Aug. 4, 1936. E. D. JONES ET AL 2,049,959

BURNER CONTROL APPARATUS

Original Filed Oct. 5, 1933 2 Sheets-Sheet 1

Fig. 1

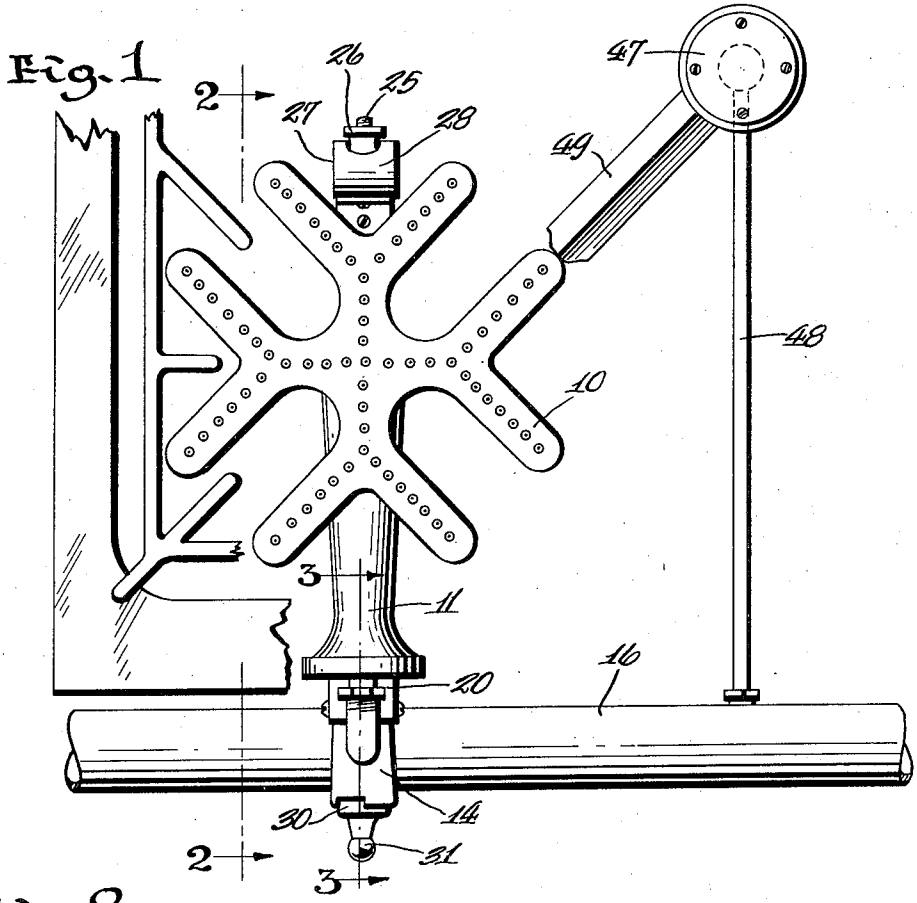
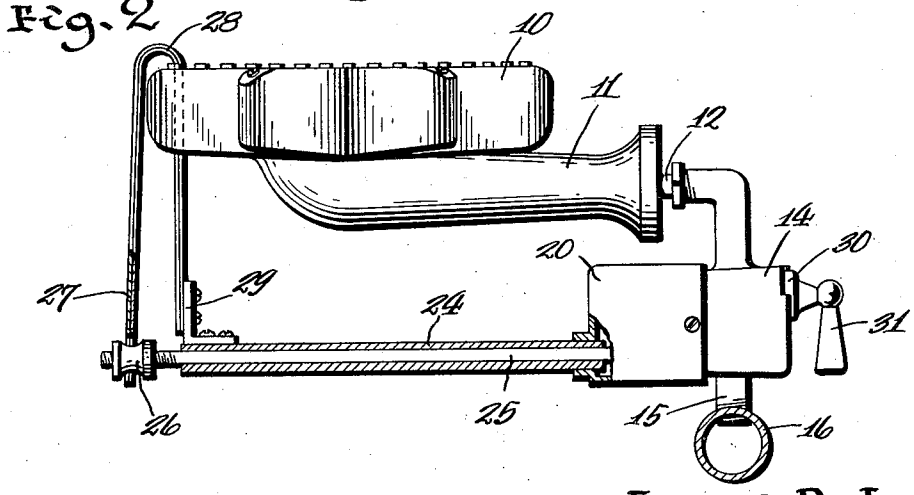


Fig. 2



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Fig. 3

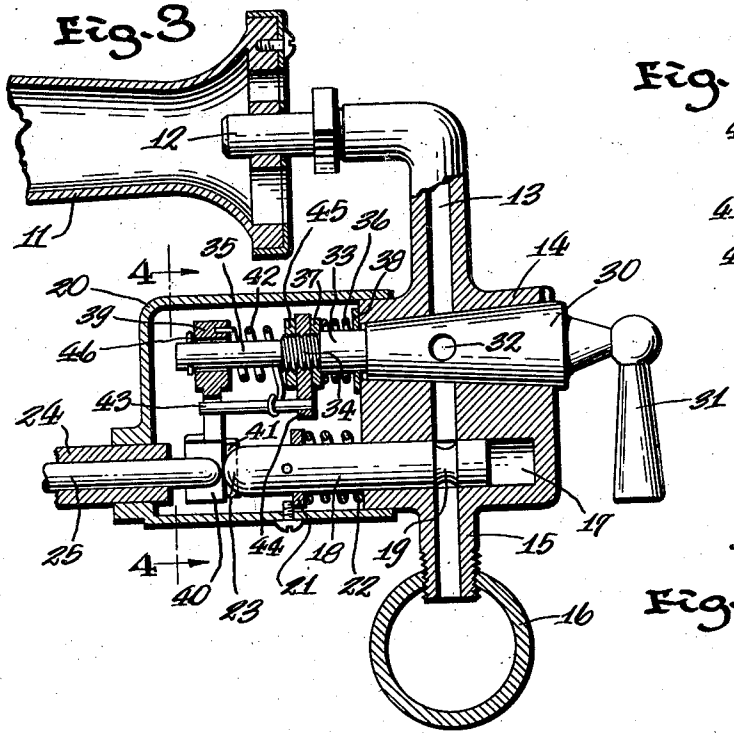


Fig. 4

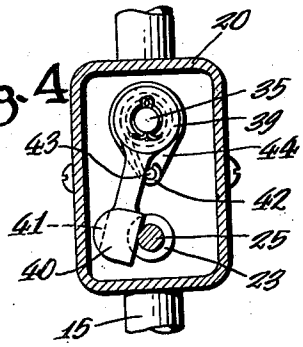


Fig. 6

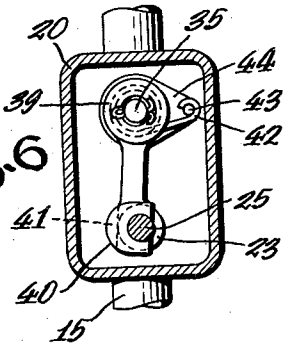
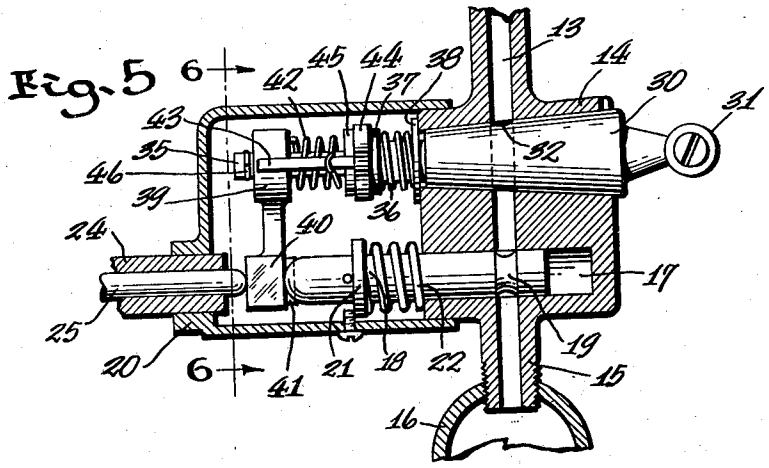


Fig. 5



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Patented Aug. 4, 1936

2,049,959

UNITED STATES PATENT OFFICE

2,049,959

BURNER CONTROL APPARATUS

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Application October 5, 1933, Serial No. 692,294
Renewed June 13, 1936

15 Claims. (Cl. 158—117.1)

This invention relates to control apparatus particularly suitable for use in connection with gas burners and the like, and wherein valve control means are provided which are operable automatically to interrupt the supply of fuel to a burner, should the burner flame be extinguished while fuel is being supplied to said burner.

In the drawings accompanying this specification and forming a part of this application, we have shown, for purposes of illustration, certain forms which our invention may assume.

In these drawings:

Figure 1 is a fragmentary top plan view of an embodiment of the invention,

Figure 2 is a vertical sectional view corresponding substantially to the line 2—2 of Figure 1, and showing parts in elevation,

Figure 3 is an enlarged fragmentary vertical sectional view corresponding substantially to the line 3—3 of Figure 1, and showing the control means in the position occupied when no fuel is being supplied to the burner,

Figure 4 is a fragmentary vertical sectional view corresponding substantially to the line 4—4 of Figure 3,

Figure 5 is an enlarged fragmentary vertical sectional view similar to Figure 3, and showing the control means in the position occupied after a flame has been established at the burner and during the time fuel is being supplied to said burner, while

Figure 6 is a fragmentary vertical sectional view corresponding substantially to the line 6—6 of Figure 5.

The embodiment of the invention herein disclosed comprises a burner 10 having a mixing tube 11 of a well known character connected therewith and adapted to receive fuel through a nozzle 12 communicating with a bore 13 extending transversely entirely through a valve casing 14 and communicating through a nipple 15 with a source of fuel supply which may be in the form of a manifold 16.

Reciprocably mounted in a bore 17 intersecting the bore 13 is a valve member 18 having an annular groove 19 adapted to register with the bore 13, extending outwardly of the casing and into a housing 20 and provided with a collar 21 between which and the wall of the casing 14 is interposed a spring 22, normally urging the valve member outwardly away from the casing, and beyond the collar 20 the valve has a rounded end portion 23.

Disposed coaxially in line with the valve member 18, and reciprocably mounted in a tubular extension 24 carried by the housing 20, is a rod 25, the outer end of which has threaded thereon an abutment member 26 having an annular depression for the reception of the bifurcated end of a bi-metallic thermostatic element 27 which extends in loop formation as indicated at 28 to a position adjacent to the burner 10 and has its opposite end rigidly fixed to an angular bracket 29 carried by the outer end of the tubular extension 24.

The valve casing 14 is also provided with a tapered bore for the reception of a rotatable valve member 30 having a handle 31 by means of which the valve member 30 may be rotated, and the valve member 30 is also provided with a transverse diametrically extending bore 32 adapted in one position of the rotatable valve member 30 to register with the bore 13. The reduced end of the valve member 30 is provided with a cylindrical extension 33, having a threaded portion 34 and having a still further reduced extension 35, the valve member 30 being held tightly in position by a spring 36 interposed between a collar 37 threaded upon the threaded portion 34 and a washer 38 disposed about the cylindrical extension 33 and abutting the adjacent wall of the casing 14.

Rotatably and slidably mounted upon the reduced extension 35 is an arm 39 having an enlarged portion 40 at its end and provided with an offset flange 41 adapted in one position to bear against the rounded end portion 23 of the valve member 18, and the arm 39 is normally urged to swing in a counter-clockwise direction, as viewed in Figures 4 and 6, through the medium of a torsion spring 42 connected at one end thereto, surrounding the reduced extension 35, and having its opposite end connected to a pin 43 extending transversely of the path of movement of the arm 39 and carried by a laterally projecting member 44 threaded onto the threaded portion 34 of the cylindrical extension and held in position by a lock nut 45, and outward movement of the arm 39 is limited by a cotter pin 46 extending through the end portion of the extension 35.

A pilot burner 47 is provided receiving its fuel supply through a conduit 48 leading to the manifold 16, and an ignition device 49 extends between the burner 10 and the pilot burner.

The normal position of the mechanism of the device is as shown in Figures 3 and 4, with the groove 19 of the reciprocable valve member 18 in registry with the bore 13, and the bore 32 of the rotatable valve member 30 out of registry with the bore 13.

Assuming the pilot burner 47 to be burning, and it is desired to supply gas to the burner 10, the rotatable valve member is rotated by manipulation of the handle 31 to bring the bore 32 into registry with the bore 13 through the valve casing 14. Rotation of the rotatable valve member 30 also rotates the laterally projecting member 44 which moves away from the arm 39, resulting in an increase in the torsional effect of the spring 42 upon the arm, and the arm therefore is strongly urged against the adjacent end of the rod 25. The burner 10 having been ignited, the heat therefrom influences the bimetallic thermostatic element 27 to cause the end thereof connected to the rod 25 to move toward the left as viewed in Figure 2 and pull the rod therewith, resulting in a gap between the inner end of the rod 25 and the rounded end portion 23 of the valve member 18, and when the gap enlarges to a sufficient extent, the enlarged portion 40 of the arm will move into the gap with the offset flange 41 bearing against the rounded end portion 23 of the valve 18 to limit movement of the arm. Should the burner 10 be accidentally extinguished, cooling thereof will result in the thermostatic element 27 assuming its initial position, and moving the rod 25 to the right, as viewed in Figure 2, and the arm 39 now being interposed between the inner end of the rod and the valve member 18, will result in the valve member 18 being moved toward the right as viewed in Figure 3, carrying the groove 19 of the valve 18 out of registration with the bore 13, the arm 39 of course moving along the reduced extension 35 in the same direction as the valve member 18. When the rotatable valve member 30 is closed, that is rotated to move the bore 32 out of registration with the bore 13, the pin 43 comes into contact with the arm 39 and moves it outwardly from its position between the end of the rod 25 and the rounded end portion 23 of the valve 18, permitting the valve 18 again to assume its position with the annular groove 19 in registry with the bore 13, and also permitting the arm again to move along the extension 35 to its initial position, after which the device is operated as before described.

It will be apparent to those skilled in the art that the embodiment herein disclosed accomplishes at least the principal object of this invention, but also, that the construction is adaptable to other uses, and embodies advantages other than those herein particularly mentioned, and also, that the particular embodiment described may be variously changed and modified without departing from the spirit of the invention, and accordingly it will be understood that the disclosure herein is illustrative only and that our invention is not limited thereto.

We claim:

1. A device of the character described, comprising: valve mechanism having a valve casing and a movably mounted valve; actuating means, constructed to move to and fro, toward, but short of dislodging engagement with said valve, and away from said valve, sufficiently to leave a gap therebetween; and means interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve.

2. A device of the character described, comprising: valve mechanism having a valve casing and a movably mounted valve; actuating means, constructed to move to and fro, toward, but short of dislodging engagement with said valve, and away from said valve, sufficiently to leave a gap therebetween; means interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve; and means normally biasing said interposable member in a direction to enter said gap when it is formed.

3. A device of the character described, comprising: valve mechanism having a valve casing and a movably mounted valve; actuating means, constructed to move to and fro, toward, but short of dislodging engagement with said valve, and away from said valve, sufficiently to leave a gap therebetween; means mounted to swing at an angle to the direction of movement of said actuating means, and shiftable in a direction coinciding with the direction of movement of said actuating means, said means being interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve; and means normally biasing said interposable member in an angular direction to enter said gap when it is formed.

4. A device of the character described, comprising: valve mechanism having a valve casing and a movably mounted valve; actuating means, constructed to move to and fro, toward, but short of dislodging engagement with said valve, and away from said valve, sufficiently to leave a gap therebetween; means interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve; a second valve means having a movable valve member; and means operable by movement of said second valve member for controlling the operative position of said interposable member with respect to said actuating means.

5. A device of the character described, comprising: valve mechanism having a valve casing and a movably mounted valve; actuating means, constructed to move to and fro, toward, but short of dislodging engagement with said valve, and away from said valve, sufficiently to leave a gap therebetween; means interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve; a second valve means having a movable valve member; and means operable by opening movement of said second valve member for placing said interposable member in operative position with respect to said actuating means, and operable by closing movement thereof to retract said interposable member from said operative position.

6. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; safety valve mechanism cooperable with said conduit, having a valve casing and a movably mounted valve having means normally biasing said valve to open position to permit passage of fluid to said burner; means including actuating means responsive to the heat of a flame at said burner, and operable when said burner is not burning to move toward, but short of dislodging engagement with said valve, and operable to move away from said valve when said burner is burning, sufficiently to leave a gap between said actuating means and said valve; and means automatically interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve and cut off flow of fuel to said burner.

7. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; safety valve mechanism cooperable with said conduit, having a valve casing and a movably mounted valve having means normally biasing said valve to open position to permit passage of fluid to said burner; thermostatically controlled actuating means, responsive to the heat of a flame at said burner, and operable when said burner is not burning to move toward, but short of dislodging engagement with said valve, and operable to move away from said valve when said burner is burning, sufficiently to leave a gap between said actuating means and said valve; and means automatically interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve and cut off flow of fuel to said burner.

8. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; safety valve mechanism cooperable with said conduit, having a valve casing and a movably mounted valve having means normally biasing said valve to open position for permitting passage of fluid to said burner; means including actuating means responsive to the heat of a flame at said burner, and operable when said burner is not burning to move toward, but short of dislodging engagement with said valve, and operable to move away from said valve when said burner is burning, sufficiently to leave a gap between said actuating means and said valve; means automatically interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve and cut off flow of fuel to said burner; a second valve means having a manually controllable valve member; and means operable by movement of said second valve member for controlling the operative position of said interposable member with respect to said actuating means.

9. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; safety valve mechanism cooperable with said conduit, having a valve casing and a movably mounted valve having means normally biasing said valve to open position for permitting passage of fluid to said burner; means including actuating means responsive to the heat of a flame at said burner, and operable when said burner is not burning to move toward, but short of dislodging engagement with said valve, and operable to move away from said valve when said burner is burning, sufficiently to leave a gap between said actuating means and said valve; means automatically interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve and cut off flow of fuel to said burner; a second valve means having a manually controllable valve member; and means operable by movement of said second valve member for placing said interposable member in operative position with respect to said actuating means when said second valve member is opened, and for retracting said interposable member from operative position when said second valve member is closed.

10. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; safety valve mechanism cooperable with said conduit, having a valve casing and a movably mounted valve having means normally biasing said valve to open position for permitting passage of fluid to said burner; thermostatically operated actuating means, responsive to the heat of a flame at said burner, and operable when said burner is not burning to move toward, but short of dislodging engagement with said valve, and operable to move away from said valve when said burner is burning, sufficiently to leave a gap between said actuating means and said valve; means automatically interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve and cut off flow of fuel to said burner; a second valve means having a manually controllable valve member; and means operable by movement of said second valve member for placing said interposable member in operative position with respect to said actuating means when said second valve member is opened, and for retracting said interposable member from operative position when said second valve member is closed.

11. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; safety valve mechanism cooperable with said conduit, having a valve casing and a movably mounted valve having means normally biasing said valve to open position for permitting passage of fluid to said burner; thermostatically operated actuating means, responsive to the heat of a flame at said burner, and operable when said burner is not burning to move toward, but short of dislodging engagement with said valve, and operable to move away from said valve when said burner is burning, sufficiently to leave a gap between said actuating means and said valve; means interposable in said gap to prolong said actuating means upon its subsequent movement toward said valve to effect operative movement of said valve and cut off flow of fuel to said burner; means for mounting said interposable member to swing at an angle to the direction of movement of said actuating means, and to shift in a direction coinciding with the direction of movement of said actuating means; means normally biasing said interposable member in the direction of its angular movement and toward said actuating means; a second valve means having a manually controllable valve member; and means operable by movement of said second valve member for placing said interposable member in operative position with respect to said actuating means when said second valve member is opened, and for retracting said interposable member from operative position when said second valve member is closed.

12. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; safety valve mechanism cooperable with said conduit, having a valve casing and a movably mounted valve, and having means normally biasing said valve to open position to permit passage of fluid to said burner; thermostatic means disposed in juxtaposition with reference to said burner and responsive to the heat of a flame at said burner; actuating means, adjustably connected to said thermal means, and operable when said burner is not burning to move toward, but short of abutting engagement with said valve, and operable to move away from said valve, when said burner is burning, sufficiently to leave a gap between said actuating means and said valve, said adjustable connection providing for adjustment in said movement; and means automatically interposable in said gap to prolong said actuating means upon its subsequent move-

ment toward said valve to effect operative movement of said valve and cut off flow of fuel to said burner.

13. A device of the character described, comprising: a burner; a conduit for conducting fluid to said burner; valve means interposed in said conduit, operable to control the flow of fluid to said burner; safety valve mechanism cooperable with said conduit, and having means normally biasing said valve to open position, and operable to control the flow of fluid to said valve means; means including actuating means responsive to the heat of a flame at said burner, and operable when said burner is not burning to move forward, but short of abutting engagement with said valve mechanism, and operable to move away from said valve mechanism when said burner is burning, sufficiently to leave a gap between said actuating means and said valve; and means automatically interposed in said gap, to prolong said actuating means upon its subsequent movement toward said valve mechanism to effect operative movement of said valve mechanism to cut off flow of fuel to said valve means.

14. A device of the character described, comprising: burner means; fuel supply means for said burner means; valve means for controlling passage of fuel through said fuel supply means; actuating means, movable to and fro, adapted for actuating said valve means; and means forming an operative connection between said actuating means and said valve means, said connection having a lost motion device permitting said actuating means to move in one direction without disturbing said valve means, and constructed to effect movement of said valve means when said actuating means move in a reverse direction.

15. A device of the character described, comprising: burner means; fuel supply means for said burner means; first valve means for controlling passage of fuel through said fuel supply means; actuating means movable to and fro, adapted to actuate said first valve means; means forming an operative connection between said actuating means and said first valve means, said connection having a lost motion device constructed to permit said actuating means to move in one direction without disturbing the position of said first valve means, and constructed to effect movement of said first valve means when said actuating means move in a reverse direction; and manually operable valve means also for controlling passage of fuel through said fuel supply means, said manually operable valve means having means for automatically rendering said actuating means effective when said manually operable valve means are manipulated.

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