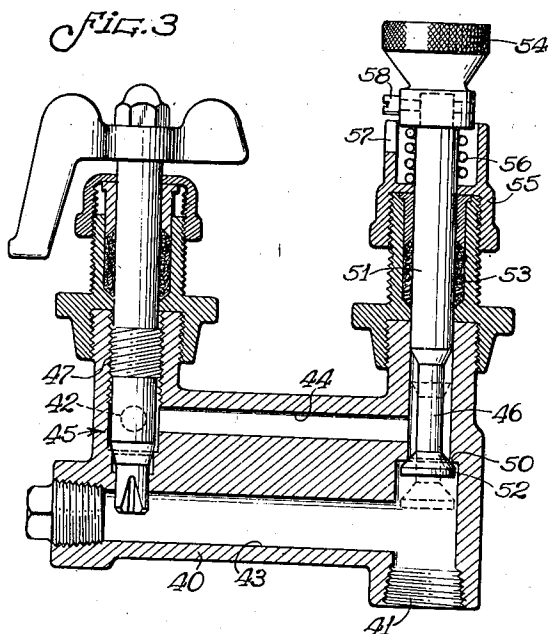
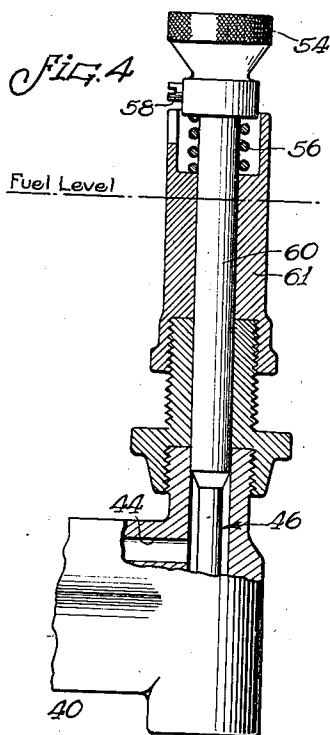
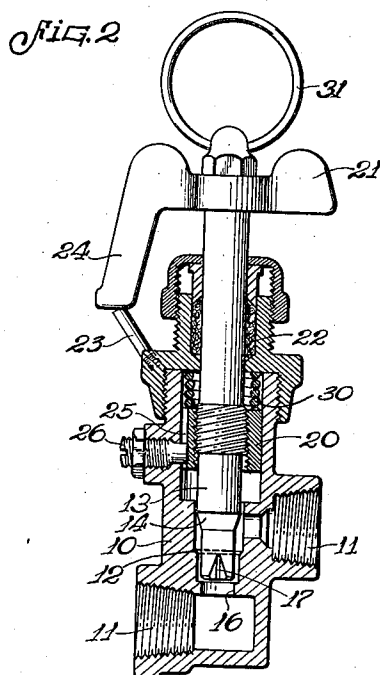
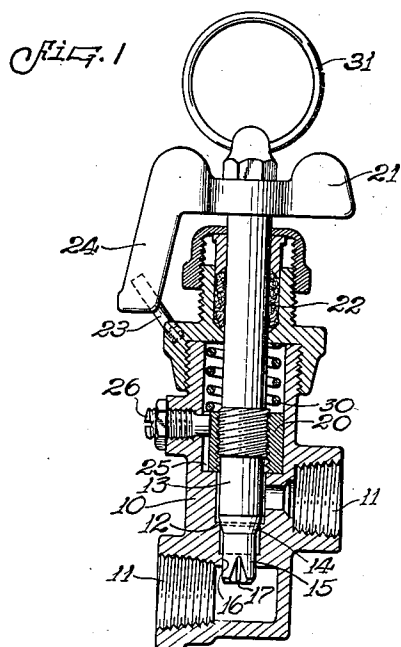


Sept. 10, 1935.

W. T. BRADBURY
BURNER CONTROL DEVICE

2,013,822

Filed May 5, 1933



Inventor
William T. Bradbury
By *Clint H. Parker & E. C. Eason*
Attorneys

UNITED STATES PATENT OFFICE

2,013,822

BURNER CONTROL DEVICE

William T. Bradbury, Kankakee, Ill., assignor to
Florence Stove Company, Boston, Mass., a cor-
poration of Massachusetts

Application May 5, 1933, Serial No. 669,543

3 Claims. (Cl. 251—1)

The invention relates generally to control devices and more particularly to a device for controlling the flow of fuel to a vapor-type of burner employing a liquid fuel.

5 In starting a burner using a liquid fuel, such as oil, the burner is first flooded with fuel which is ignited and serves to heat the burner to the point where the incoming fuel is completely vaporized. It is desirable, from the standpoint
10 of convenience to be able to flood the burner quickly, and the flow of fuel for the maximum rate of burning after the fuel is being vaporized is insufficient for such quick flooding. The flow
15 for flooding the burner quickly is, however, too great to permit its continuance after the burner is heated. The flow must therefore be reduced when the burner is heated sufficiently to vaporize the fuel.

The general object of the invention is to provide a control device for a burner of this type,
20 which may be adjusted to permit a rate of flow of fuel lying anywhere within the range required for normal operation of the burner, which may be manipulated to permit a flow sufficient to flood the burner quickly, and which will automatically
25 reduce the flow from the flooding rate to any rate of normal operation to which it has previously been adjusted.

Another object is to provide a control device
30 for a burner of this type, which may be set to prevent accidental operation of the device at its flooding rate.

A further object is to provide a burner control device which is simple and safe to operate and
35 is inexpensive in construction.

Other objects and advantages will be apparent from the following description taken in connection with the accompanying drawing, in which:

Figure 1 is a longitudinal sectional view of a
40 device embodying the features of the invention and showing the device in the closed position.

Fig. 2 is a view similar to Fig. 1 but showing the device opened for flooding the burner.

Fig. 3 is a view similar to Fig. 1 but of a modified
45 form of device.

Fig. 4 is a fragmentary sectional view of another modified form of the device.

The exemplary embodiment of the invention comprises a body member having a passage there-
50 through adapted to be connected to a fuel supply and the burner, and means for controlling the flow of fuel through said passage. This means is movably mounted within the body member and may be adjusted, by hand, by a rotary movement
55 to control the flow within the range of normal

operation of the burner and by a sliding or rectilinear movement to permit quick flooding of the burner in starting it. In order that the flooding may be automatically stopped when the
5 hand is removed from the device, spring means is provided opposing said sliding movement.

As shown in Figs. 1 and 2 of the drawing, the device comprises a body member 10 having a passage therethrough adapted to be connected at its respective ends to a fuel supply and the burner
10 as by threaded connections 11. Within the body is a valve controlling the flow through said passage comprising a valve seat 12 formed in the body and preferably tapered, and an adjustable valve stem 13 having a correspondingly
15 tapered portion 14 cooperating with said seat. The valve stem 13 has an extension 15 beyond the tapered portion 14, which has a snug fit with a part of the body indicated at 16.

In the extension 15 are one or more longitudinal tapered grooves 17 which are closed at one
20 end by the snug-fitting portion 16 of the body when the valve is closed. When the valve stem 13 is moved longitudinally to disengage the tapered portion 14 of the stem and the seat 12, the
25 grooves 17 extend beyond the snug-fitting portion 16 of the body and permit a flow of fuel sufficient for normal operation of the burner, the distance said grooves extend determining the
30 rate of flow.

For such rotary adjustment of the valve stem for normal feeding of fuel, it is threaded into a
nut 20 mounted within the body and having a fixed position relative to the body during such
35 adjustment. Thus, this adjustment of the valve is accomplished by a rotary movement. To rotate the stem in effecting such adjustment, the stem is extended beyond the body where it is provided with a handle or knob 21, a gland 22
40 being provided to prevent leakage around the stem. To limit the range of such adjustment of the valve stem, a pin 23 projects from the body and constitutes an abutment for a lug 24 extending from the handle 21, thus limiting the ad-
45 justment to that provided by one revolution of the stem.

For flooding the burner, the grooves 17 in the valve stem 13 provide a flow which is insufficient to flood the burner in a short time. To permit
50 a much greater flow, the valve stem may be moved until the extension 15 thereon is completely removed from within the snug-fitting portion 16 of the body so that the fuel may flow freely therethrough, as shown in Fig. 2. For
55 such movement of the stem, rectilinear move-

ment thereof is provided by mounting it slidably within the body, and the nut 20, which is threaded to the stem, is also slidable within a recess in the body so that the nut and stem slide as a unit.

To hold the nut 20 against rotation and yet permit such sliding movement, the nut is provided with a longitudinal groove 25 cut in its periphery and a set screw 26 threaded into the body extends radially into the groove.

One feature of the invention is the provision of means for automatically reducing the flow through the valve from the flooding rate to whatever rate within the normal range the valve may be adjusted. To this end, a spring 30 is mounted within the recess in the body for the nut 20 so that it bears against the nut to oppose the sliding movement of the valve stem, such movement permitting flooding of the burner. The spring 30 thus serves to hold the nut 20 in a fixed position relative to the body when the valve stem is adjusted by the handle 21, so that the spring does not affect such adjustment. It also serves to return the stem from the flooding position to the position to which it has previously been adjusted by rotary movement. To effect the sliding movement of the valve stem, a hand ring 31 by which the valve stem may be pulled is provided on the end of the stem extending beyond the body.

The modified form of device shown in Fig. 3 comprises a body 40 having an inlet 41 adapted to be connected to a fuel supply and an outlet 42 adapted to be connected to the burner. Connecting said inlet and outlet are a pair of passages 43 and 44 respectively controlled by means such as valves, indicated generally at 45 and 46, the valve 45 being constructed for regulating the flow within the range of normal operation of the burner and the valve 46 permitting flooding of the burner. The valve 45 is generally of the same type as that shown in Fig. 1 except that it is threaded directly into the body 40 as at 47 and hence is not slidable to permit flow for flooding the burner. Thus, it merely controls the flow within the range for normal operation of the burner and is operated by a rotary movement.

The valve 46 comprises a tapered valve seat 50 formed in the body 40 and a valve stem 51 having correspondingly tapered portion 52 cooperating with the seat 50 to close the passage. The valve stem 51, it will be noted, is moved inwardly of the body to open the valve. The stem 51 is slidably mounted in the body and extends outwardly of the body, a gland 53 being provided to prevent leakage, and a push button 54 is mounted on the outer end of the stem by which the valve may be opened. The gland 53 includes a cap 55 having a cup-shaped outer end in which a spring 56 is located, the spring surrounding the valve stem 51 and bearing against push button 54, tending to close the valve. Thus, the valve 46 is operable by a rectilinear movement to the position indicated in Fig. 3 by dotted lines, to permit a flow for flooding the burner, and automatically shuts off such flow as soon as the hand is removed from the push button.

This form of the device also includes means to prevent accidental operation of the valve 46. To this end, the cup-shaped portion of the cap 55 is provided with a longitudinal notch 57 in the end thereof and the push button 54 is provided with a radially extending set screw 58 constituting a lug which must be aligned with the notch 57 to permit operation of the valve 46.

By rotating the valve stem 51 sufficiently to disalign the screw 58 and notch 57, accidental operation of the valve 46 is prevented.

The modified form of device shown in Fig. 4 is similar to the device shown in Fig. 3 but is constructed to avoid the use of a gland to prevent leakage. The supply of fuel is usually carried in a tank so that the fuel has a predetermined level. In the device shown in Fig. 4, the valve 46 is provided with an elongated stem 60 and a cap 61 closing the body 40 around the stem is also elongated sufficiently to extend above the level of the fuel. Thus, the use of a gland to prevent leakage is avoided.

In the operation of the device shown in Figs. 1 and 2, the valve stem 13 is adjusted by rotating the handle 21, thus turning the stem within the nut 20 to regulate the flow of fuel for normal operation of the burner. To flood the burner, the ring 31 is pulled to give a wide opening of the valve, as shown in Fig. 2, permitting sufficient flow to flood the burner quickly, the nut 20 moving with the stem. As soon as the burner is flooded, the ring 31 is released and spring 30, bearing against the nut, moves the stem back to the position to which it was adjusted by rotary movement.

In the operation of the form shown in Fig. 3, or the form shown in Fig. 4, the valve 45 is adjusted by rotation to regulate the flow for normal operation of the burner. To flood the burner, the button 54 is pushed, moving the stem 51 to the dotted line position shown in Fig. 3, and permitting a free flow to the burner. When the hand is removed from the push button, the spring 56 immediately returns the valve 46 to its closed position so that any flow to the burner must take place through the valve 45 which may be adjusted to regulate the burner. To prevent accidental operation of the valve 46, the push button 54 may be slightly rotated to disalign the screw 58 and the notch 57, thereby preventing opening movement of the stem 51.

The subject matter shown in Figs. 3 and 4 of the drawing is covered by my divisional application Serial No. 20,340, filed May 8, 1935.

From the above description, it will be apparent that I have provided a burner control device which may be adjusted to regulate the flow required for normal operation of the burner and may be operated to permit a large flow to flood the burner quickly, and which will automatically reduce the flow to the rate of normal operation to which it has been previously adjusted. It is also apparent that the device may be set so that the burner will not be accidentally flooded. The device is simple and safe to operate and is inexpensive in construction.

I claim as my invention:

1. A device for controlling the flow of fuel to a burner comprising, in combination, a valve body having a fuel passage therethrough, valve means normally closing said passage and movable with a rotary motion to open said passage gradually to permit of a regulated flow for normal operation of the burner, means for limiting said rotary motion to the maximum regulated flow required for said normal operation, said valve means also being movable with a rapid rectilinear motion to open said passage to an extent greater than said normal maximum to permit flow of fuel in an unregulated amount sufficient to flood the burner, and spring means opposing said rectilinear movement.

2. A device for controlling the flow of fuel to

a burner comprising, in combination, a valve body having a fuel passage therethrough provided with a valve seat, a movable valve within said body and cooperating with said valve seat for normally closing said passage, said valve being movable in two steps and being fashioned to provide during the first step a slow graduated movement to effect a regulated flow for normal operation of the burner and during its second step to move rapidly clear of said seat to permit a greater flow for flooding the burner, said valve being both rotatably and rectilinearly movable from a closed position, means to limit the range of rotary movement of said valve to that permitting said regulated flow, and spring means opposing rectilinear movement of the valve for automatically stopping said greater flow when the valve is released.

3. A device for controlling the flow of fuel to a burner comprising, in combination, a valve body having a fuel passage therethrough provided with a port, a valve member having one end fitting snugly in said port and having in one side thereof a tapered slot opening from said end, said valve member being rotatably movable from a position where said slot is closed by said port to a position where said slot permits a regulated flow through said port for normal operation of the burner, said valve member also being rectilinearly movable to a position where said end is clear of said port to permit a flow for flooding the burner, and spring means opposing the rectilinear movement of the valve member for automatically returning said end to a position within said port.

WILLIAM T. BRADBURY.