

No. 816,962.

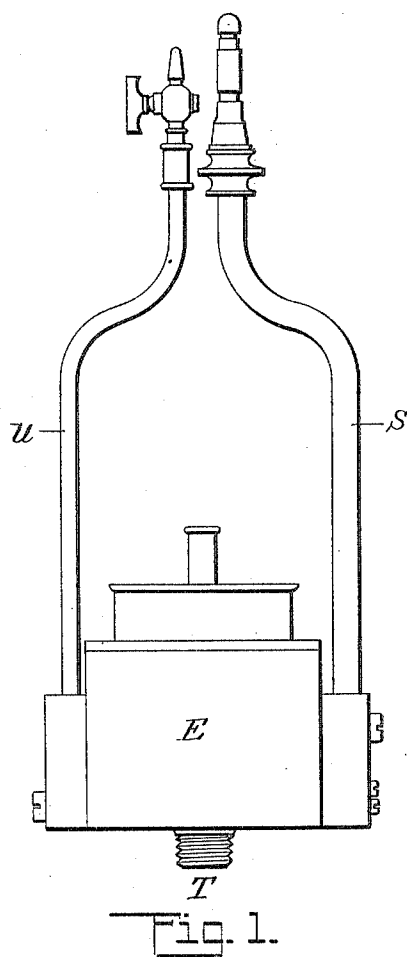
PATENTED APR. 3, 1906.

J. L. BRUCE.

AUTOMATIC LIGHTER AND EXTINGUISHER FOR GAS BURNERS.

APPLICATION FILED DEC. 21, 1904.

4 SHEETS—SHEET 1.



WITNESSES:

*L. Almquist*  
*A. H. Davis*

INVENTOR

*John Leck Bruce*

BY

*Mum & Co*

ATTORNEYS

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4 SHEETS—SHEET 2.

Fig. 2.

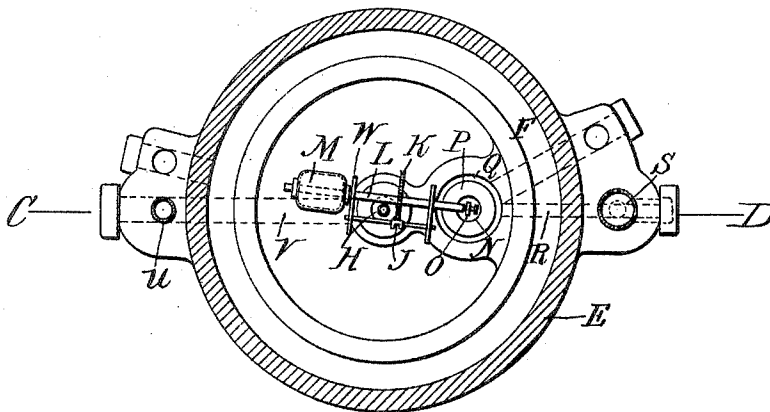
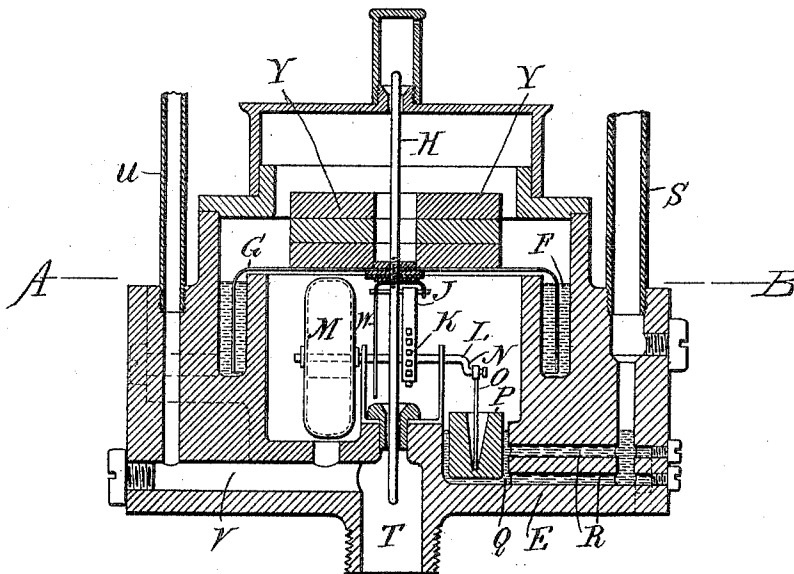


Fig. 3.

WITNESSES:

*L. Almquist.*  
*A. H. Davis*

INVENTOR

*John Leck Bruce*

BY *Mum & Co*

ATTORNEYS

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4 SHEETS—SHEET 3.

Fig. 4.

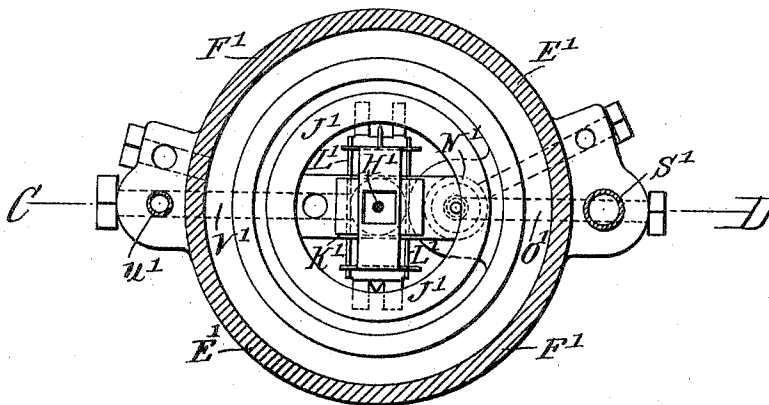
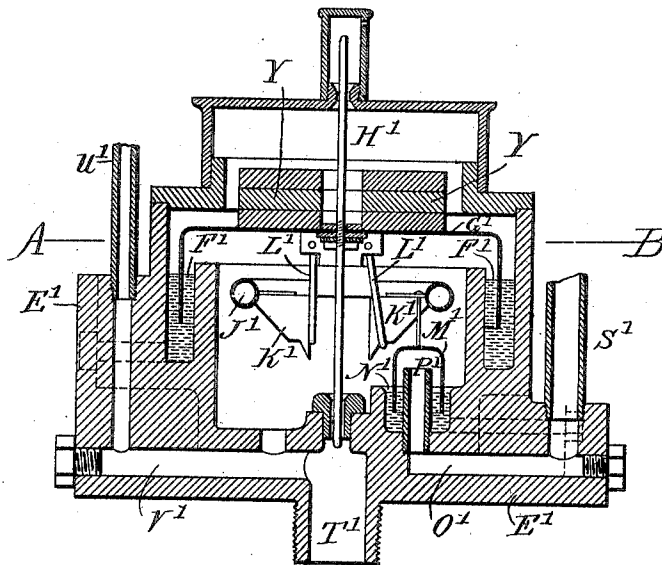


Fig. 5.

WITNESSES:

*L. Almqvist*  
*A. S. Davis*

INVENTOR

*John Leck Bruce*

BY

*Mumford*

ATTORNEYS

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4 SHEETS—SHEET 4.

Fig. 6.

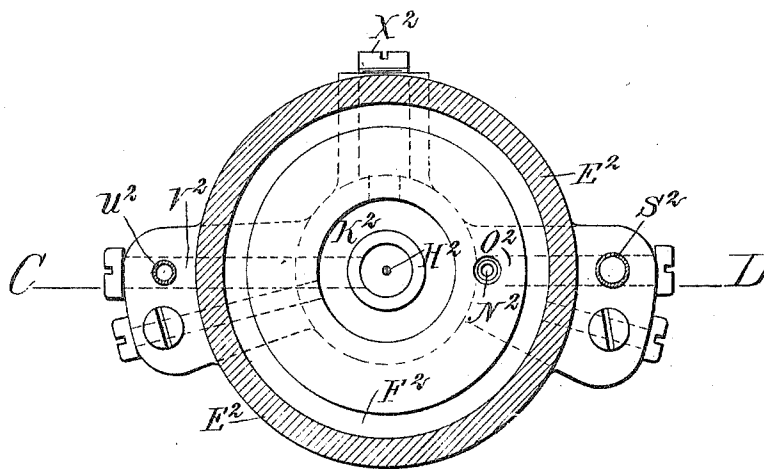
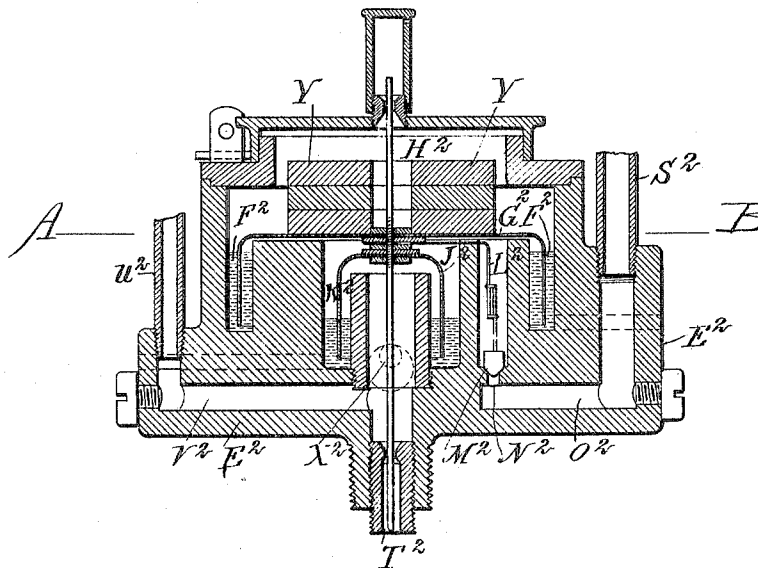


Fig. 7.

WITNESSES:

*L. Olmquist*  
*A. Edwards*

INVENTOR

*John Leck Bruce*

BY

*Mumford*

ATTORNEYS

# UNITED STATES PATENT OFFICE.

JOHN L. BRUCE, OF KOGARAH, NEW SOUTH WALES, AUSTRALIA.

AUTOMATIC LIGHTER AND EXTINGUISHER FOR GAS-BURNERS.

No. 816,962.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed December 21, 1904. Serial No. 237,798.

*To all whom it may concern:*

Be it known that I, JOHN LECK BRUCE, a subject of the King of Great Britain, residing at Kogarah, in the State of New South Wales, in the Commonwealth of Australia, have invented certain new and useful Improvements in Automatic Lighters and Extinguishers for Gas-Burners, of which the following is a specification.

My invention relates to an improved apparatus for lighting and extinguishing street and other gas-lamps from a distance.

This invention relates to a device by means of which gas-burners provided with means for ignition, such as pilot-lights, can be lighted or extinguished from a distance by increasing and decreasing the pressure of gas in the mains. I am aware that different devices have been tried for this purpose; but many of them have failed in reliability under the varying conditions incidental to gas-light practice.

The object of my invention is to provide an apparatus which will be absolutely reliable under all conditions.

The essential feature of my invention is a mercury-valve which controls the gas-supply and is operated by the rise and fall of a gasometer-bell or its equivalent, actuated by predetermined variations of pressure in the gas-main. The operation of the valve may be obtained either by the direct action of the gasometer-bell or by means of a suitable intermediate mechanism, and the form of the valve may be either a small mercury sealed bell or a displacer-plunger immersed in mercury. There are many suitable intermediate mechanisms that might be used to operate the valve; but I will confine myself to the description of two forms which I have found in practice to be simple and effective.

Figure 1 shows the apparatus complete in elevation. Figs. 2 and 3 illustrate my apparatus with one form of intermediate mechanism for operating the valve, Fig. 2 being a vertical section on line C D, Fig. 3; and Fig. 3, a horizontal section on line A B, Fig. 2. Figs. 4 and 5 are vertical and horizontal sectional views, respectively, illustrating a modification of the invention; and Figs. 6 and 7 are similar views, respectively, representing a further modification of the invention.

The device, as illustrated, consists of an outer casing containing a small gasometer, the bell of which is sealed, preferably with mercury. Within the gas-chamber and be-

neath the bell is a horizontal shaft supported on suitable bearings. One end of this shaft is cranked and carries depending therefrom a plunger, which lies within a mercury-well, so that by the rise and fall of the plunger the level of the mercury is lowered or raised. The other end of the shaft carries a weighted tumbler, consisting of, preferably, a closed oblong vessel partially filled with mercury or shot. At or near the center of the shaft is a ratchet-wheel securely keyed thereto. Depending from the inside roof of the gasometer-bell and attached thereto in such a position as to engage the ratchet-wheel is a vertical rack.

The action of the apparatus is as follows: Assuming that the bell has been weighted, either by dead-weight or by springs, to lift at a predetermined maximum pressure and that the light is out, the pressure in the main is first reduced to a predetermined minimum. This causes the bell to descend into the position shown in Fig. 2, the rack of course riding over the teeth of the ratchet-wheel without engagement. The pressure is then increased to the predetermined maximum, at which the bell will rise, and as the bell rises the rack attached thereto engages the ratchet-wheel on the underlying shaft, which carries the plunger and causes the same to revolve a quarter-revolution, when the mercury contained in the tumbler will transfer itself to the other end thereof, and so aid the rack and ratchet-wheel in completing a half-revolution of the shaft, and retain the parts in the position reached till again moved by the next rise of the gasometer-bell. The half-revolution of the shaft will raise the plunger out of the mercury-well sufficiently far to lower the level of the mercury and open a passage for the gas to pass to the burner.

In order that the invention may be clearly understood, I shall describe the parts in detail by reference to the drawings.

In Figs. 1, 2, and 3, E is main body of apparatus. F is an annular channel containing mercury. G is gasometer-bell. H is a vertical spindle attached to and passing upward and downward through the bell G for the purpose of vertically guiding the bell in its rise and fall. J is a hinged rack depending from the bell in such a position as to engage the ratchet-wheel K. L is a horizontal shaft supported on suitable bearings, as shown. M is a weighted tumbler, preferably consisting of an oblong vessel partially filled with mercury. This tumbler is fixed to one end

of the shaft L. The other end of the shaft L has a crank N, to which is pivotally attached a small rod O, carrying the displacer-plunger P. W is guide provided to prevent the bell 5 G from turning. Q is a mercury-well in which is immersed the plunger P. R R are gas-passages leading from the mercury-well to the burner supply-pipe S. When the plunger P is raised by a half-revolution of the shaft L, caused by the rise of the gasometer-bell G, the level of the mercury in the well 10 Q falls and the mercury in the upper passage R flows therein, thus opening a passage for the gas to the burner supply-pipe S, and the gas lights. The falling of the bell G, owing 15 either to a predetermined or a normal lowering of the pressure in the main, will have no effect on the supply to the burner, as the rack J rides over the ratchet-wheel K; but when 20 the bell G rises again, as a result of the raising of the pressure in the main to a predetermined maximum, the rack J engages the ratchet-wheel K and aided by the tumbling-weight M causes the shaft L to make another 25 half-revolution, which immerses the plunger P in the mercury in the well Q, thereby raises its level, fills the passages R, and cuts off the gas-supply to the burner. Different channels with suitable screw-plugs are provided, 30 as shown, for the purpose of clearing the passages from obstructions and filling and emptying the mercury seals when desired. Connection with the gas-main is made at T, the pilot-light u being in communication with 35 the gas-supply through channel V.

In Figs. 4 and 5 another suitable intermediate mechanism is shown for operating the valve, which in this case consists of a small bell with mercury seal covering the gas-out- 40 let to burner. This small bell is suspended from a hollow ring containing a small quantity of mercury and horizontally pivoted at two sides to form a tumbling-weight. From the main bell are suspended two wire loops, 45 one on either side of the center, which engage alternately with a suitably-shaped piece of metal attached to the ring, causing the latter to dip, either one way or the other, on the bell being raised by the increased pressure of gas. 50 It will thus be seen that the gas may be either turned on or off by increasing the pressure, and if it is desired, for instance, to extinguish the light it is necessary to first lower the pressure in order to make the bell descend, and so 55 have the other wire loop engage in the piece of metal underneath the ring in order to dip the ring the other way, and have the small bell descend and cut off the gas by means of its mercury seal. Referring to the drawings, E' is outer casing. F' is annular channel containing mercury. G' is gasometer-bell with vertical guide-spindle H' attached thereto. T' is gas-supply connection. V' is 60 supply-pipe to pilot w'. J' is a hollow ring partially filled with mercury on two opposite

sides and having on its under side a peculiarly-shaped piece of metal K', with which the wires L' engage. On the bell being further 70 raised by increased gas-pressure from position shown on Fig. 4 this will cause the ring J' to dip to the left and raise the small bell M', suspended, as shown, from ring J', to be raised 75 out of its mercury seal N', uncovering the orifice P'. The gas is thus enabled to pass freely through passage O' to main burner-pipe S'. On the pressure being slightly lowered the bell G' will descend, relieving the 80 right-hand wire loop L' and engaging the left-hand wire loop L'. On the bell G' being raised by increased gas-pressure the ring J' is caused to dip the other way, whereby the small bell M' descends into its mercury seal and cuts off the gas-supply.

Figs. 6 and 7 show the apparatus with the mercury-valve operated direct by the rise 85 and fall of the gasometer-bell. This form of my invention may be used when it is desired to turn on the gas when the pressure reaches a predetermined maximum and cut off the gas when the pressure is reduced to a predetermined minimum. The essential features 90 of this device are similar to those already described and consist of an outer casing, a gasometer, and a mercury-valve, which consists of a small bell (with a mercury seal) underlying 95 and fixed to the gasometer-bell and concentric therewith. The mercury-valve communicates with the gas-supply, and on the pressure being raised to a certain predetermined maximum the gas will bubble through the 100 mercury surrounding the lip of the valve-bell and raise the gasometer-bell, thus allowing the gas to pass to the burner. For the purpose of accurately adjusting the level of the mercury sealing the valve a displacer-screw 105 is provided. In order to avoid quick loss of pressure within the gasometer at starting, the gas-passage to the burner is kept nearly closed by a check-plug, movably attached to the bell, which allows the gas to accumulate 110 under the main bell till the pressure has been raised sufficiently to lift the valve-bell out of mercury seal. When the pressure in the gas main is reduced, both bells (being weighted to a predetermined extent) will descend 115 again and shut off the supply, thereby extinguishing the light.

Referring to Figs. 6 and 7, E<sup>2</sup> is outer casing. F<sup>2</sup> is annular channel containing mercury. G<sup>2</sup> is gasometer-bell with vertical spindle H<sup>2</sup>. The gas entering at T<sup>2</sup> passes upward till arrested by the small bell J<sup>2</sup>. On the pressure being sufficiently raised the gas will bubble through the mercury seal of valve K<sup>2</sup> and raise the large bell G<sup>2</sup>, carrying 120 with it the valve-bell J<sup>2</sup> and the supporting-arm L<sup>2</sup>. X<sup>2</sup> is displacer-screw provided for the purpose of adjusting the level of the mercury valve-seal. A further rise of the bell G<sup>2</sup>, still carrying with it the supporting-arm 130

L<sup>2</sup>, lifts the valve-bell J<sup>2</sup> clear of the mercury and the check-plug M<sup>2</sup> from its seat and allows the gas to pass freely through the orifice N<sup>2</sup> and channel O<sup>2</sup> to the burner S<sup>2</sup>. Through a passage V<sup>2</sup> the pilot-burner u<sup>2</sup> is in constant communication with the gas-main. Suitable channels and plugs or stoppers are provided to remove any obstructions and to supply or to empty the mercury, as described.

10 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A device for lighting and extinguishing street and other gas-burners from a distance, comprising a structure in communication with a gas-main, having a well containing mercury, together with a gas-passage leading from the well to a burner supply-pipe, a gasometer-bell, means for controlling the admission of gas to said supply-pipe by displacement of the mercury within said well, connections for operating the same by the

rise and fall of the bell, and means for actuating the bell on variations of pressure in the gas-main. 25

2. A device for lighting and extinguishing street and other gas-burners from a distance, comprising a structure in communication with a gas-main, having a well containing mercury, together with a gas-passage leading from the well to a burner supply-pipe, a gasometer-bell, means for controlling the admission of gas to said supply-pipe by displacement of the mercury within said well, connections for operating the same by the rise and fall of the bell, and means for actuating the bell on variations of pressure in the gas-main, embodying a displacer-plunger working in the well. 30 35 40

Signed at Sydney, in the State of New South Wales, this 27th day of October, 1904.

JOHN L. BRUCE.

Witnesses:

ARTHUR GRIFFITH,  
LESLIE C. A. WARD.