May 27, 1924. 1,495,545

J. B. ANDERSON

GAS VALVE

Original Filed July 14, 1922 2 Sheets-Sheet 1

FIG. I.

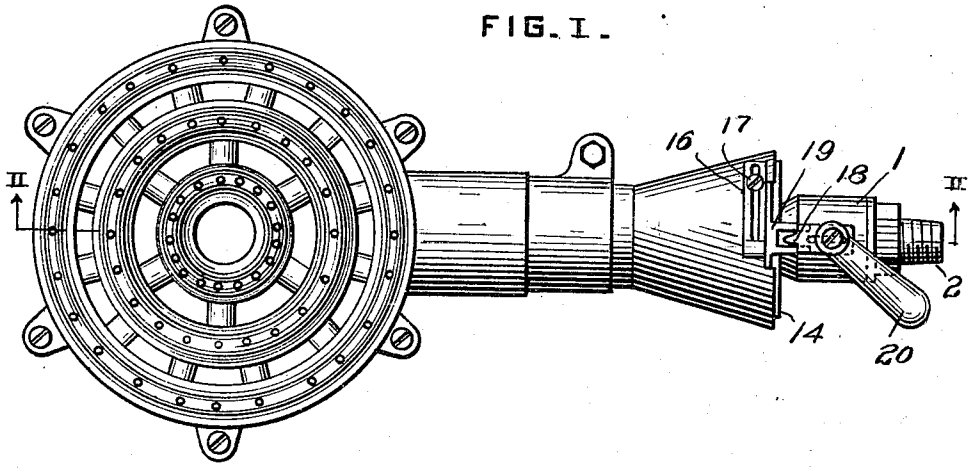
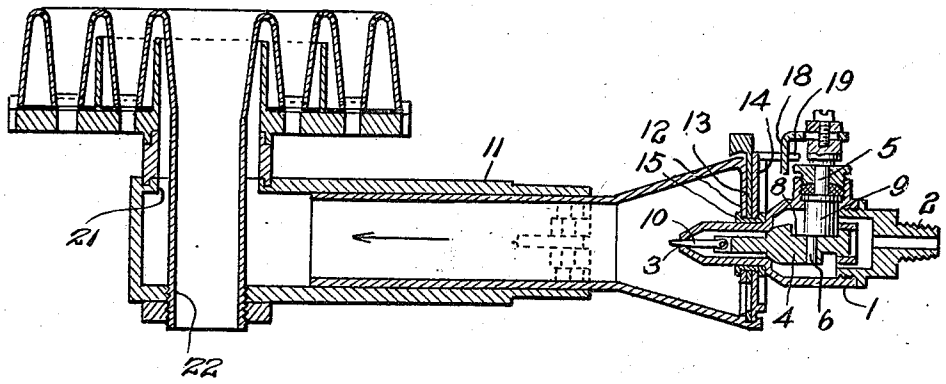


FIG. II.



WITNESSES

J. Herbert Bradley.

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FIG. III.

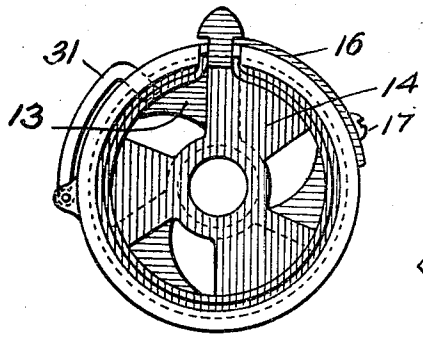


FIG. IV.

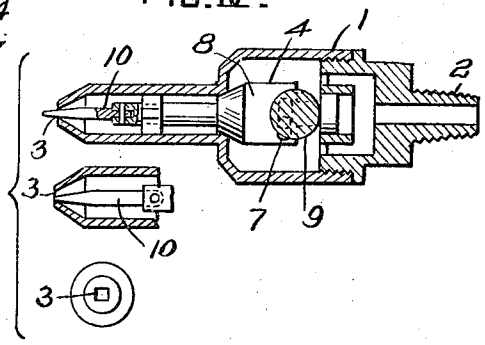


FIG. V.

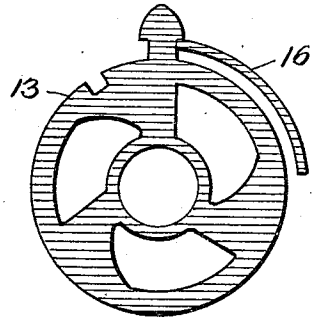
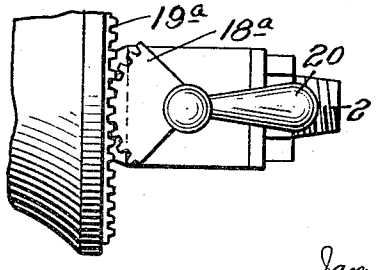


FIG. VI.



WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

JAMES B. ANDERSON, OF SHALER TOWNSHIP, ALLEGHENY COUNTY, PENNSYLVANIA, ASSIGNOR TO PEOPLES NATURAL GAS COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF WEST VIRGINIA.

GAS VALVE.

Original application filed July 14, 1922, Serial No. 575,103. Divided and this application filed May 9, 1923. Serial No. 637,724.

To all whom it may concern:

Be it known that I, JAMES B. ANDERSON, residing in Shaler Township, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered a certain new and useful Improvement in Gas Valves, of which improvement the following is a specification.

In an application for Letters Patent of the United States filed by me July 14th, 1922, and bearing Serial No. 575,103, allowed April 12th, 1923, which has matured into Patent No. 1,456,754, May 29, 1923, I have described and claimed a gas burner, and in connection with it have described a certain flow-regulating valve.

In the course of the prosecution of the application alluded to for purposes of division only, I cancelled claims which were drawn to the gas valve. In this application I shall describe and claim as my invention the gas valve.

By the employment of the gas valve which constitutes my present invention, minute control may be effected of the stream of gas flowing to the burner, ordinarily the burner for domestic cooking stoves, so that, within the range of supply, and up to the maximum of which the apparatus is capable, I may grade the size of the stream with greatest accuracy. Additionally I provide control of the ports through which air is supplied to the burner, this port control being so coordinated with the gas valve that as the stream of gas increases the air ports shall shall correspondingly widen. To this coordination is added a feature of adjustability, whereby gas valve and air control may initially be coordinated, and particular adaptation made to such circumstantial matters as quality of gas, pressure of gas, or even atmospheric conditions.

The invention possessing these features I shall show and describe in association with a gas burner of particular form and character. Its characteristic feature is that when the stream of fuel conveyed to the burner is small, the flame shall be concentrated within a relatively small area and, proportionately, as the size of the stream increases, the flame shall widen over an increasingly larger area. This particular burner is the subject matter of the application to which already I have made allusion.

In the accompanying drawings Fig. I is a view in plan from above of a burner for a cooking stove in association with which my present invention is employed. Fig. II is a view in vertical and medial section of the burner and valve, the plane of section being indicated by the line II—II, Fig. I. Fig. III is a view of the structure in end elevation, but lacking the gas nozzle. Fig. IV is a view in longitudinal and vertical section of the gas nozzle with its contained valve. Associated with Fig. IV are fragmentary illustrations of the delivery orifice of the nozzle in elevation and of a certain tongue in the position it assumes as the valve is unseated. Fig. V is a view in elevation of an adjustable disk which forms part of the structure, detached from its associate parts. Fig. VI is a fragmentary view in plan from above, illustrating a modification in detail.

I shall describe first the means of controlling the stream of gas in which means my present invention centers. I here refer particularly to Figure IV. A casing 1 is provided with an inlet lead 2 and a delivery orifice 3. The valve within the casing is in its general features such as that described in my application for United States Letters Patent filed March 30, 1921, Serial No. 456,798.

The valve of Fig. IV (cf. Fig. II) consists essentially of a cylindrical body 4 with conical end, mounted for axial traverse in suitable ways within chamber 1. An operating stem 5 extends through a suitable packing gland in the wall of casing 1, and in a direction at right angles to the axis of the valve body. Connection between operating stem and valve body is through a pin 6, placed eccentrically on the end of the stem 5 and entering a transverse slot 7 in the valve body. The cylindrical valve body is recessed on one side as at 8, and the enlarged end 9 of the valve stem enters the recess. The proportions are such that, as the stem is turned and the valve body shifted, the range of valve traverse is limited by abutment of the square end of the recess 8 in the valve body upon the cylindrical face of the enlarged end 9 of the operating stem. The

conical end of the valve body is, as the valve is shifted, alternately seated and unseated in a properly formed orifice to control flow. The structure as thus far described is one in which accuracy and durability are combined. All of these matters are minutely described and explained in my earlier application for Letters Patent alluded to above, Ser. No. 456,798.

The valve has a further and additional refinement, not shown in that prior patent application. The delivery orifice 3 of casing 1 is a contracted orifice, and the valve body terminates in a tapered tongue 10 which, when the parts are assembled and the valve seated, extends through and fills the delivery orifice. As the valve recedes from its seat this tongue is to a greater and greater degree withdrawn (to the right as shown in Figure IV) and the delivery orifice is left more or less completely unobstructed. The tongue is pivoted to the valve body, and when unrestrained drops by gravity from alignment in the axis of the valve body. The delivery orifice 3 is preferably square in cross section, and the tongue 10 is square, tapering to an edge. The edge extends transversely to the direction in which the tongue is driven against gravity (due to its pivotal mounting) during valve closing. Accordingly, as the valve recedes from its seat the tongue will uncover an increasingly widening slot, until at length the delivery orifice is completely unobstructed.

It will be understood that, tongue 10 being properly proportioned, a most minute gradation in rate of flow through delivery orifice 3 is obtained, from the cracking of the valve all the way to its position of fullest opening.

The gas nozzle delivers its stream axially to an induction passageway formed through the induction member 11. The gas is delivered through the end of the induction member 11, and through this end and around the gas nozzle streams of air are drawn in by the rush of the gas to mingle with the gas in the passageway, and to form therein the combustible mixture. The gas nozzle is supported in the end of induction member 11 by a bridge 12.

Facing the bridge 12 is an adjustable ported disk 13 (cf. Figs. II, III, and V), and facing disk 13 is a damper disk 14. The two disks 13 and 14 are mounted for rotation on a bushing 15 carried by bridge 12 and encircling the gas nozzle. Disk 13 is manually adjustable, and provision is made, as through a segment 16 of a cylindrical shell integral with disk 13 and overlying the outer surface of the induction member 11, whereby the disk when rotated to the desired position may be secured by a set screw 17. A latch 31 may be provided, for locking disk 13 against turning beyond a certain point. Such latch when present may constitute a safeguard, to prevent turning by an unskilled person to a degree unsuited to the conditions of a particular installation. Disk 14 is articulated with the gas valve, to the end that as the gas valve is opened and closed the damper disk 14 will rotate, and the effective area of the ports through disk 13 will correspondingly vary. Manifestly the articulation here may take any suitable or convenient form. Fig. II of the drawings shows a crank pin 18 carried by the valve stem and making engagement with a crotch 19 which extends from the perimeter of the damper disk 14. Fig. VI indicates that damper disk 14 may be provided with a rack 19^a, and that this rack may be engaged by a pinion or pinion sector (I term it a "quadrant gear") 18^a borne concentrically by the stem of the valve. In either case, turning of the valve stem effects a proportionate rotation of disk 14. In the specific form shown in Figs. I and II the pin 18 is shown to be adjustable, so that it may swing on an arc of larger or smaller radius. This manifestly is a provision affording possibility of very nice adjustment between valve opening and damper opening.

The valve stem, as should have been remarked above, whatever be the particular form of the valve, is provided with an operating handle 20.

The induction lead 11 at the end opposite that where the gas and air enter, is widened, and concentric circular openings of unequal diameter 21 and 22 are formed in opposite walls. These opposite walls extend in parallel planes and in normal assembly are horizontally disposed. In these concentric and opposite openings the burner is secured, as best appears in Fig. II. The burner structure itself, claimed in my application first alluded to above, Serial No. 575,103, forms no part of the invention of this divisional application; suffice it to say that the burner with which my improved valve is here shown to be associated, is so constructed as to cause the stream of gas to advance in sinuous course. At the crest of the successive sinuosities are delivery orifices for the mixture of gas and air. If the flow be small the combustible mixture will all escape through the orifices in the crest of the first sinuosity, and as the flow increases the excess of flow which does not find escape through the orifices in the first crest will flow on and escape through the orifices of a succeeding crest or crests. Thus when the flow is small, the flame is concentrated, and as the flow increases the flame is extended over wider space.

I claim as my invention:

1. A gas nozzle including a valve casing provided with a contracted delivery orifice of square cross section and with an internal

valve seat, and a valve body provided with a conical surface adapted to engage said internal seat and with a tongue-like extension of square cross-section, tapering to an edge, said tongue being pivoted to the valve body, and in the range of operation protruding to greater or less extent through said delivery orifice, and means for shifting said valve body longitudinally of its axis within said casing.

2. In a valve structure an orifice surrounded by a conical valve seat, a valve body provided with a conical surface adapted to engage said valve seat and provided further with a tongue-like extension pivoted to it, and in the range of operation protruding to a greater or less extent through said orifice, and means for shifting said valve body toward and from said valve seat.

In testimony whereof I have hereunto set my hand.

JAMES B. ANDERSON.

Witnesses:
FRIEDA E. WOLFF,
PERCY A. ENGLISH.