Aug. 17, 1926.

1,596,043

J. T. HUME

GAS BURNER VALVE

Filed June 5, 1922

Fig. 1.

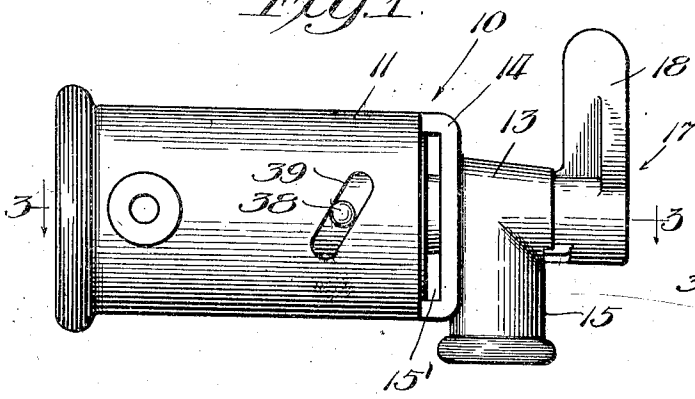


Fig. 2.

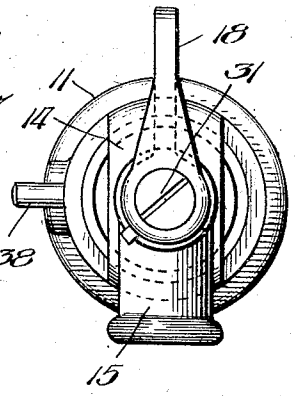


Fig. 3.

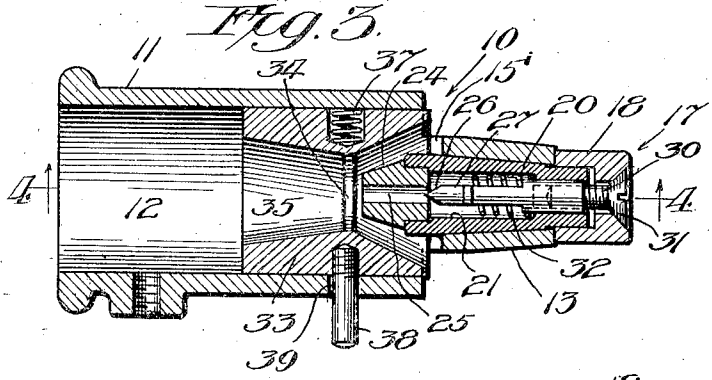


Fig. 4.

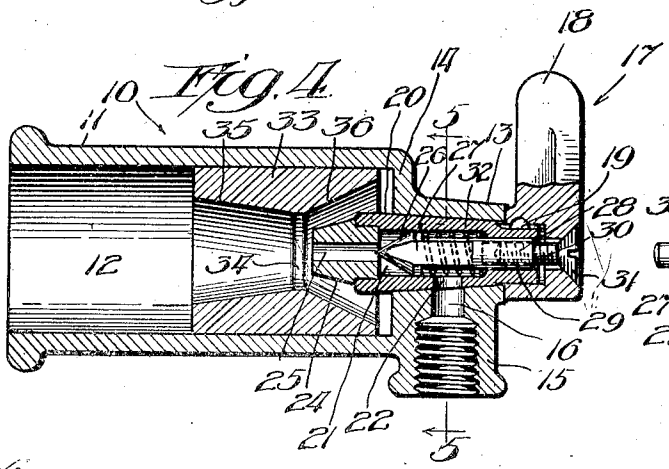
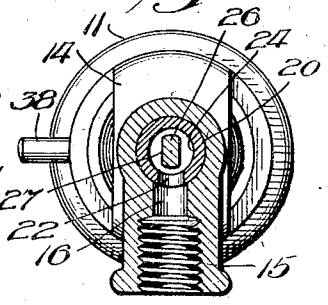


Fig. 5.



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Patented Aug. 17, 1926. 1,596,043

UNITED STATES PATENT OFFICE.

JOHN T. HUME, OF CHICAGO, ILLINOIS, ASSIGNOR TO HURLEY MACHINE COMPANY, A CORPORATION OF ILLINOIS.

GAS-BURNER VALVE.

Application filed June 5, 1922. Serial No. 565,935.

My invention has for its general object to provide an improved valve structure and mixing unit for supplying gas and air to burners for gas-heated ironing machine rolls and the like. More particularly its objects are to provide a simple, efficient and easily adjustable construction by which proper mixture and regulation may be had for most effective fuel combustion. To these ends my invention consists in the features of construction and combinations of parts hereinafter claimed, reference being had to the accompanying description and drawing setting forth one specific embodiment of my invention in a preferred form of construction, although it will be understood that many changes in details may be made without departure from the spirit of my invention within the scope of said claims.

In the drawing Fig. 1 is a side elevation of the mixing valve structure; Fig. 2 is an end elevation thereof; Fig. 3 is a section on line 3—3 of Fig. 1; Fig. 4 is a section on line 4—4 of Fig. 3, and Fig. 5 is a section on line 5—5 of Fig. 4.

Shell 10 provides a body 11 in which is formed the cylindrical mixing chamber 12, and also provides a head 13, carried by but spaced from the body as by legs 14, so as to leave the air-ingress openings 15′ through the body, this head having a laterally extending gas-pipe receptive boss 15 through which opening 16 is made for inflow of gas under pressure, and said head being equipped with a rotatable valve structure 17 preferably having its axis of rotation coincident with the axis of the mixing chamber 12.

In the valve structure shown, 18 is the handle, keyed at 19 to valve-barrel 20, preferably of tapered exterior form and having a cylindrical bore 21 into which there opens the side port 22 for opening or closing communication between the valve-bore and the gas supply port 16. This structure I will call the main valve or cut-off valve.

Supplementally to the cut-off valve I provide a regulated flow orifice, between the main flow port 22 and the mixing chamber, and this orifice may be provided appurtenantly to the main valve and adjustably regulated by an exteriorly controlled needle valve head. 24 indicates a nozzle-plug fixed in the inner end of the valve barrel 20 and having a duct 25 to afford the flow orifice regulated in capacity by an adjustable valve head 26 preferably conically or needle-tapered so that its base may be guided in the cylindrical bore of the main valve, but with its sides flattened as at 27 to give obstructed gas passage to the needle point. The stem 28 of this needle valve is guided for axial movement in a counter-bore 29 of the main valve, of smaller diameter than the cylinder 21 thereof, and said stem is interiorly threaded to engage an adjusting screw 30 extending loosely through the handle 18 so that the screw head 31 is readily accessible in the countersink provided therefor in the handle. A spring 32 interposed between the bottom shoulder of the valve-cylinder 21 and the valve-head 26 holds the valve-head always as close to the orifice 25 as the adjustment of screw 30 in the stem of the valve will permit. Manifestly this regulating valve gives very accurate control of the maximum capacity of the gas flow orifice, subject to the gas pressure being turned on full or lowered by the rotation of the main valve to govern the port-openings 16—22.

Within the body 11 of the valve I provide a longitudinally-adjustable air-flow regulator, having its adjusting means readily accessible from the outside of the structure, this adjustable element coacting with the delivery end or nozzle 24 of the main valve regulator so that the gas flow to the mixing chamber may induce air flow accordantly with the varying conditions adapted by axial adjustment of the air flow regulator. In the specific construction shown 33 is the air regulating element slidable and rotatable in the body 11 and presenting a restriction 34 near the middle of its length from which its interior walls flare both forwardly and rearwardly as at 35 and 36, as one desirable form of Venturi-tube construction. The forwardly tapering tube-zone 36 surrounds the tapering nozzle 24 in spaced relation so that gas may flow from the supply opening 25 through said tube, and the forward flare of the tube opens to, and forms a substantial continuation of, the mixing chamber 12. A friction spring 37 normally holds the air regulator in any position to which it may be adjusted, and its adjustment may simply and effectively be made by means of adjusting pin or handle 38 extending through a slot 39 in the shell. Such a slot might extend longitudinally only, but for ease of manipulation of pin 38 it is preferably made

diagonally or spirally as shown, thereby aiding the spring 37 in holding the regulator block against accidental displacement and enabling finer regulating movement to be effected than could readily be accomplished with a straight longitudinal slot; the symmetrical arrangement of the regulating block 33 about the axis of the shell making rotary movement of the block merely a negligible incident, as far as coaction of the air regulator and gas supply structure is concerned. By varying the adjustment of the Venturi-tube structure longitudinally, the quantity of air entrained by the gas, and consequently the richness of the mixture, may be varied as desired.

It will thus be seen that my invention provides a particularly compact, rugged, efficient and inexpensive construction, by which effective mixture for the desired character of combustion may be attained under very wide changes in the character and pressure of the gas initially supplied at the intake passage 16, and that all of the co-related and coacting provisions for adjustment may be operated easily while the gas burner is in operation. The initial gas supply may be throttled by the cut-off valve anywhere between fully closed and fully opened condition, and, with any given initial pressure and extent of opening of the throttle or cut-off valve, pressure and velocity of gas flow through the elongated nozzle-bore may be varied by adjusting the effective side of the opening, by means of the needle valve 26, and accordantly with the amount of and velocity of the gas delivered by the nozzle under the joint influence of these two valve adjustments, the Venturi tube structure may be and should be adjusted, for the resultant unitary result of closely maintaining the desired character of mixture most effectively to burn the gas notwithstanding the wide variations that are encountered in practice as to quality of pressure of the gases delivered from the source of supply to the intake 16.

I claim:

In a device of the character described, the combination of a chambered body having a longitudinal smooth bore and provided with a side slot, a head carried by one end of said body leaving end portions open, said head having a longitudinal valve-receptive bore and a transverse gas-supply opening, a Venturi-tube structure longitudinally slidable in said first-mentioned bore and having a pin projecting through said slot for tube-adjustment, a hollow rotary valve mounted in said head-bore and having a port for coaction with said supply opening of the head, a nozzle structure carried by the inner end of said rotary valve structure and having a delivery duct, a handle carried by said valve beyond the outer end of said head, a needle valve within the hollow of the rotary valve for varying the effective opening of the nozzle duct, a spring within said hollow valve pressing said needle valve toward said nozzle, and adjustable means for limiting the spring-displacement of said needle valve extending through the outer end of said rotatable valve.

JOHN T. HUME.