No. 756,583. PATENTED APR. 5, 1904.

T. E. CHARLTON.

GAS BURNER.

APPLICATION FILED JAN. 11, 1904.

NO MODEL.

Fig. 1.

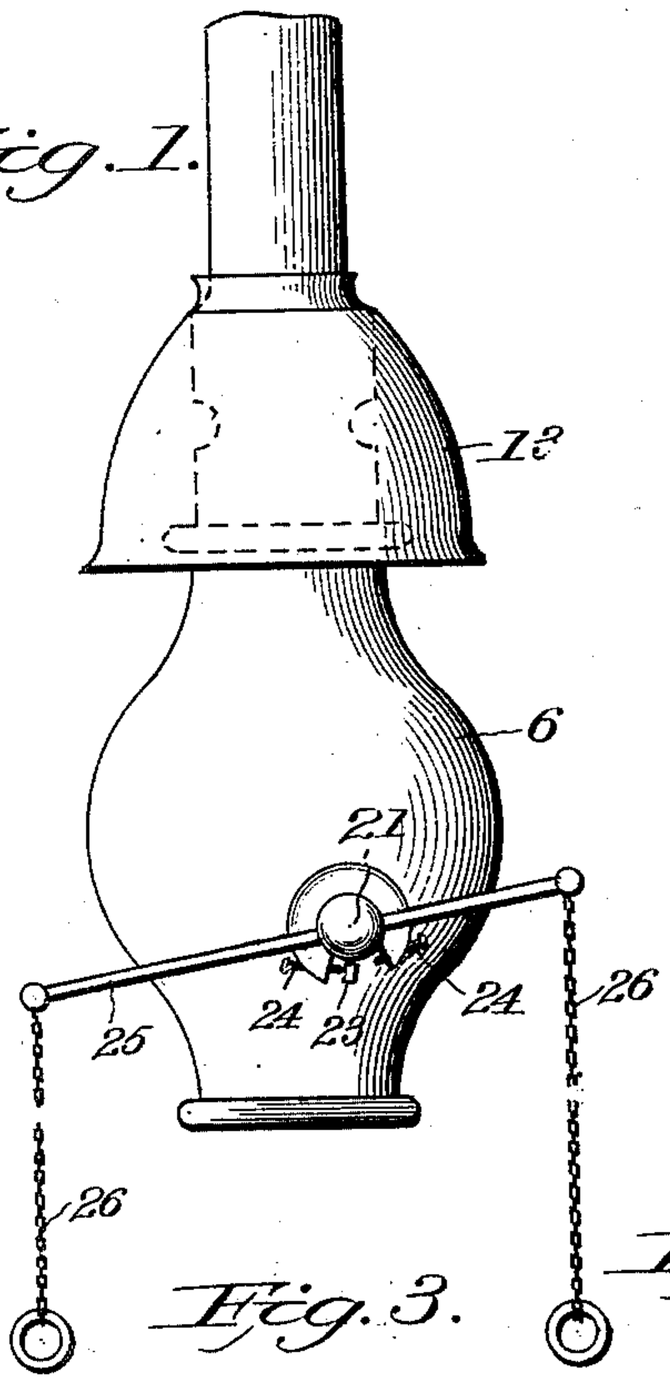


Fig. 2.

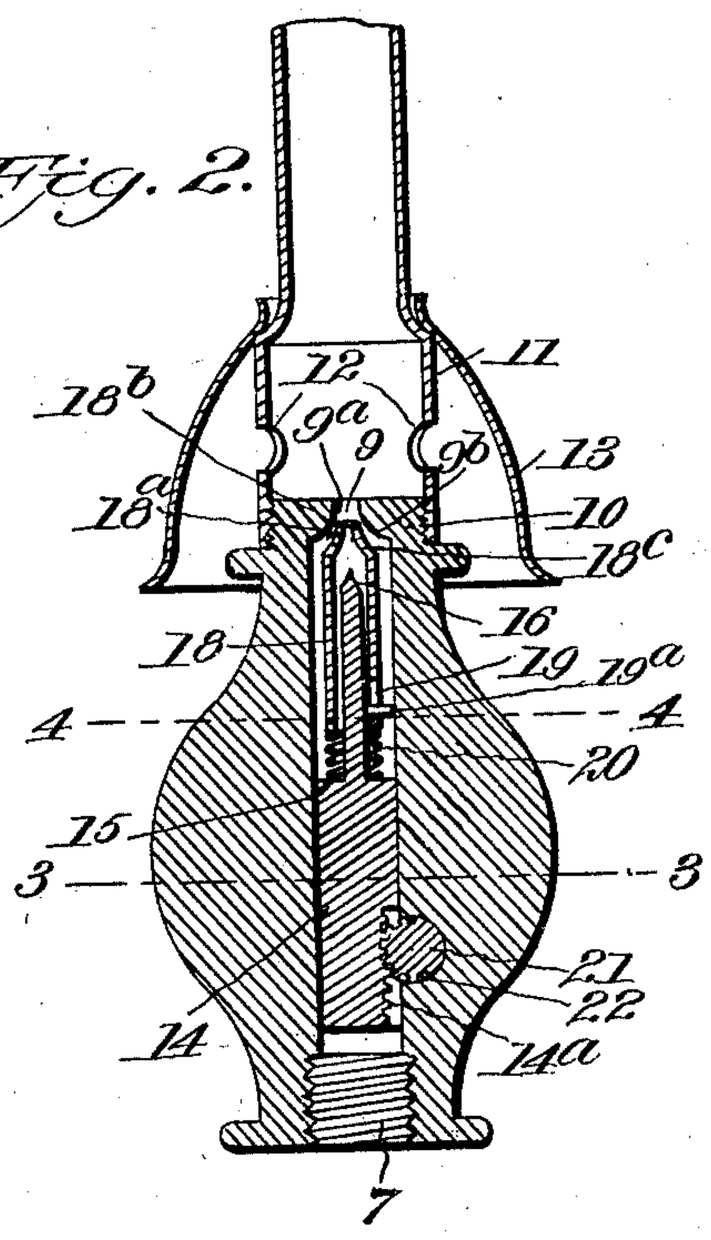


Fig. 3.

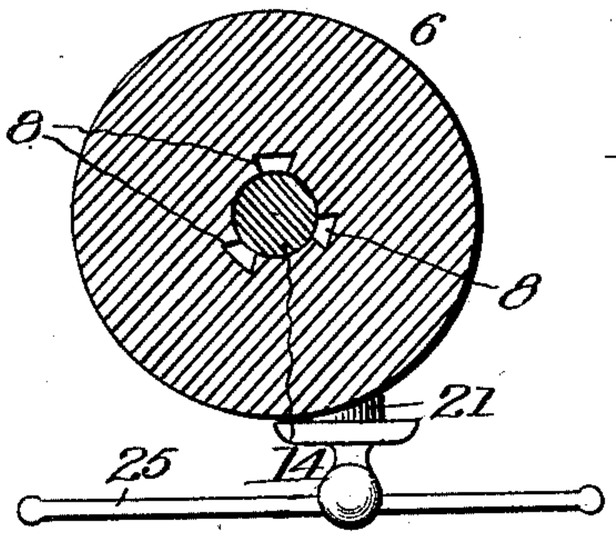


Fig. 5.

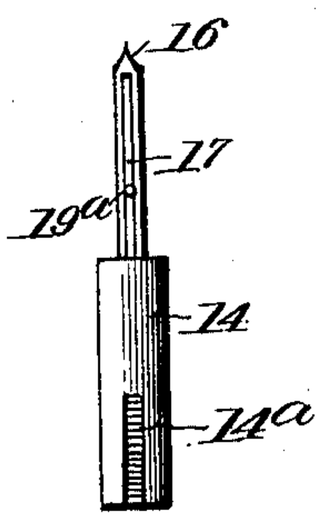


Fig. 4.

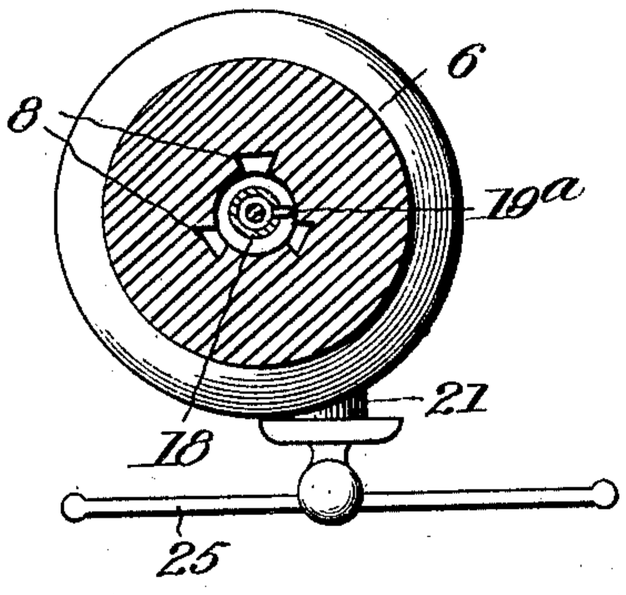
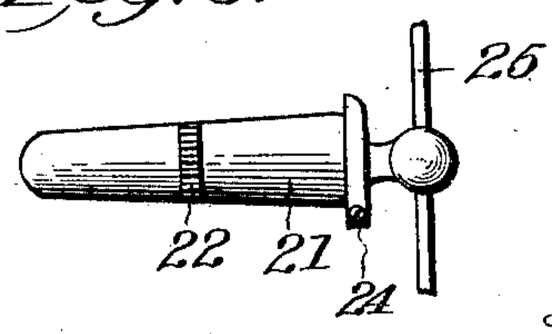


Fig. 6.



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No. 756,583. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

THOMAS E. CHARLTON, OF CLEVELAND, OHIO.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 756,583, dated April 5, 1904.

Application filed January 11, 1904. Serial No. 188,589. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. CHARLTON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Gas-Burners, of which the following is a specification.

This invention relates to a gas-valve particularly designed for use with Bunsen burners, but not in any way limited thereto.

The object of the invention is to form an improved valve suitable for either natural or artificial gas and characterized by improvements of construction and operation, as will be more fully apparent hereinafter.

With respect to natural and artificial gas it is known that the former should rise from the check or orifice in a body and that the latter should rise from the orifice in a more or less diffused form to produce the best results with the light. It is also known that the smaller the size of the orifice the greater the velocity of the gas passing therethrough. With ordinary plug-valves acting to shut off the flow of gas through the supply-pipe to the burner the action is to retard the flow, in view of the fact that the plug is located at a distance from the burner, and hence the gas as it passes the contracted opening at the plug (when the latter is partially turned off) expands into the larger bore of the pipe between the plug and the burner, and consequently its velocity is retarded, which is just opposite to what should be the case. Theoretically the smaller the amount of gas allowed to flow into a Bunsen or other burner the greater its velocity should be, while ordinary plug-valves not only decrease the supply, but also decrease the velocity.

With my invention the regulation occurs at the ignition-orifice, and the supply is regulated by regulating the size of the orifice, and at the same time the velocity is in inverse proportion to the supply. Further advantages will be apparent with respect to its adjustment for both natural and artificial gas, as referred to above.

In the accompanying drawings, in which the device is illustrated, Figure 1 is a side elevation thereof. Fig. 2 is a vertical section. Fig. 3 is a cross-section on the line 3 3 of Fig. 2. Fig. 4 is a cross-section on the line 4 4 of Fig. 2. Fig. 5 is an elevation of the needle used in the valve, and Fig. 6 is a plan of the turning-plug which operates the needle.

Referring specifically to the drawings, 6 indicates the valve-casing, having a central longitudinal bore which is enlarged and threaded at the bottom, as at 7, to screw onto the nipple of a gas-pipe. The walls of the bore are grooved, as at 8, lengthwise thereof to permit the passage of gas besides the needle hereinafter referred to. At the top the bore is contracted to an orifice 9, the walls of the orifice being parallel at the extreme tip, as at 9^a, below which they are convex, as at 9^b. The body of the casing of the valve terminates in a nipple 10, onto which the Bunsen tube 11 is screwed. This tube has air-holes 12 near the base thereof inclosed by a bell 13, which also forms a support for the gallery of the burner.

Fitting the bore of the casing is a needle 14, the upper part of which is reduced, forming a shoulder 15, and the reduced portion ends in a concaved point, as at 16. The reduced portion of the needle is grooved, as at 17, from the shoulder 15 to the beginning of the point to allow for the passage of gas up beside the needle. Within the bore of the casing and surrounding the reduced portion of the needle is a movable tube 18, which tapers at the top to an orifice at 18^a, the walls of the tapered portion being parallel at the extreme point, as at 18^b, but below that they are concaved on the outer side, as at 18^c, the intent and purpose being to fit the surfaces 9^a and 9^b of the casing. Near its lower end the tube is slotted, as at 19, to receive a pin 19^a, projecting from the needle, the length of the slot being equal to the movement required to open the valve to its greatest capacity. Between the lower end of the tube and the shoulder 15 is a coiled spring 20, which acts to lift the tube to the extent permitted by the pin in the slot referred to. The needle and the tube thereon have vertical movement in the bore of the casing, as will be more fully described hereinafter.

To produce the vertical movement just referred to, a conical plug 21 is used. This is

let into a cross-bore in the casing, which cuts the main bore, and the plug has teeth 22 formed around the same, which engage in a rack 14ª, produced on the lower and larger portion of the needle. Obviously turning of the plug will raise or lower the needle. The extent of the turn of the plug is regulated by a stop-pin 23, projecting from the casing, which is struck by either of the small adjusting-screws 24, which are carried at the outer end of the plug in position to respectively strike the stop 23. The plug has a lever 25 and pull-chains 26 of ordinary construction.

Referring now to the use and operation of the valve, it is closed by lifting the needle by means of the plug until the tapered portion of the tube 18 fits the orifice 9 and the point 16 of the needle fits the orifice 18ª. For use with natural gas, in which it is desirable to project the gas with considerable velocity through a small orifice, the needle 14 is lowered or retracted a sufficient distance to open the orifice 18ª, in which position the tube 18 remains in closed position by virtue of the pressure of the spring 20. To open both orifices, and thus secure the delivery of the gas in the more diffused form desirable with artificial gas, farther downward movement of the needle is produced. This causes the pin 19ª to strike the lower end of the slot and carry with it the tube 18, whereby the main orifice 9 is opened, allowing the escape of gas therethrough and also through the orifice 18ª, giving a central and also a surrounding annular stream of gas. In either case the escaping gas takes up air through the openings 12 and passes thence to the mantle or other burner. In closing the valve the first action is the lift of the needle and with it, by pressure of the spring 20, the tube, which latter first closes the annular orifice at 9. Further lift of the needle throws its point 16 in the orifice 18ª, thereby closing the same.

It will be noticed that the valve is produced at the delivery-orifice, and naturally the velocity of the flow will increase as the size of the orifice is decreased. The concave and convex shapes of the parts, as above described, also assist in producing these results. It is evident that as the tube is retracted or lowered the concaved surface 18ᶜ will leave the convex surface 9ᵇ to a greater distance than the parallel surface 18ᵇ from the surface 9ª. The same remarks apply to the concaved point 16 and the orifice 18ª. Thus the point of greatest contraction and consequent greatest velocity of delivery is always nearest the extremity of the delivery-orifice, which is important for the reasons heretofore stated.

The flow of gas is from the pipe-nipple up through the grooves 8 to the orifice 9 and also up through the grooves 17 to the orifice 18ª. By pulling the chains alternately the plug will turn to the extent permitted by the adjusting-screws 24 and by its engagement with the needle will cause the needle and cap to rise or fall, but when it rises it closes first the outer valve and then the inner, and when it falls it opens first the inner valve and then the outer, forming by such operation a perfect valve for natural or high-pressure gas and also a perfect valve for artificial or low-pressure gas, with respect both to the amount and velocity of gas delivered.

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

1. In a gas-burner valve, the combination with a casing having a gas-orifice, of a needle slidable lengthwise therein, and a tapered tube yieldingly supported by, and slidable with, the needle, between the point of the needle and the orifice.

2. In a gas-burner valve, the combination with a bored casing having a gas-orifice at the end of the bore, of a needle for the orifice, slidable in the bore, and a tapered tube the point of which works between the point of the needle and the orifice, said tube being carried on the needle and having a limited movement with respect thereto.

3. In a gas-burner valve, the combination with the casing having the gas-orifice, of the needle-valve for the orifice, slidable in the casing, the tube slidably mounted on the needle and having a tapered end between the point of the needle and the orifice, and the spring and stop between the tube and the needle.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS E. CHARLTON.

Witnesses:

JOHN A. BOMMHARDT,

LOTTIE NEWBURN.