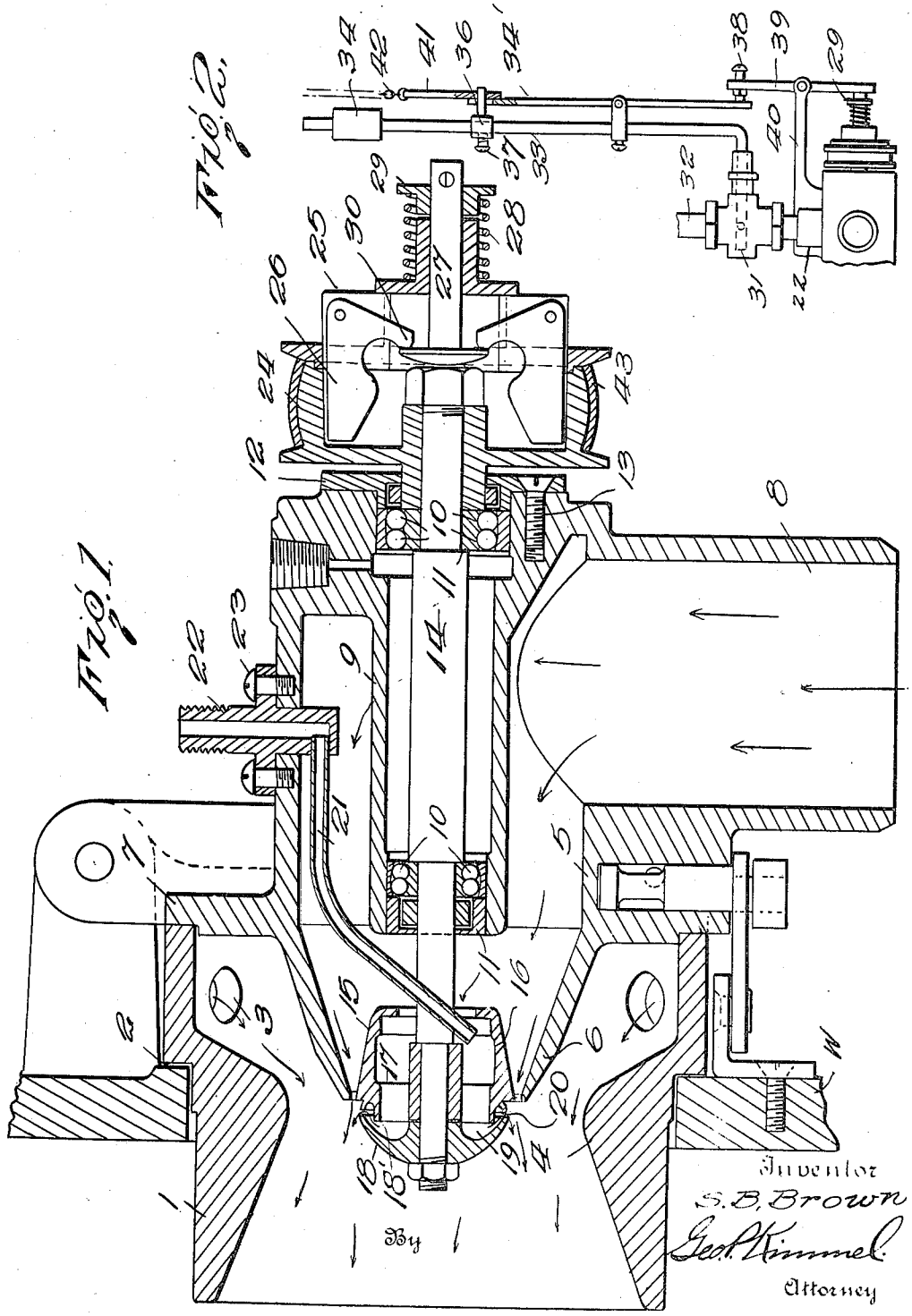
S. B. BROWN.

LIQUID FUEL BURNER.

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1,320,374.

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SAMUEL BARTON BROWN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO LAURENCE E. FRENCH, OF SEBASTOPOL, CALIFORNIA.

LIQUID-FUEL BURNER.

1,320,374. Specification of Letters Patent. Patented Nov. 4, 1919.

Application filed December 27, 1917. Serial No. 209,103.

To all whom it may concern:

Be it known that I, SAMUEL BARTON BROWN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Liquid-Fuel Burners, of which the following is a specification.

This invention relates to liquid fuel burners and it is the dominant object of the invention to provide a burner so constructed as to cause the fuel to be thoroughly atomized and mixed with the proper portions of air and discharged from the same in form of a spray for burning.

It is also an object of the invention to provide a burner having a rotatable head through which the fuel passes and is atomized; the head being adjustable in order that the passage of the air therethrough may be regulated to change the shape and size of flame produced to that desired.

Another and equally important object of the invention is to provide the burner with a novel form of fuel control means, the same operating in a manner to permit the flow of fuel to the burner head upon rotation and to automatically discontinue the flow thereto upon the stopping or improper operation of the head.

Other independent objects are to provide features of construction of portions of the burner which tend toward the attainment of the above aims irrespective of the relation in which they are used.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is shown one of various possible embodiments of my invention:—

Figure 1 is a vertical longitudinal section through the improved burner; and

Fig. 2 is a fragmentary detail in elevation of the automatic fuel control means whereby the passage of fuel through the burner will be automatically regulated.

Similar characters of reference refer to similar parts throughout the several views of the drawings.

Having more particular reference to the drawings, W represents the wall of a furnace or other suitable support having an annular opening formed therein through which the circular burner guard 1 is passed, it being noted, that the said guard is provided with an annular shoulder 2 adapted to abut the inner surface of the wall W, whereby to prevent undue movement of the guard with relation to the said wall. A series of circularly disposed openings 3 are formed in the rear portion of the burner guard 1 and, obviously, serve as air inlet passages; the course of the air through the guard being deflected by means of the restricted throat in the shape of a "Venturi tube" element 4 formed integral with the inner surface of the forward portion thereof.

A combined casing and bearing element indicated in its entirety by the numeral 5 is provided and has the forward extremity thereof constricted as at 6 and provided with an annular flange 7 adapted to engage the rear end of the circular burner guard 1 as clearly shown in the Fig. 1. The casing is provided with a branch 8, which, as will be readily understood, serves as an air inlet port, which in operation of burner is served with air under pressure from a blower or air pump, permitting the passage of air through the same and through the constricted portion 6 of the said casing. Formed integral with the rear wall of the casing 5 is a bearing sleeve 9 having anti-frictional bearings 10 arranged in suitable ways at points in proximity of the opposite ends thereof; undue lateral movement of the said bearings being prevented by means of collars 11 and 12, the latter being secured to the rear end of the casing 5 by set screws 13 or similar fastening devices. Resting upon the bearings 10 is a longitudinally disposed shaft 14, which shaft as will be noted, is provided with reduced ends, thereby forming shoulders

which abut the anti-frictional bearings 10 and serve as means for preventing inward movement of the same in the sleeve 9.

Rotatably mounted upon the forward extremity of the shaft 14 is an oil discharging head 15, the said head including an oil receiving element 16 having a concentrically disposed bearing collar supported therein upon radially disposed arms or spiders 17. A cap 18 is also arranged upon the shaft 14 adjacent the element 16 and is channeled as at 19, while the outer surface of the same is curved, for a purpose which will be subsequently described. In this connection, it is to be noted that that marginal edge of the element 16 as adjacent the cap 18 is provided with an oil receiving and discharging channel 20 and further, that the adjacent marginal edge of the said cap 18 is overlapped by a distended flange 18′, formed on the adjacent marginal edge of the element 16 and is arranged in spaced relation from said element and the channel 20, thereby providing an opening or way through which the fuel in its atomized form is discharged. Obviously, by providing the element 16 with the overlapping distended flange, the oil will be caused to pass along the inner surface of the element and will not directly pass through the gap between the said element and the cap 18 because of the said lip, but will pass by centrifugal force to the cap 18 and then will pass through the said gap whereupon it encounters an air stream which materially assists in breaking up the oil into fine particles. It will be appreciated that this is of vital importance to the effectiveness of the burner when using crude oil therein, which as will be understood, has a high viscosity and is very difficult to properly atomize. The rear end of the element 16 is partially opened and receives the discharge end of a conduit 21 therein, the said conduit having connection with a fitting 22 secured to the casing 5 by set screws 23 and passing through a suitable opening formed therein. It is of course to be understood, that the fitting 22 is adapted for connection with a supply conduit leading from a suitable fuel reservoir or the like. When a governor is used fitting 22 screws into the casing of valve 31 as shown in the Fig. 2.

Fixedly mounted upon the inner end of the shaft 14 is a hollow pulley 24, the said pulley having arranged adjacent the same a centrifugal governor element indicated in its entirety by the numeral 25 and including pivotal arms 26, the lateral extremities of which are adapted to engage with the inner surface of the said pulley 24 at times. A headed pin 27 is slidably mounted in a collar secured to the governor element 25 and is normally maintained under tension by means of a coil spring 28 arranged about the said collar and engaged with a bearing 29 secured to the outer end of the headed pin 27. The pivotal arms 26 are provided with fingers 30 engageable under the head of the slidable pin 27. Thus, when the pulley 24 is rotated the pivotal arms of the centrifugal governor member 25 will be thrown outwardly, thereby causing the fingers 30 to move the slidable pin 27 forwardly against the tension of the spring 28. However, when the pulley 24 is stopped or is not properly rotating the pivotal arms 26 will be permitted to swing downwardly, thereby disengaging the fingers 30 from the head of the pin 27 and allowing the same to return to its inactive position by means of the spring 28.

As means for automatically discontinuing the supply of oil to the burner upon the stopping of the same, a rotary plug valve 31 is interposed in the oil supply pipe 32 which as hereinbefore stated, is connected to the fitting 22. The valve 31 is provided with a handle member having an elongated portion 33 bent at substantially right angles thereto and carrying a weighted element 34 upon its outer end. Pivotally mounted upon the intermediate portion of the handle is a lever 34′ having a forked upper end 35 which is adapted to be engaged over a pin 36 slidably mounted on the handle portion 33 and secured thereto in its adjusted position by means of a set screw 37. As will be noted, the lower end of the lever 34 is arranged in proximity to an adjusting screw 38 carried upon the upper end of a lever 39 mounted on a suitable bracket arm 40, which arm in turn, is secured to the casing 5 at a point in proximity to the fitting 22. The lower end of the lever 39 is arranged in the path of movement of the slidable pin 27 and is adapted to be engaged by the same at times. The weighted end of the handle portion 33 is normally maintained in upright position by means of a hook element 41 engaged with one end of a chain 42, the remaining end of which is secured to a steam diaphragm regulator, not shown.

To rotate the burner 15, a belt 43 has one end of the same engaged over the pulley 24 while the remaining end thereof is passed about a pulley arranged on the armature shaft of a motor or other suitable power device, not shown.

In operation, the rotating burner 15 upon receiving oil or other suitable fluid from the conduit 21 thoroughly atomizes the same due to the high velocity at which it is rotating and then discharges the fuel in its atomized state by way of the opening between the element 16 and the cap 18 from the guard 1 in form of a mist. Simultaneously with the discharge of the atomized fuel from the rotating burner 15, a forced draft is pro-

duced through the casing 5 by connecting a blower or other suitable device to the branch 8. Attention is directed to the fact that the gap occurring between the element 16 and the cap 18 adjacent the channel 20 discharges a large column of air, due to the pressure from the blower entering through the branch 8 and through the back of the head 15, which column of air, when discharging from the gap strikes a second column of air passing from the annular opening formed by the constricted portion 6 of the casing; the two air columns impinging at substantially right angles and the single resultant air stream being discharged rearwardly toward the other current due to the curvature at 19 and dependent upon the size of the channel 20. The atomized fuel when engaged by the forced air supply will be carried forwardly from the burner guard 1 in a highly combustible state and may be ignited. Due to the mode of discharge of the atomized fuel spray from the burner guard 1 it will be understood that additional air supply will be drawn through the ports 3, thus allowing the fuel to be properly proportioned with air in order that combustion of the same will be insured. The guard 1 due to its restricted portion 4 will serve as an injector to help draw air through the openings 3 in an even manner thereby preventing noise caused by shock or eddy currents.

Should the shaft carrying the burner 15 be stopped or improperly rotated for any reason whatsoever, the pivotal clutch arms 26 will be permitted to move downwardly, thereby disengaging the fingers 30 of the same from the headed pin 27, which action obviously, will permit the return of the pin, by means of the spring engaged therewith to its normal position. Thus, the adjacent end of the lever 39 will be moved outwardly, while the upper end of the same will be moved inwardly and engaged with the adjacent end of the lever 34', thereby disengaging the forked head 35 of the same with the pin 36 and removing the hook 41 in order that the weighted handle portion 33 of the valve may immediately drop to closed position, whereupon the supply of fuel to the burner will be discontinued. Further, since the chain 42 secured to the hook 41 is engaged with the steam diaphragm regulator, as steam pressure in the boiler communicating therewith lowers, the weighted handle portion 33 will be moved upwardly to admit a greater flow of fuel to the burner. However, when the steam pressure rises, the weighted handle portion 33 will be permitted to lower, thereby decreasing the supply of fuel to the burner and as a consequence, regulating the steam pressure. Hence, the valve 31 performs a two fold function, one being to automatically control the steam and the other being to automatically and completely shut off the supply of oil to the burner in the event that the same should stop or some form of trouble arise in the motor or other operating device, not shown.

By placing a plurality of washers or shims upon the outer reduced end of the shaft 14, the cap 18 may be spaced accordingly from the oil receiving element 16, thereby increasing the width of gap between the element 16 and the cap 18 to permit the increase of the air discharged in proportion to the air passing from the constricted portion 6, thus changing the angle of the resultant air stream and making it possible to adjust the shape of the stream by merely changing the number of shims. This feature is of especial note on account of the varying viscosity of different grades of fuel.

Manifestly, the construction shown is capable of considerable modification and such modification as is within the scope of my claims, I consider within the spirit of my invention.

I claim:—

1. In a liquid fuel burner, a casing having an air inlet and also provided with an air discharge opening, a longitudinally disposed shaft journaled in the casing, a fuel receiving element mounted on one end of the shaft in proximity to the air discharge opening in the casing, and a burner cap mounted on the shaft and having its marginal edges arranged in spaced relation to the marginal edges of the fuel receiving element to in consequence provide a fuel discharge opening.

2. In a liquid fuel burner, a casing having an air inlet opening also constricted toward one end and provided at the constricted end with an air discharge opening, a longitudinally disposed shaft journaled in the casing, a fuel receiving element mounted on one end of the shaft and having its outer edges arranged in spaced relation to the edges of the air discharge opening, a cap also mounted on the shaft and adjustable with relation to said fuel receiving element for providing a variable fuel discharge opening, and a fuel supplying conduit passing through the casing and loosely received by the fuel receiving element.

3. In a liquid fuel burner, a casing having an air inlet opening and also provided with an air discharge opening, a longitudinally disposed shaft journaled in the casing having one end projecting through the air discharge opening, a fuel receiving element mounted on the shaft and arranged in the air discharge opening with its outer edges spaced from the edges of the air discharge opening, the outer edge of the fuel receiving

element being channeled, a burner cap mounted on the projecting end of the shaft exteriorly of the casing and adjustable with relation to the channeled marginal edge of the fuel receiving element, means for supplying fuel to said receiving element, and an annular guard arranged about the discharge opening in the casing and having its walls spaced from the casing.

In testimony whereof, I affix my signature hereto.

SAMUEL BARTON BROWN.