C. STICHLER.

FUEL REGULATOR FOR GAS BURNERS.

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1,407,098. Patented Feb. 21, 1922.

Fig. 1.

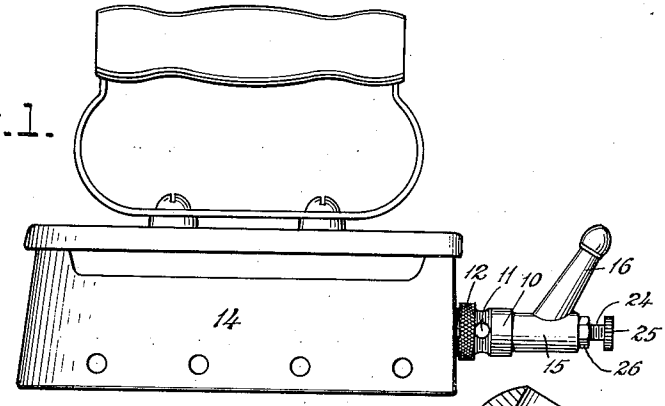


Fig. 2.

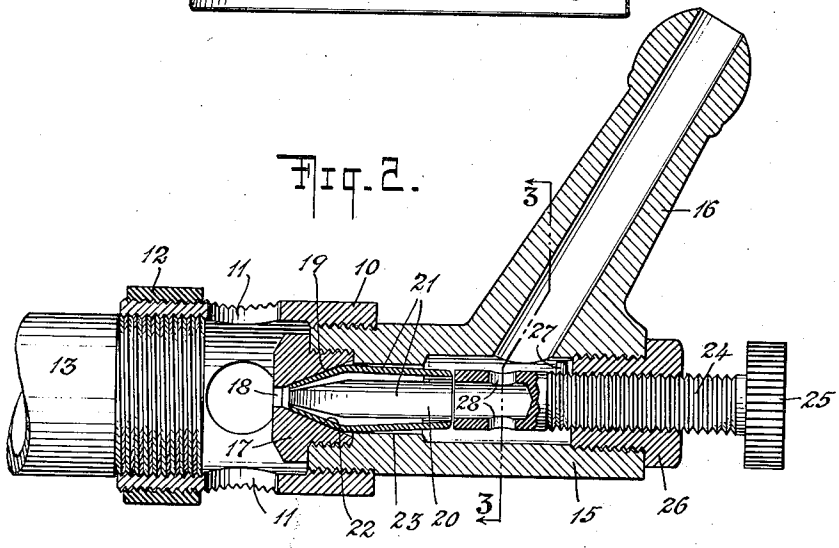


Fig. 3.

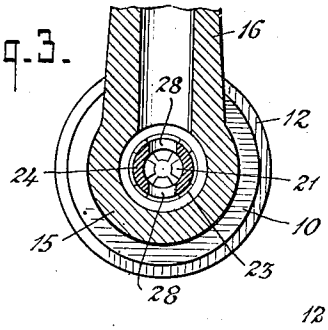


Fig. 4.

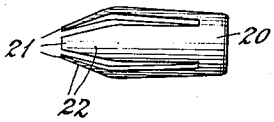
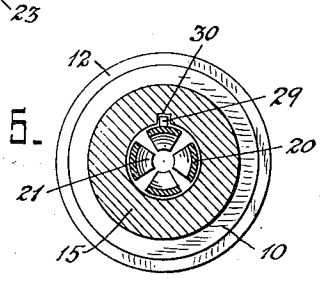


Fig. 5.



WITNESSES

G. V. Rasmussen

INVENTOR

CHARLES STICHLER

BY

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES STICHLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO STRAUSE GAS IRON CO., OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

FUEL REGULATOR FOR GAS BURNERS.

1,407,098. Specification of Letters Patent. Patented Feb. 21, 1922.

Application filed February 14, 1920. Serial No. 358,680.

To all whom it may concern:

Be it known that I, CHARLES STICHLER, a citizen of the United States, and resident of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Fuel Regulators for Gas Burners, of which the following is a specification.

My invention relates to fuel regulators for gas burners and has for its object to provide a regulator of novel construction which is specially adapted for increasing the efficiency of gas irons and which is readily accessible for purposes of adjustment. Other more specific objects will appear from the description hereinafter and the features of novelty will be pointed out in the appended claims.

In the accompanying drawings, which illustrate a specific embodiment of the invention without defining its limits, Fig. 1 is a side elevation showing the regulator combined with a gas iron; Fig. 2 is a sectional elevation of the regulator itself on an enlarged scale; Fig. 3 is a cross-section on the line 3—3 of Fig. 2; Fig. 4 is a detail view of an element of the regulator and Fig. 5 is a detail section illustrating a variation of the regulator.

In the illustrated example 10 represents the air-mixer which may be of any suitable construction and as shown comprises a tubular, internally screw-threaded member provided with air-inlets 11 which are controlled by means of an air shutter 12 adjustably mounted upon said air-mixer. In the form chosen for illustrative and descriptive purposes the latter is connected with the burner 13 of a gas-iron 14 of any well known construction and with the hollow casing 15 of the regulator; the air-mixer 10 in addition to its other functions thus serves as a coupling whereby the regulator is operatively connected with the burner. A nipple 16 extends upwardly from the casing 15 preferably as an integral part thereof and at an inclination thereto for the reception of one end of the customary fuel hose whereby connection with a source of fuel supply is made. That end of the casing 15 which is located within the air-mixer 10 is internally screw-threaded for the accommodation of the nozzle 17 which is provided with a nozzle opening 18 and with an interior surface 19 diverging inwardly from said nozzle opening 18 as shown in Fig. 2. The regulator comprises further a tubular controlling member 20 located within the casing 15 and provided with a plurality of resilient fingers 21 which extend into the nozzle 17 and are formed with exterior surfaces 22 conforming to and arranged to co-operate with the surface 19 to actuate the controlling member 20 and control the flow of fuel as will be more fully pointed out hereinafter. For the purpose of guiding the member 20 in the axial directions in which it moves in the operation of the regulator, the casing 16 is constructed with an internal, inwardly projecting flange 23 of considerable axial width as shown in Fig. 2. The controlling member 20 is positioned in axial registry with an adjusting screw 24 having an operating head 25, the opposed ends of said member 20 and screw 24 being arranged to contact with each other. In the preferred construction the adjusting screw 24 is mounted in a screw-threaded bushing 26 which is screwed into the outer end of said casing 15 as illustrated in Fig. 2. For the purpose of preventing the screw 24 from being removed from the bushing 26 said screw 24 is provided with one or more projections 27 extending radially outward therefrom and whereby the outward movement of said screw relatively to said bushing is arrested. In order to provide a ready flow of fuel the screw 24 is preferably made hollow at least for a distance inwardly from its inner end and is provided with a plurality of openings 28 through which the fuel passes to the interior of the screw and thence to the interior of the controlling member 20. In some instances the hollow interior of the screw 24 and the communicating openings 28 may be omitted in which cases leakage between the elements may be relied upon to provide the required flow of fuel within the regulator. Similarly if desired the controlling member 20 may constitute an integral continuation of the screw 24 or be secured thereto instead of comprising an element separate therefrom as shown.

In setting forth the utility of the invention the operation thereof will be described in connection with a gas-iron of usual construc-

tion, it being understood that this is only an example and that, while the regulator is specially adapted for increasing the efficiency of such gas-irons, it may be used with equally good results in connection with gas-burners of other types. In order to secure maximum efficiency in gas-irons with an economical use of fuel, it is necessary to adjust the flow of the latter to the burner in accordance with the quality of fuel and the pressure at which it is delivered in the locality where the iron is being used, it being understood that the quality and pressure or both vary materially in different sections of the country. Attempts to satisfactorily accomplish this adjustment have heretofore been made by increasing or diminishing the size of the nozzle opening, a proceeding which obviously has many objections and disadvantages. The most common method in existence for producing the desired results involves the use of the so-called needle valve whereby the nozzle opening is obstructed to a greater or less extent. This method is inefficient for the reason that as the tapering end of the needle valve is gradually moved into the nozzle opening the fuel which flows around said needle valve will be deflected more and more from a straight line by said tapering end and by contacting with the inner surface of the fixture at an angle increases the friction whereby the flow of the fuel is retarded. Accurate adjustment, if not entirely impossible, is therefore very difficult of attainment. In addition, with the needle valve, unless considerable care is exercised to avoid the same, the adjustment may be such as to supply such a scant amount of fuel to the burner that the flames thereat will be extinguished or blown out the moment the iron is used. With the present invention all of these objections and disadvantages are overcome as will be clear from the description which follows:

In adjusting the regulator the screw 24 is manipulated, for instance, in a direction to press against the controlling member 20 toward the nozzle opening 18; as manipulation of said screw 24 in this direction continues the fingers 21 through the co-operative camming action of the surfaces 19 and 22 will be forced inwardly toward each other and will thus reduce the size of the exit end of said controlling member 20. The volume of fuel which passes through the opening 18 is thus reduced in accordance with the adjustment, it being understood that in the illustrated form the fuel passes from the nipple 16 to the casing 15 and from there through the openings 28 into the interiors of the screw 24 and controlling member 20. As the screw 24 is actuated in the reverse direction the fingers 21 being under a spreading tension, because of their resiliency, cause the surfaces 22 to exert a camming force against the surface 19 whereby the controlling member is forced in a direction away from the opening 18 and thus follows the screw 24. As this takes place the size of the exit end of the member 20 is increased because the fingers 21 spread apart so that the volume of fuel which reaches the opening 18 is increased. In this outer position of the parts, which is indicated in Fig. 2, the fuel may pass also around said controlling member 20 and through the spaces between the fingers 21.

It is thus possible to secure an accurate regulation of the fuel without at any time obstructing the nozzle opening 18 so that the flow of fuel is always maintained in a direct, straight line with the result that friction, whereby said flow may be retarded, is reduced to and maintained at a minimum. With the present arrangement the nozzle opening 18 may be made of size to supply the maximum amount of fuel to the burner which the latter is capable of efficiently utilizing and the volume which passes therethrough may be accurately regulated in a simple manner requiring no special training. At the same time by constructing the controlling member 20 in such a manner that it will close only to a predetermined extent, a minimum supply of fuel to the burner great enough to create a flame which will not be extinguished or blown out when the iron is manipulated is always assured. The arrangement is very simple to operate and economical to produce and provides a regulator whereby the fuel supply to the burner may be easily and efficiently regulated by any one in accordance with whatever conditions exist at the place of use. The regulator is always in a position of ready accessibility and does not require the use of tools or implements of any description.

Under some conditions the controlling member 20 when constructed as an individual element, may rotate about its axis under the influence of the screw 24 during adjustment. If this is objected to the same may be prevented in any suitable manner, for instance, as shown in Fig. 5, by means of a pin 29 carried by the member 20 and projecting into a groove 30 extending lengthwise of the flange 23.

By providing the projection 27 or its equivalent it is impossible to completely remove the adjusting screw 24 entirely from the bushing 26 thus making it difficult to tamper with the device; when it is desired to legitimately disassemble the parts the screw 24 may be removed from the casing by unscrewing the bushing 26 therefrom. As this operation is accomplished only with the aid of a suitable tool, it will be apparent that ordinary tampering with the regulator is guarded against.

Various changes in the specific form

shown and described may be made within the scope of the claims without departing from the spirit of my invention.

I claim:

1. In a fuel regulator for gas burners, the combination of a casing, a stationary nozzle thereon having a nozzle opening, an expansible and contractable controlling member whereby the flow of fuel to said nozzle opening is controlled, means separate from and abutting against said controlling member and extending in axial alignment therewith, said means being rotatable about its axis for shifting said controlling member relatively to said nozzle, co-operating surfaces on said nozzle and member whereby the contraction or expansion of the latter is effected to regulate said flow and a device whereby the movement of said means in a direction to shift said member to an open position is arrested.

2. In a fuel regulator for gas burners, the combination of a casing, a stationary nozzle detachably connected therewith and having a nozzle opening, the inner surface of said nozzle diverging from said opening, a controlling member within said casing and having a plurality of resilient fingers extending into said nozzle, and means separate from said member for moving the latter relatively to said nozzle whereby the inner diverging surface of the latter will adjust said fingers to regulate the flow of fuel to said nozzle opening.

3. The combination of a sad iron, a gas burner thereon for heating said iron, an air mixer connected with said burner, a casing connected with said air mixer, a nipple on said casing whereby the latter is connected with a source of fuel supply, a nozzle on said casing having a nozzle opening and provided with an inner surface diverging from said opening, a tubular controlling member terminating at one end in resilient fingers having outer surfaces conforming to the inner surface of said nozzle, an adjusting screw having a recessed, apertured end whereby the interior of said controlling member is connected with said source of fuel supply, said screw being separate from and arranged to shift said controlling member in an axial direction relatively to said nozzle whereby the surfaces of said nozzle and fingers adjust the latter to regulate the flow of fuel to said nozzle opening, an actuating head whereby said screw is manipulated, said head being located exteriorly of said casing in a position of ready accessibility, and means whereby the outward movement of said screw relatively to said casing is arrested.

4. In a fuel regulator for gas burners, the combination of a stationary nozzle having a nozzle opening, means for conducting fuel to said nozzle opening, an expansible and contractible controlling member slidably adjustable for alone controlling the flow of fuel through the nozzle opening, an adjusting screw separate from and abutting against said controlling member and arranged to shift the same in an axial direction relatively to said nozzle, and means whereby rotation of said controlling member, by the action of said adjusting screw, is prevented.

In testimony whereof I have hereunto set my hand.

CHARLES STICHLER.