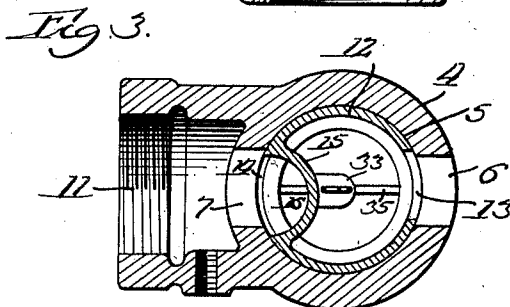
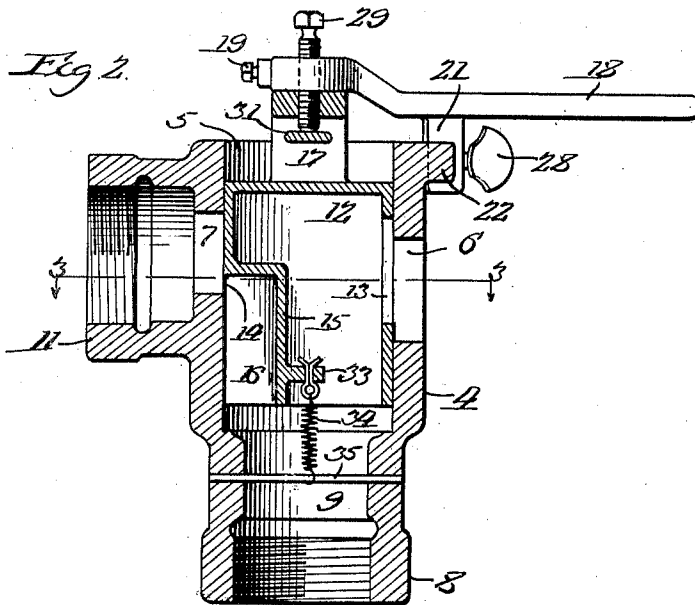
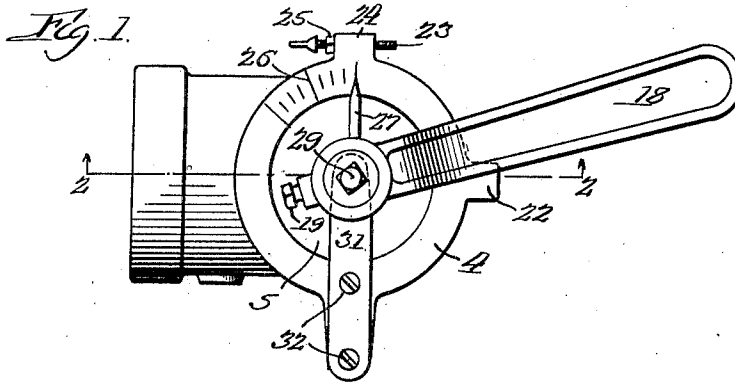


G. W. McKEE.
MIXING VALVE.

APPLICATION FILED NOV. 27, 1917.

1,357,294.

Patented Nov. 2, 1920.



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UNITED STATES PATENT OFFICE.

GARNET W. McKEE, OF ROCKFORD, ILLINOIS.

MIXING-VALVE.

1,357,294.

Specification of Letters Patent.

Patented Nov. 2, 1920.

Application filed November 27, 1917. Serial No. 204,164.

To all whom it may concern:

Be it known that I, GARNET W. McKEE, a subject of the King of Great Britain, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Mixing-Valves, of which the following is a specification.

This invention relates to mixing valves especially adapted for proportionally mixing gas and air prior to the delivery thereof to a mixer, which produces a combustible mixture of the desired character. One example of the utility of my improved mixing valve is illustrated in my copending application Serial No. 201,540 filed Nov. 12, 1917, showing apparatus for producing from illuminating gas and air a mixture of the proper proportions to give a maximum amount of heat when delivered under pressure to a burner for heating furnaces of various characters. It should be understood, however, that the example referred to is simply illustrative of one way in which my improved mixing valve may be employed.

The primary object of the present invention resides in the provision of an improved mixing valve, whereby the relative proportions of air and gas delivered to a mixer may be varied and regulated at will, and whereby the volumes of air and gas may be simultaneously diminished or increased as the case requires, without affecting their relative proportions. Another object is to provide a mixing valve of the character described, which may be produced at a comparatively low cost, which will effectually serve the purposes desired, and in which the several adjustments may be made quickly and easily.

These and other objects and attendant advantages will be more readily appreciated as the invention becomes better understood by reference to the following description when considered in connection with the accompanying drawings, in which—

Figure 1 is a plan view of a mixing valve embodying my improvements;

Fig. 2, a longitudinal sectional view through the valve taken substantially on the line 2—2 of Fig. 1; and

Fig. 3, a cross-sectional view through the valve taken substantially on the line 3—3 of Fig. 2.

As explained in my co-pending application mentioned above, the present mixing

valve serves to proportionally mix air and gas at substantially atmospheric pressure prior to the delivery of these two fluids to a mixer. Consequently, in considering the present improvement it may be assumed that the gas supply is taken into the mixing valve at substantially atmospheric pressure, although, if conditions require, such pressure might be varied, it being understood however, that the gas is supplied to the mixing valve at a constant uniform pressure. This insures, as will be readily appreciated, a combustible mixture of desired uniform proportions.

Referring to the drawing, it will be observed that my improved mixing valve is housed in a suitable casing designated generally by reference character 4 shaped to provide a cylindrical valve chamber 5 provided with an air inlet port 6 and a gas inlet port 7 arranged in this instance at diametrically opposite sides of the chamber. The mixing valve is adapted to be connected through means of the coupling stud 8 to a mixer so that by means of suction therefrom air and gas will be drawn through the ports 6 and 7 into the valve chamber and thence to the mixer through the passage 9. The gas supply pipe may be connected to the coupling stud 11 of the casing. The valve designated generally by reference character 12 fits within the cylindrical chamber 5 and is capable of being oscillated and moved longitudinally therein for purposes of adjustment. The valve consists of a hollow body provided at one side with a port 13 adapted to register with the port 6 and at its opposite side with a port 14 adapted to register with the port 7.

An arcuate wall 15 disposed around and extending downwardly from the port 14 deflects the inflowing gas and provides a passage 16 through which the gas is drawn into the passage 9, where it is mixed with the air drawn in through the ports 6 and 13. The top of the valve body 12 is provided with an upwardly projecting boss 17 to which an operating handle 18 is fixedly secured by a setscrew 19. By means of this handle the valve body may be oscillated between fully open position, in which a lug 21 projecting downwardly from the handle 18 engages a fixed stop 22 on the casing 8, and an adjustable abutment 23 consisting of a setscrew threaded through a boss 24 located 90° from the boss 22 and locked in adjusted

position by a lock nut 25. When the handle is turned to the position shown in Fig. 3 the ports 13 and 14 are nearly in full registration with their respective ports 6 and 7.

5 When the handle is swung until the boss 21 engages the adjustable stop 23 the ports 13 and 14 are both in only slight registration with their respective inlet ports, so that only a small quantity of air and gas will be admitted. This construction prohibits the entire closing off of the air and gas, thereby insuring a flow to the burners at a rate in excess of the rate of flame travel and consequently eliminating all danger of flare-back from the burners. The valve, of course, may be set at any point between the abutments 22 and 23, and in order that the operator may accurately gage the position of the valve at any time the top of the casing 4 is provided with a series of indications 26 over which a pointer 27, projecting laterally from the boss 17, travels. By glancing at the position of the pointer the extent to which the valve is open at any time may be readily observed. The valve may be locked in any adjusted position against accidental displacement, by means of a setscrew 28 threaded through the lug 21 and adapted to clamp against the wall of the casing 8.

30 Different grades of gas or different purposes for which the apparatus is to be employed may require a variation in the relative proportions of air and gas included in the mixture, and I have therefore made provision for regulating the relative proportions of air and gas delivered to the mixer, consisting of an adjustable setscrew 29 threaded downwardly through the horizontally projecting portion of the boss 17 into engagement with a supporting bar 31 which is fixed to the top of the casing 4 by screws 32 or otherwise and projects directly beneath the screw 29 by which the weight of the valve member 12 is supported. By adjusting this screw 29 the valve may be raised or lowered. Raising of the valve will increase the effective area of the port 14 and diminish the effective area of the port 13, and lowering of the valve will correspondingly diminish the effective area of port 14 and increase the effective area of the port 13. Thus by raising or lowering the valve the relative proportions of air and gas admitted may be regulated and controlled to a fine degree of nicety, and it should be noted that this regulation of the proportions affects in no way the opening or closing of the valve by means of the handle 18, as the opening and closing movements resulting from the manipulation of this handle takes place so as to open and close the ports 13 and 14 simultaneously and equal amounts irrespective of the vertical adjustment of the valve.

While I have shown the valve casing 4 in the present instance as located in a vertical

position it obviously might be used in an inclined or a horizontal position equally as well, and in order that no accidental withdrawal or partial withdrawal of the valve may occur I have provided the wall 15 with a lateral boss 33 to which the upper end of a contractile spring 34 is attached, the lower end being connected with a transverse pin or bar 35, with the result that this spring pulls longitudinally upon the valve to maintain the supporting screw 29 at all times in engagement with the supporting bar 31.

From the foregoing, it will be manifest that by the application of suction to the lower end of the valve casing, air and gas may be drawn into the casing through the ports 13 and 14 respectively in proportions determined by the position of the valve. The relative proportions of these two fluids may be changed at will by adjustment of the screw 29 and the volume of the fluid may be diminished or increased at will by adjustment of the handle 18 without interfering with the fixed relative proportions of the fluids.

I claim:

1. A mixing valve, comprising a casing having a cylindrical valve chamber open at both ends and having diametrically opposed air inlet and gas inlet ports, a valve fitting in said chamber so as to be rotatable and movable lengthwise therein, the valve being closed at one end and open at the other and having ports adapted to register with said air and gas inlet ports, the valve being divided interiorly to provide a conduit leading from the gas inlet lengthwise of the valve to the open end thereof, the closed end of the valve having an outstanding boss, a handle or adjusting arm secured to said boss and having a depending lug, a fixed and an adjustable stop on the casing for limiting oscillation of the handle by contact with its lug, an adjusting screw threadingly engaged in the valve boss and substantially co-axial therewith, and a part fixed with respect to the valve casing and with which said screw coöperates, the screw being adjustable to move the valve lengthwise in the casing to increase the registering area of one of said inlet ports and its corresponding valve port and diminish the registering area of the other inlet port and its corresponding valve port.

2. A mixing valve, comprising a casing having a lateral port in its wall for communicating with a source of fuel gas, and a lateral port through its wall for communicating with a source of air supply, a valve adapted to rotate and slide axially in said casing and having ports adapted to register with said air and gas ports and so arranged that upon rotary movement of the valve the effective areas of the several registering ports will be varied and upon axial move-

ment of the valve the effective area of one of the ports will be increased and the other diminished, an outstanding boss integral with the valve, a handle fixed to said boss and
5 operable for oscillating the valve, and an adjusting screw threadingly engaging said boss and cooperating with a part fixed with respect to the casing, said screw being detachable to adjust the valve axially, for the
10 purpose described.

3. A mixing valve, comprising a casing having a lateral port in its wall for communicating with a source of fuel gas, and a lateral port through its wall for communicating with a source of air supply, a valve adapted to rotate and slide axially in said casing and having ports adapted to register with said air and gas ports and so arranged that upon rotary movement of the valve the
15 effective areas of the several registering ports will be varied and upon axial movement of the valve the effective area of one of the ports will be increased and the other diminished, an outstanding boss fixed to the
20 valve having a laterally turned outer end, a handle fixed to said boss for oscillating the

valve, an adjusting screw through said laterally turned end of the boss, and a part fixed to the casing and extending beneath said laterally turned end of the boss, providing
30 an abutment with which said screw is cooperating for adjusting the valve axially.

4. A mixing valve, comprising a casing having a cylindrical valve chamber provided with an air intake port, a gas intake
35 port and an outlet, a cylindrical valve adapted to be oscillated and adjusted longitudinally in said chamber, the valve being closed at one end and open at the other, the valve having a port adapted to register with
40 the air intake port and a second port adapted to register with the gas intake port, an arcuate wall within the valve reaching from side to side of the gas-registering port therein and lengthwise of the valve to the open end
45 thereof, forming a closed gas conduit at the periphery of the valve reaching from the gas intake port to the open end of the valve, and means for oscillating the valve and moving it axially.

GARNET W. McKEE.