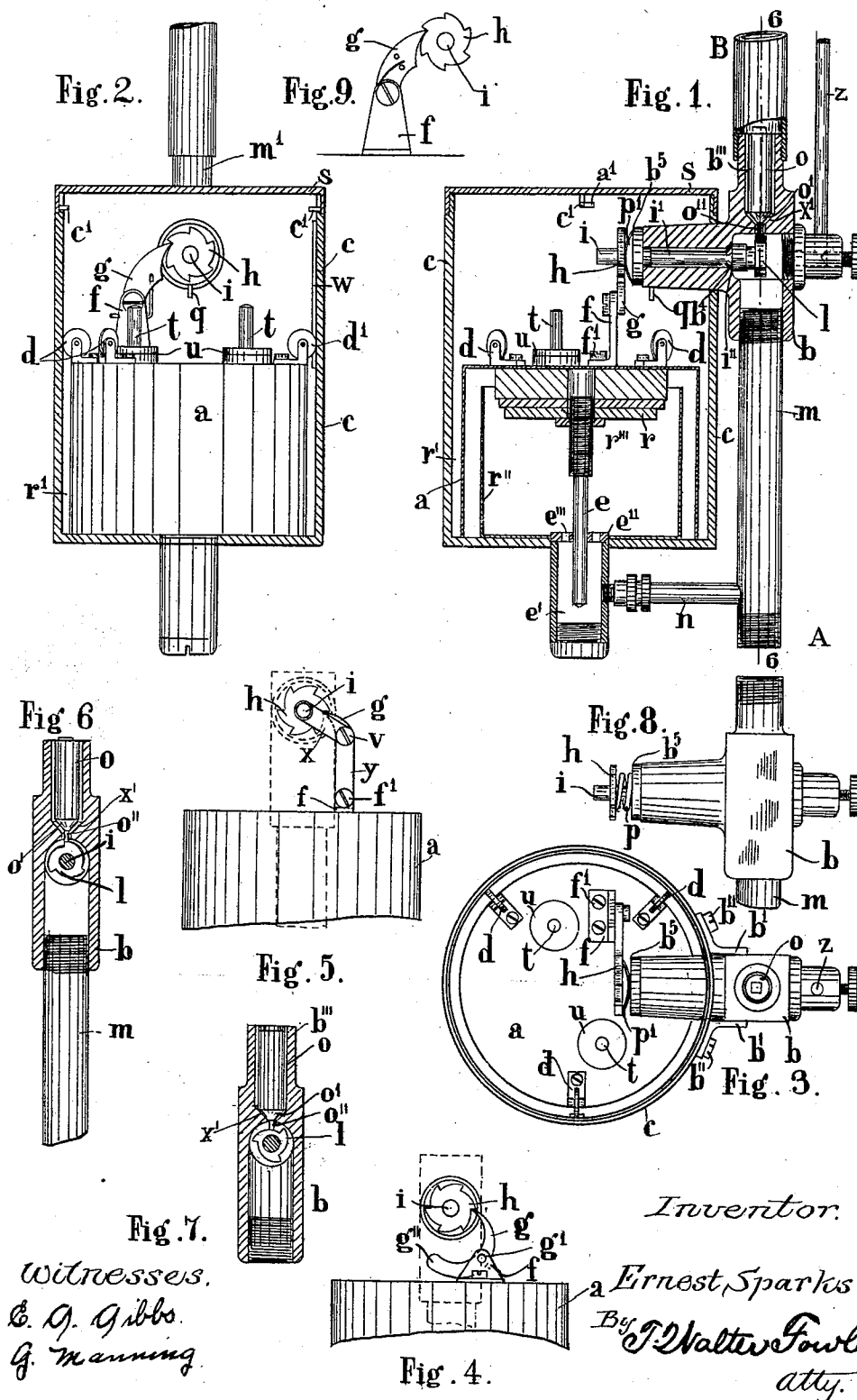


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 PRESSURE OPERATED GAS LIGHTING AND EXTINGUISHING APPARATUS.
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Patented May 16, 1911.



Witnesses.
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UNITED STATES PATENT OFFICE.

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PRESSURE-OPERATED GAS LIGHTING AND EXTINGUISHING APPARATUS.

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Specification of Letters Patent.

Patented May 16, 1911.

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To all whom it may concern:

Be it known that I, ERNEST SPARKS, a subject of the King of England, and residing at 24 Hugo road, Tufnell Park, London, England, have invented certain new and useful Improvements in Pressure-Operated Gas Lighting and Extinguishing Apparatus, of which the following is a specification.

This invention relates to improvements in devices for controlling gas-lighting systems by variation of the pressure in the mains. These pressure controllers serve to turn off the gas or to turn it on as the case may be, as the result of the effecting of a sudden momentary increase of pressure in the mains, each burner of the system being lighted from a pilot or by-pass burner.

The present invention consists of an apparatus in which a lift valve or plug valve is inserted in the direct path of a straight gas way from main to burner, this gas way being arranged parallel with the operating cylinder of the pressure controller; the invention also comprises certain combinations and arrangements to facilitate construction of the apparatus and more efficient working of the parts.

The invention is hereafter described with reference to the accompanying drawings, upon which:—

Figure 1 is a sectional elevation of the apparatus. Fig. 2 shows a side elevation of the piston, at right angles to Fig. 1. Fig. 3 is a plan of Fig. 1. Figs. 4 and 5 are modified forms of pawl for effecting the rotary advance of the ratchet-fitted cock. Fig. 6 is a section of the straight-way gas pipe on line 6—6 of Fig. 1, showing the gas plug in the raised position. Fig. 7 is a similar view showing the plug in the closed position. Fig. 8 shows a coiled spring instead of the spring washer in Figs. 1 and 3. Fig. 9 shows the operating pawl controlled as to position by a spring.

In these drawings gas is to pass from A to B or its passage from A to B is to be cut off, as a result of a momentary increase of pressure in the main.

A represents the end of the device which leads to the main pipe and B represents that end of the device which leads to the gas burner.

The pressure controller utilizes a piston *a* which is raised by the increased pressure of gas and this lift of the piston causes alternately gas to pass through the cock *b* or the

passage of gas through the cock *b* to be cut off.

The piston is mounted in a cylinder *c* and is preferably guided in the known manner by means of a central guide *e* and rollers mounted on said piston. The cylinder *c* is shown fitted in Fig. 1 with a lid secured thereto, and the base of the cylinder is provided with a chamber *e'* in the lid *e''* of which the stem *e* is guided. This chamber *e'* communicates with the underside of the piston *a* through perforations *e'''* in the lid *e''*.

The piston *a* carries at top a bracket *f* in which secured thereto by means of screws *f'* or otherwise, is mounted a pawl *g* and this pawl is adapted to engage a ratchet toothed wheel *h* mounted on a spindle *i* projecting into the cylinder *c* above the piston *a* at right angles to the axis of said cylinder. This spindle *i* passes longitudinally through a gas cock *b* secured externally upon the wall of the cylinder, or passing through the same, and is provided with a cam-wheel *l* or second ratchet wheel arranged in the straight gas pipe *m*. Gas passes from this pipe under the piston through a branch pipe *n* connected to the chamber *e'*.

The number of teeth or cams on the wheel *l* is one half the number of teeth on the ratchet wheel *h* and the cam wheel *l* is situated in that part of the cock-casing which is in line with the gas pipe *m*; a cylindrical plug *o* with conical shoulder *o'* ending in a point *o''* is suitably seated in the casing of the gas cock and is adapted to be lifted by the cams or ratchet teeth *l* provided for this purpose on the spindle *i*.

When the piston is lifted by a momentarily increased pressure of gas, the operating pawl *g* will rotate the ratchet wheel *h* one tooth and this will cause the spindle *i* to turn and the conical plug valve *o* will be raised from its seat *x'* in the said casing, or if raised, be allowed to return to its seat *x'*; in the first case gas will thereupon be allowed to pass along the gas pipe *m* direct to the usual burner *i. e.* from A to B, and in the second case the passage of gas will be obstructed and cut off.

The pin *q* or equivalent device prevents the piston rising beyond a point the exceeding of which might result in the ratchet wheel *h* being moved to the extent of more than one tooth.

When the apex *o''* of the conical plug bears on the cam or tooth *l*, the plug *o* is

held out of its seat x' and when the said plug has seated itself with its conical shoulder o' in the seating x' the said apex passes between adjacent teeth or cams of the wheel l .

5 In order to avoid side-thrust and to steady the piston in its movements, I prefer to arrange the guide rollers in such a way that, as shown for example in Fig. 3, two of the rollers d bear against the inside of the cylinder c on the same side as are situated the pawl g and bracket f and a single roller d' travels in a groove or slot w in the wall of the cylinder on the opposite side to the guide rollers d . Other suitable numbers of guide
10 rollers d d' may, however, be employed.

The gas cock b to which the upper and lower portions of the straight gas pipe m are screwed or otherwise connected, preferably passes through the wall of the cylinder c , the gas pipe m being also preferably parallel with the axis of the piston and cylinder. The plug o is with advantage of the cylindrical shape shown and a loose fit in the part b''' of the casing b , the shoulder o'
20 when resting on the seating x' absolutely closing the gas passage.

The gas cock casing b is secured to the cylinder c for the piston a in any convenient manner; for example the casing may be provided with side wings or flanges b' fitting
30 against the exterior of the cylinder c and attached thereto by screws b'' , see Fig. 3.

In order to prevent leakage past the spindle i of the gas cock, I form the said spindle within the socket portion of the casing with a narrowed part i' and interpose a coiled spring p (see Fig. 8) or spring washer p' (see Fig. 1) between the ratchet wheel h and the outer extremity b^5 of the socket portion b , this spring device serving to hold the shoulder i'' of the spindle i against a corresponding shoulder b^4 in the bearing for the said spindle within the socket b .
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The piston is weighted to the required extent by means of removable weights r secured thereto in the usual manner and it is preferably provided with a mercury bath or seal r' into which it dips, in the known manner. This mercury bath is contained in an annular trough formed between the wall c of the cylinder and an inner annular wall r'' upstanding from the base of the cylinder and suitably secured thereto. The weights r are shown held upon the upper screw-threaded part of the central spindle or guide
55 e by means of a nut r''' . The top of the piston is also shown provided with studs or stems t upstanding therefrom and upon these stems other weights u may be fitted to secure a fine adjustment of the weight of the piston without having to alter the weights r on the underside of the piston.

In Figs. 4 and 5, I have shown other forms of pawl to effect the advance of the
65 ratchet wheel h to the extent of one tooth

each time the piston is raised. In Fig. 4 the pawl g is pivoted at g' to the bracket f and is provided with a weighted end g'' which holds the pawl against the wheel h ; this end g'' lifts when the piston descends and the pawl g thereupon rides over the tooth. In Fig. 5 the pawl g is mounted on a pivot v connected to a link x carried both by the spindle i and also by a link y pivoted to the bracket f .
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The cylinder is shown covered by a flanged lid s fastened thereto by bayonet slots c' in the wall of the cylinder c into which pass studs a' projecting from the cylinder.
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A by pass pipe z is shown in Figs. 1 and 2, this by pass being of the ordinary well known construction.
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It will be understood that the wheels h and l may be fitted with teeth other than respectively six and three in number but the teeth in the wheel h must always be double the number of teeth (or cams) on the wheel l , in order that each time the wheel h is moved to the extent of one tooth the position of the lift plug o may be changed from the raised to the lowered or vice versa.
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Having thus described my invention, what I claim as such and desire to secure by Letters Patent is:—

1. A pressure operated gas lighting and extinguishing apparatus comprising a piston mounted in a cylinder, a gas cock passing laterally through the wall of the cylinder and interposed in a straightway gas pipe, a spindle mounted in said gas cock and adapted to project over the said piston, a ratchet wheel at one end of said spindle and a cam wheel at the other end of the spindle, said ratchet wheel adapted to be engaged and rotated by a pawl mounted in a bracket carried by said piston, said cam wheel having half the number of teeth of the ratchet wheel and adapted to raise from its seat a coned plug in the gas cock casing and in the line of the straightway gas pipe.
95 100 105 110

2. A pressure operated gas lighting and extinguishing apparatus comprising a straightway gas pipe arranged parallel with a cylinder containing a mercury-sealed piston, a gas cock interposed in the length of the said gas pipe and having a spindle passing through the cylinder to above the piston, ratchet and cam wheels mounted on opposite ends of said spindle, said wheels having teeth in the proportion of two to one, the larger wheel adapted to be rotated by an actuating pawl mounted on the top of the piston, and the smaller wheel adapted by means of cam-like portions to hold a lift plug from its seating in the gas cock, and thereupon to allow gas to pass through the straightway gas pipe.
115 120 125

3. A pressure operated gas lighting and extinguishing apparatus comprising a mer-
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cury-sealed piston adapted to rise or fall in a cylinder, a gas cock secured to the wall of the cylinder with a spindle projecting over the piston, said spindle having means whereby it may be partially rotated by the lift of the piston and having means also whereby a lift plug interposed in the passage through the straightway gas pipe may be raised from its seat therein by the partial rotation of said spindle.

4. A pressure operated gas lighting and extinguishing apparatus comprising a gas cock having connections to pipes, said pipes and cock being alined, a lift plug mounted in alinement with said pipe and capable of seating itself to close the passage of gas through said pipe and cock, a lateral branch from said cock, a revoluble spindle mounted in said branch, said spindle having means whereby it may be rotated by the lift of a mercury-sealed piston in the controller, said spindle provided also with means to raise the said lift plug from its seat, a coned shoulder upon said spindle, a corresponding coned abutment in said branch for said shoulder, and a spring member mounted on the spindle adapted to hold said shoulder against said coned abutment.

5. A pressure operated gas lighting and extinguishing apparatus, comprising a covered cylinder, a mercury-sealed piston arranged therein, means for passing gas to the underside of said sealed piston, a gas cock interposed in a gas pipe, said cock having a lateral branch passing into said cylinder to above said piston, a revoluble spindle mounted gas-tight in said branch, a ratchet wheel secured upon the end of the spindle over said piston, a bracket mounted on said piston, a pawl pivoted on said bracket, said pawl co-acting with said ratchet wheel to turn the spindle to the extent of one tooth each time the piston rises due to a sudden increase of gas pressure below the piston, guides for said piston bearing against the inner wall of the cylinder, adjustable weights carried by said piston, a cylindrical plug mounted in the cock in alinement with the gas pipe, said plug having a coned end adapted to seat itself in a seating in said gas cock and thereby to obstruct the passage of gas through said pipe, and a cam-fitted wheel mounted on the opposite end of the revoluble spindle, said wheel having cams in number half the number of teeth upon the ratchet wheel, said cams adapted to lift the plug from its seating so that gas may pass through the pipe.

6. A pressure operated gas lighting and extinguishing apparatus, comprising a covered cylinder, a mercury-sealed piston movable therein, a gas inlet to the underside of said piston, a straightway gas pipe parallel

with the axis of said cylinder, a gas cock interposed in the length of said gas pipe, a plug valve with coned shoulder and pointed end seated in said cock in alinement with said pipe, said shoulder adapted to rest upon a conical seating, a lateral branch from said cock passing into said cylinder and containing a revoluble spindle projecting above said piston, a ratchet wheel mounted upon the projecting end of said spindle, a spring member interposed between said ratchet wheel and the end of said branch, a pawl mounted on a bracket carried by said piston, said pawl engaging said ratchet wheel, a shoulder on said spindle bearing against a coned seat in the bore of said branch, and a cam-fitted wheel mounted on the end of the spindle opposite to the ratchet wheel, said cams being adapted to lift said plug each alternate part-rotation of the spindle by means of the operating pawl.

7. A pressure-controller comprising a cylinder, a piston arranged within said cylinder, an annular wall upstanding from the base of the cylinder and forming an annular trough for mercury wherein the piston dips, a central chamber dependent from the base of the cylinder and having a perforated cover, a guiding stem from said piston passing through said cover to said chamber, adjustable weights carried by the piston, a bracket mounted on the piston and having a pawl pivoted thereto, a straightway gas pipe parallel with the cylinder and a branch pipe from said pipe to said dependent chamber, guiding rollers mounted in brackets carried by said piston and bearing against the inner wall of the cylinder, a gas cock interposed in the length of the straightway pipe, a lift plug adapted to be seated in the gas cock in the path of the gas through the straightway pipe, said plug being cylindrical and having a coned lower part conforming with a seating in the cock, a lateral branch projecting from the gas cock through the cylinder, a revoluble spindle carried by said lateral branch, wheels upon the ends of said spindle, said wheels having teeth in the proportion of two to one, and rotated by the operating pawl so that each alternate rise of the piston will lift the plug valve and allow gas to pass through the straightway pipe to above the gas cock, and a by pass to the burner, said by pass supplied from below the gas cock and a projection from the lateral branch of the gas cock to limit the rise of the piston.

In testimony whereof I have affixed my signature in presence of two witnesses.

ERNEST SPARKS.

Witnesses:

VICTOR F. FEENY,
VICTOR I. FEENY.