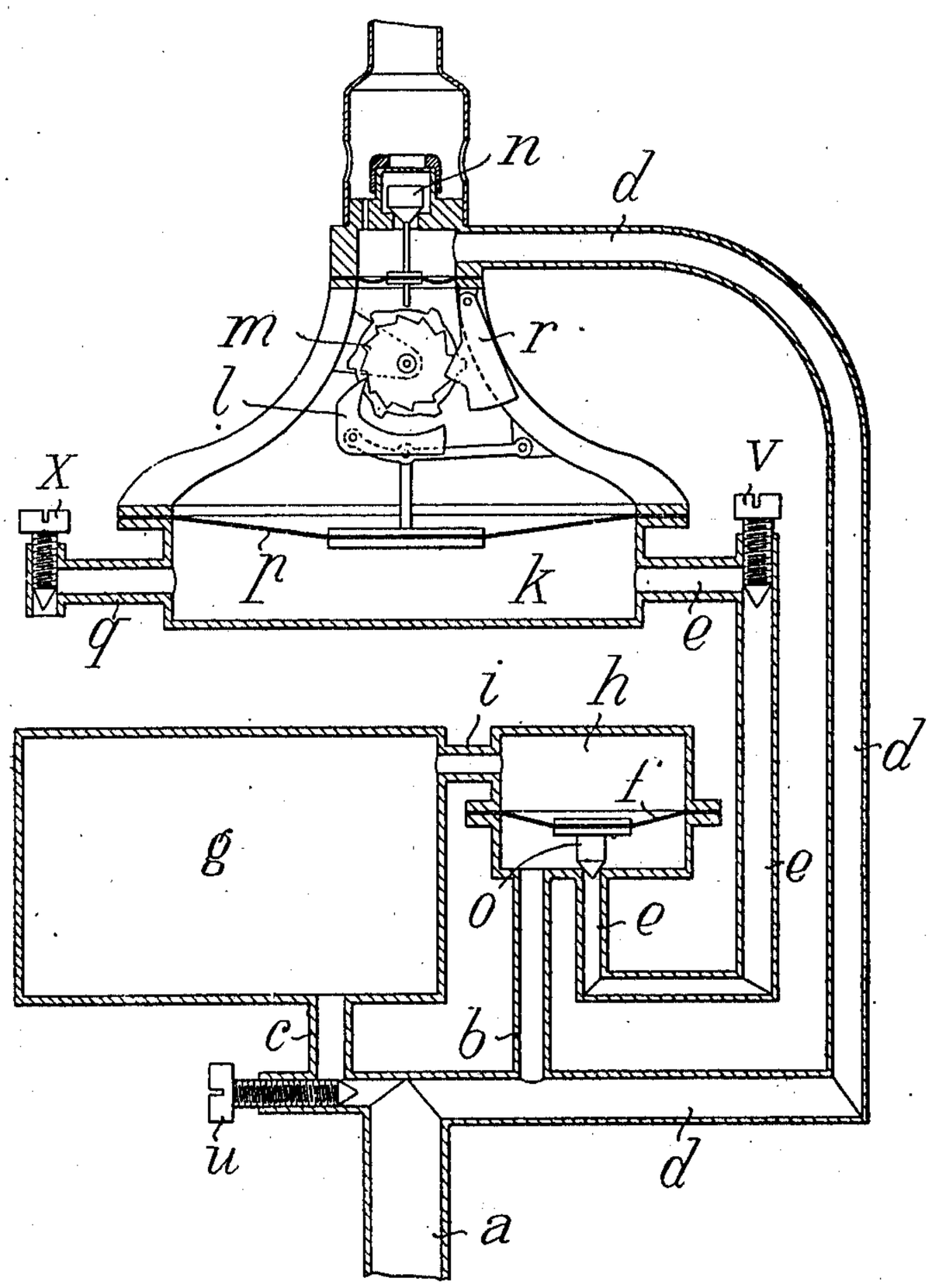
APPLICATION FILED APR. 9, 1909.

992,907.

Patented May 23, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

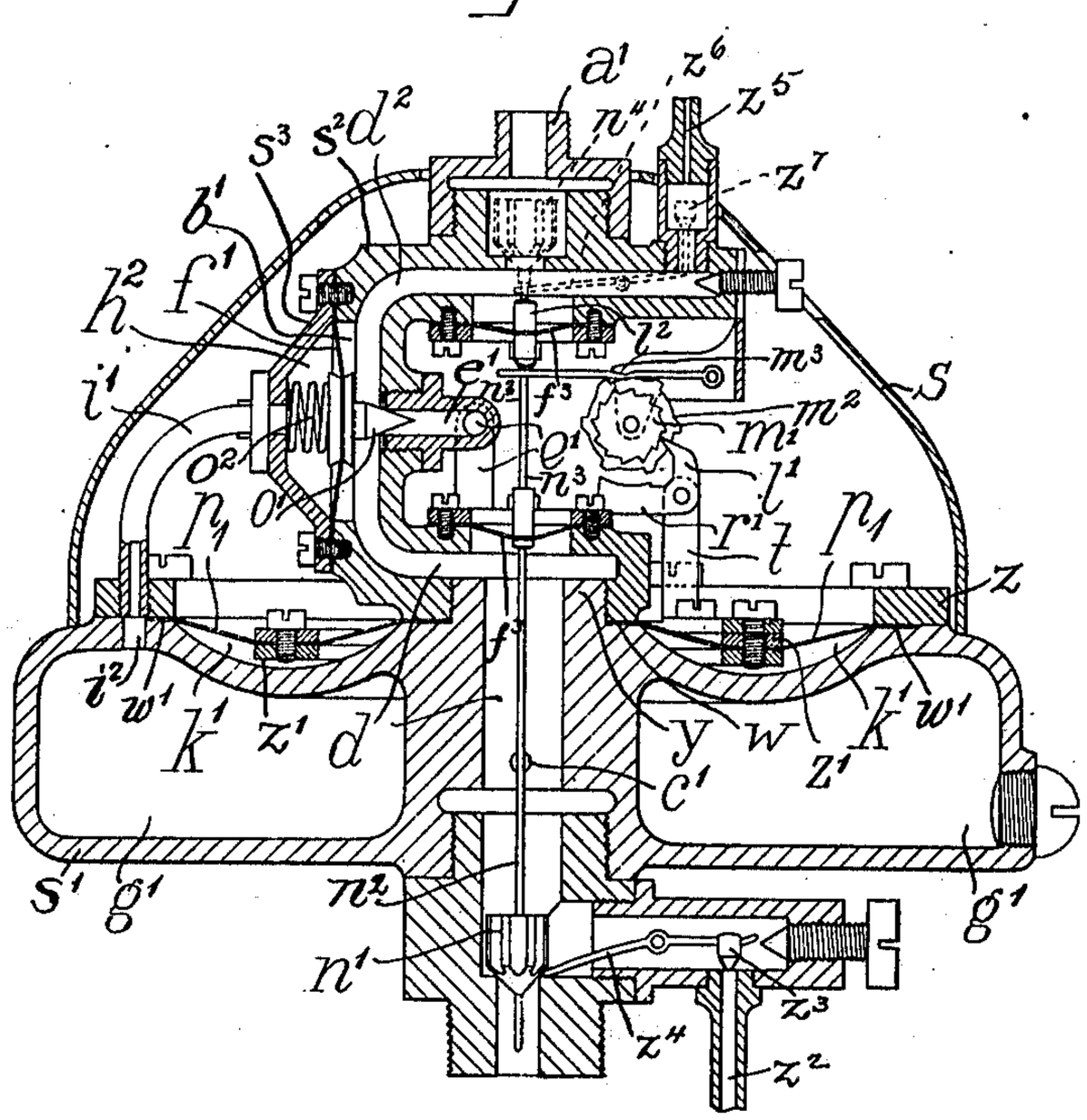
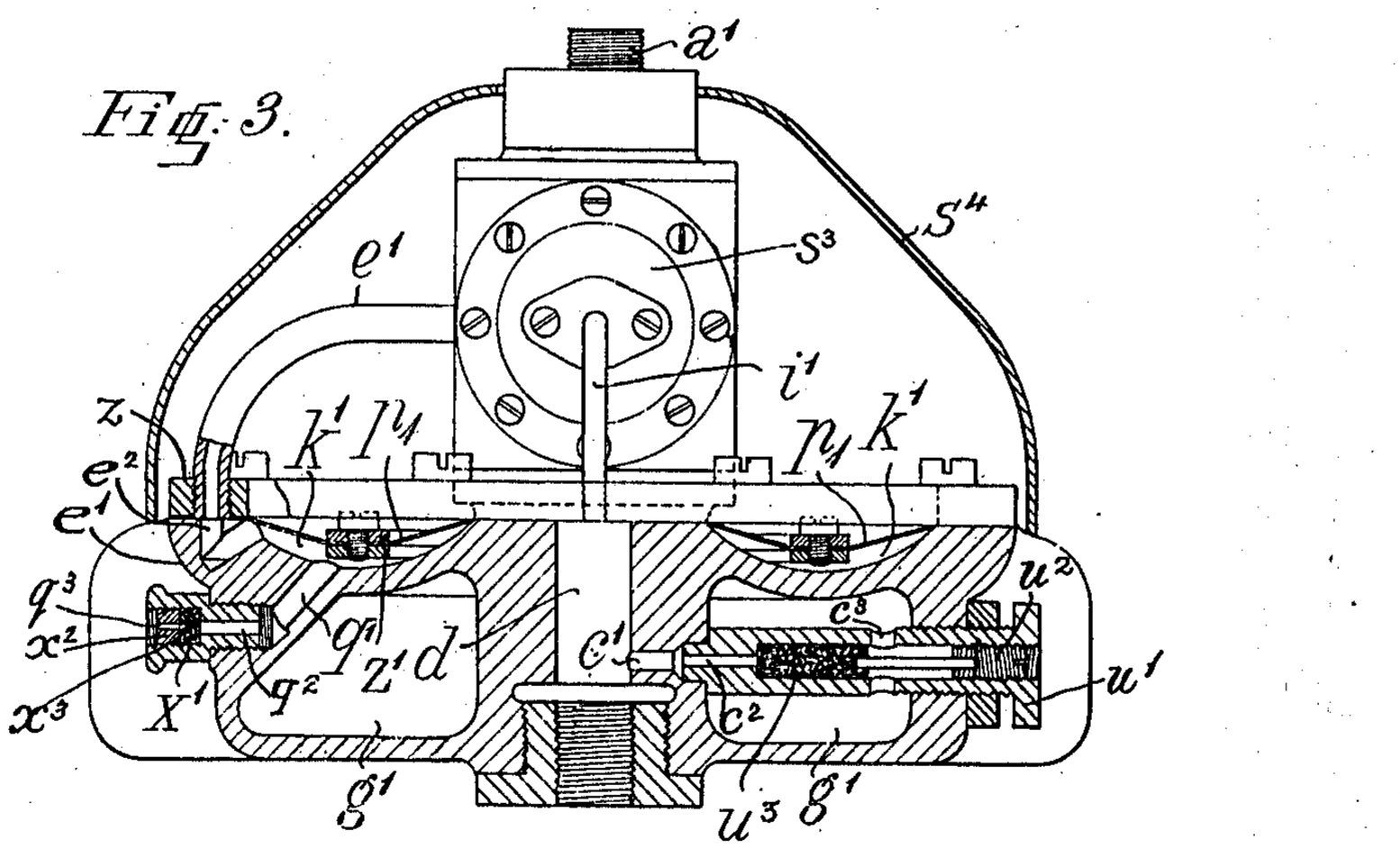


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRITZ ROSSBACH-ROUSSET, OF TEMPELHOF, NEAR BERLIN, GERMANY.

APPARATUS FOR CONTROLLING GAS-BURNERS FROM A DISTANCE.

992,907. Specification of Letters Patent. Patented May 23, 1911.

Application filed April 9, 1909. Serial No. 488,969.

To all whom it may concern:

Be it known that I, FRITZ ROSSBACH-ROUSSET, a citizen of the Empire of Germany, residing at Tempelhof, near Berlin, Germany, have invented certain new and useful Improvements in Apparatus for Controlling Gas-Burners from a Distance, of which the following is a full, clear, and exact description.

This invention relates to apparatus for controlling from a distance the valves of gas burners, particularly lighting burners of the type wherein on a temporary increase in the gas pressure taking place gas is admitted to the burner by means of a yielding member on which the gas pressure operates. Hitherto in gas lighting apparatus of this kind it has been proposed to arrange the yielding member, for instance a diaphragm, in such a manner that its two sides were normally exposed to the pressure of the atmosphere, only one side being placed under the gas pressure when it was desired to actuate the burner valve. A liquid seal has up to the present been employed for loading the diaphragm but such an arrangement was open to the disadvantage that the apparatus was rendered dependent on the certain gas pressure being maintained determined by the dimensions of the column of liquid, and this pressure had to be reduced as soon as the burner valve had been operated to prevent leakage which might otherwise occur. According to this invention this drawback is obviated by the provision of an auxiliary diaphragm or other yielding member which controls the supply of gas to the main diaphragm operating the gas valve. The auxiliary diaphragm is opened when the pressure of the gas is increased in the mains but closes again as soon as the pressure of gas has been balanced on both sides thereof. It will thus be seen that the burner valve is operated exclusively by increase of pressure and that this pressure can be retained after the burner valve has been opened and the initial and final degree of increase in pressure been selected at will since no definite increase in pressure is necessary for the operation of the burner valve. To increase the sensitiveness of the auxiliary diaphragm a gas collecting chamber is according to this invention provided communicating with either side of the auxiliary diaphragm, this chamber considerably retarding the equalization of pressures on either side of the auxiliary diaphragm whether this pressure has been increased or decreased. When a piston or similar member is used in place of a diaphragm and carries the mechanism for operating the burner valve it has hitherto been necessary to lead a by-pass from the gas supply pipe from below the diaphragm to the space above the latter. Naphthalene is very liable to be deposited in this by-pass so that the pipe is easily choked, and moreover since the by-pass is outside the zone heated by the burner it is apt to freeze easily. According to this invention these drawbacks are obviated by the employment of an annular diaphragm the inner circumference of which is secured to the gas supply pipe which passes through its center and leads to the gas valve. In this construction of the apparatus the mechanism for operating the gas valve, as also the pipe supplying gas to the valve, can be mounted in or near the longitudinal axis of the apparatus so that the pipe supplying gas to the valve may be within the casing which incloses the valve actuating the mechanism.

In the accompanying drawings Figure 1 shows diagrammatically in section an apparatus for controlling the supply of gas to burners from a distance in accordance with this invention. Fig. 2 is a vertical section of a practical construction of the apparatus applicable for use in connection with inverted incandescent gas burners, and Fig. 3 is a view similar to Fig. 2 seen at an angle of 90° relatively thereto.

As will be seen from Fig. 1 gas passes freely by the pipe *a* through the pipe *b* to the under surface of the auxiliary diaphragm *f*. At the same time it flows through the throttle *u* by the pipe *c* into a gas collecting chamber *g*, and thence by the pipe *i* into the chamber or space *h* above the auxliary diaphragm *f*. The gas further passes unimpeded through the pipe *d* to the gas valve *n*. Moreover, when the valve *o* controlled by the auxiliary diaphragm *f* is opened, gas passes through the throttle *v* by the pipe *e* to the under surface of the main diaphragm *p*, the upper surface of which is open to the atmosphere. After entering the casing *k* of the main diaphragm the gas escapes through the outlet pipe *q* controlled by a throttle *x*, which only permits the gas to escape very gradually into the atmosphere.

The working of the apparatus is as fol-

lows:—Under normal day or evening pressures (when any appreciable fluctuations take place gradually) there is the same pressure both above and below the auxiliary diaphragm *f*. The auxiliary diaphragm is, therefore, depressed by its weight and presses the valve *o* against its seat whereby the admission of gas to the working diaphragm *p* is shut off. The main diaphragm *p* is therefore in its lowest position, as both above and below the same there is the pressure of the atmosphere since the casing *k* is in communication with the atmosphere by means of the pipe *q*. When the various parts occupy these positions the valve actuating mechanism is ready to open the valve. If the valve is to be opened then the pressure in the mains must be raised at the central station as quickly as possible to an extent corresponding to the load on the auxiliary diaphragm *f*. The normal pressure is immaterial since this rapid increase of the pressure in the mains is at once transmitted to the under surface of the auxiliary diaphragm *f* and raises the latter, because the short time is insufficient for the transmission of the increase of pressure to the space *h* above the diaphragm owing to the narrow pipes *c*, *i*, and, more particularly, to the gas collecting chamber *g*. The length of time required for equalizing the pressure on both sides of the auxiliary diaphragm *f* is varied by means of the adjustable throttle *u* in the pipe *c*. The raising of the auxiliary diaphragm *f* opens the valve *o*. Gas passes then to the under surface of the main diaphragm *p* more quickly than it can escape into the atmosphere owing to the throttle *x* in the pipe *q*, but only as quickly as permitted by the position of the throttle *v* in the pipe *e*. The main diaphragm *p* is slowly raised and effects, by means of the mechanism *m*, *l*, *r*, the movement of the gas valve *n* so that the latter is either opened or closed. After the pressures above and below the auxiliary diaphragm *f* have become equalized the main diaphragm *p* sinks again as the valve *o* closes the gas supply, and the gas escapes from the casing *k* through the branch *q*. Both the diaphragms *f* and *p* are again exposed to equal pressure on both sides, and the valve is again ready for the next movement imparted to it by means of an increase of pressure in the gas main. The adjustment of the throttling valves *u*, *x*, *v*, (which is effected at the works), must be made in such a manner that only a rapid increase of pressure in the mains, with the subsequent comparatively short period of rest, will bring about the complete movement of the main diaphragm, so that the frequent small fluctuations of the diaphragm which occur in the case of a high wind, do not affect the main diaphragm.

In the practical construction of the gas lighting apparatus shown in Figs. 2 and 3, the gas supply pipe d' is carried to the gas valve n' through a branch *y* provided in the center of the casing s' of the gas collecting chamber g', its upper end opening into a pipe or conduit d^2 carried around the valve actuating gear, this conduit d^2 being formed in a body s^2 screwed on the branch *y* and connected to the gas supply pipe or main a'. The working diaphragm p' is of an annular shape and has its inner edge *w* secured to the branch *y* by means of the body s^2, and with its outer edge w' to the casing s' by means of a ring *z*. In the center between the points of securing, the diaphragm p' is provided with a narrow ring z' which carries a bracket *t* on which are mounted the actuating pawls l', r' for the operating wheel m' m^2 carried by the body s^2 and also the weights necessary for adjusting the lighting apparatus. The auxiliary diaphragm f' is secured by means of a cover s^3 to the body s^2 in such a manner that one face communicates with the pipe d^2 by means of an opening b'. On this side the auxiliary diaphragm f' is provided with a needle valve o' by means of which the opening of a pipe e' leading into the pipe d^2 can be closed, the said pipe e' being carried through the ring *z* (Fig. 3) and connected by means of a conduit e^2 in the casing s' to the chamber k' below the working diaphragm p'. On the other side, the auxiliary diaphragm f' is controlled by a spring o^2 resting against the cover s^3. From the chamber h^2 between the auxiliary diaphragm f' and the cover s^3 a pipe i' (Fig. 2) leads through the ring *z* and is connected by a perforation i^2 in the casing s' to the gas controlling chamber g'. The pipe d' is connected by means of an aperture c' in the branch *y* and conduit c^2 in a plug u' carried through the gas collecting chamber, to one end of an asbestos packing u^3 provided in the said plug and capable of being compressed by means of a screw u^2 the other end of this packing being connected by means of a hole c^3 to the gas collecting chamber g' (Fig. 3). The chamber k' below the working diaphragm p' is also connected by means of a passage q' in the casing s', and a conduit q^2 in a plug x' to one end of an asbestos packing x^3 compressible by means of a screw x^2, the other end of the said packing communicating with the atmospheric air by means of a conduit q^3. The asbestos packings u^3, x^3 form a substitute for the throttling screws *u* and *x* of the construction of the lighting apparatus shown in Fig. 1. The spindle n^2 of the gas valve n' is supported by the diaphragms f^3 and f^3 which constitute removable packings and are connected together by means of a rod n^3. The diaphragm f^3 is provided with a stop l^2 which the lever m^3 engages cooperating with the ratchet wheel m^2. The

ignition or by-pass pipe z^2 is branched off laterally from the pipe d' in front of the seat of the gas valve n', and can be closed by means of a valve z^3 secured to one end of a pivoted double lever z^4 the other end of which is controlled by the valve n' in such a manner that the valve z^3 is closed when the valve n' is opened. The working diaphragm p', the auxiliary diaphragm f' and the valve operating mechanism are inclosed in a common casing s^4.

The apparatus above described is intended for inverted gas incandescent lights and to enable it to be conveniently used also for ordinary incandescent gas burners, the valve spindle n^2 is detachably connected to the diaphragm f^2, so that after the removal of the gas valve n' a gas valve n^4 as shown in Fig. 4 can be connected to the diaphragm f^3 and a double lever z^6 with the valve z^7 can be arranged for controlling the by-pass z^5 provided for the purpose at the top.

The apparatus shown in Figs. 2 and 3 operates in the same manner as already described in connection with Fig. 1.

In the construction shown in Fig. 1, owing to the ordinary main diaphragm p being in the form of a solid disk carrying in its center the pawl l for actuating the valve operating ratchet m, the gas pipe d leading to the gas valve n had to be carried around the diaphragm; while in the construction of the gas lighting apparatus shown in Figs. 2 and 3, the main diaphragm p' is annular and has its inner edge w clamped to a branch y passing through its center, so that the gas supply pipe d' may be passed through the center of said diaphragm. The lighting apparatus can also be arranged in such a manner that the valve gear is disposed in the gas chamber k under the main diaphragm p. In this case the pipe d need not be carried around the valve gear, but the gas passes direct from the supply pipe a into the burner.

What I claim is:—

1. In an apparatus for controlling gas burners from a distance, the combination with the burner mechanism, of a yielding pressure member for actuating said mechanism, a valve controlling the supply of gas to the yielding pressure member, an auxiliary yielding pressure member controlling the movements of said valve, and connections between the gas supply and each side of said auxiliary yielding pressure member, so that said member is normally exposed to equal gas pressure on both sides.

2. In an apparatus for controlling gas burners from a distance, the combination, with the burner mechanism, of a yielding pressure member for actuating said mechanism, a valve controlling the supply of gas to the yielding pressure member, an auxiliary yielding pressure member controlling the movements of said valve, connections between the gas supply and each side of said auxiliary yielding pressure member, so that said member is normally exposed to equal gas pressure on both sides, and means for permitting the gas located between the yielding pressure member and the auxiliary pressure member to gradually escape.

3. In an apparatus for controlling gas burners from a distance, the combination with the burner mechanism, of a yielding pressure member for actuating said mechanism, a valve controlling the supply of gas to the yielding pressure member, an auxiliary yielding pressure member controlling the movements of said valve, connections between the gas supply and each side of said auxiliary yielding pressure member, and means interposed between the gas supply and one side of said auxiliary member for retarding the flow of gas to that side of the member.

4. In an apparatus for controlling gas burners from a distance, the combination, with the burner mechanism, of a yielding pressure member for actuating said mechanism, a valve controlling the supply of gas to the yielding pressure member, an auxiliary yielding pressure member controlling the movements of said valve, connections between the gas supply and each side of said auxiliary yielding pressure member, means interposed between the gas supply and one side of said auxiliary member for retarding the flow of gas to that side of the member and means for permitting the gas located between the yielding pressure member and the auxiliary pressure member to gradually escape.

5. In an apparatus for controlling gas burners from a distance, the combination with the burner mechanism of a yielding pressure member for actuating said mechanism, a valve controlling the supply of gas to the yielding pressure member, an auxiliary pressure member controlling the movements of said valve, connections between the gas supply and each side of said auxiliary yielding pressure member, and means interposed between the gas supply and one side of said auxiliary pressure member for retarding the flow of gas to that side of the auxiliary pressure member, said means comprising an expansion chamber and a throttling valve, substantially as described.

6. In an apparatus for controlling gas burners from a distance, the combination with the burner mechanism of a yielding pressure member for actuating said mechanism, a valve controlling the supply of gas to the yielding pressure member, an auxiliary pressure member controlling the movements of said valve, and normally exposed to equal pressure on both sides and a gas collecting chamber communicating with both

sides of the auxiliary pressure member and adapted to retard equalization in pressure on opposite sides of said auxiliary pressure member after a temporary increase of pressure.

7. In an apparatus for controlling gas burners from a distance, the combination with the burner mechanism of the yielding pressure member actuating said mechanism, a valve controlling the supply of gas to the yielding pressure member, an auxiliary pressure member controlling the movements of said valve and being normally exposed to equal pressure on both sides, a gas collecting chamber communicating with both sides of the auxiliary pressure member and means connected with said chamber for retarding the increase of pressure on one side of said auxiliary pressure member.

8. In an apparatus for controlling gas burners from a distance, the combination with the burner mechanism, of a gas supply pipe, an annular diaphragm surrounding said gas supply pipe and actuating the burner mechanism, a valve controlling the supply of gas to the annular diaphragm, an auxiliary diaphragm controlling the movement of said valve and normally exposed to equal pressure on both sides, and means interposed between the gas supply and one side of said auxiliary diaphragm for retarding the flow of gas to that side of the diaphragm.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

FRITZ ROSSBACH-ROUSSET.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.