Jan. 25, 1938. J. E. WARRICK 2,106,310

VALVE

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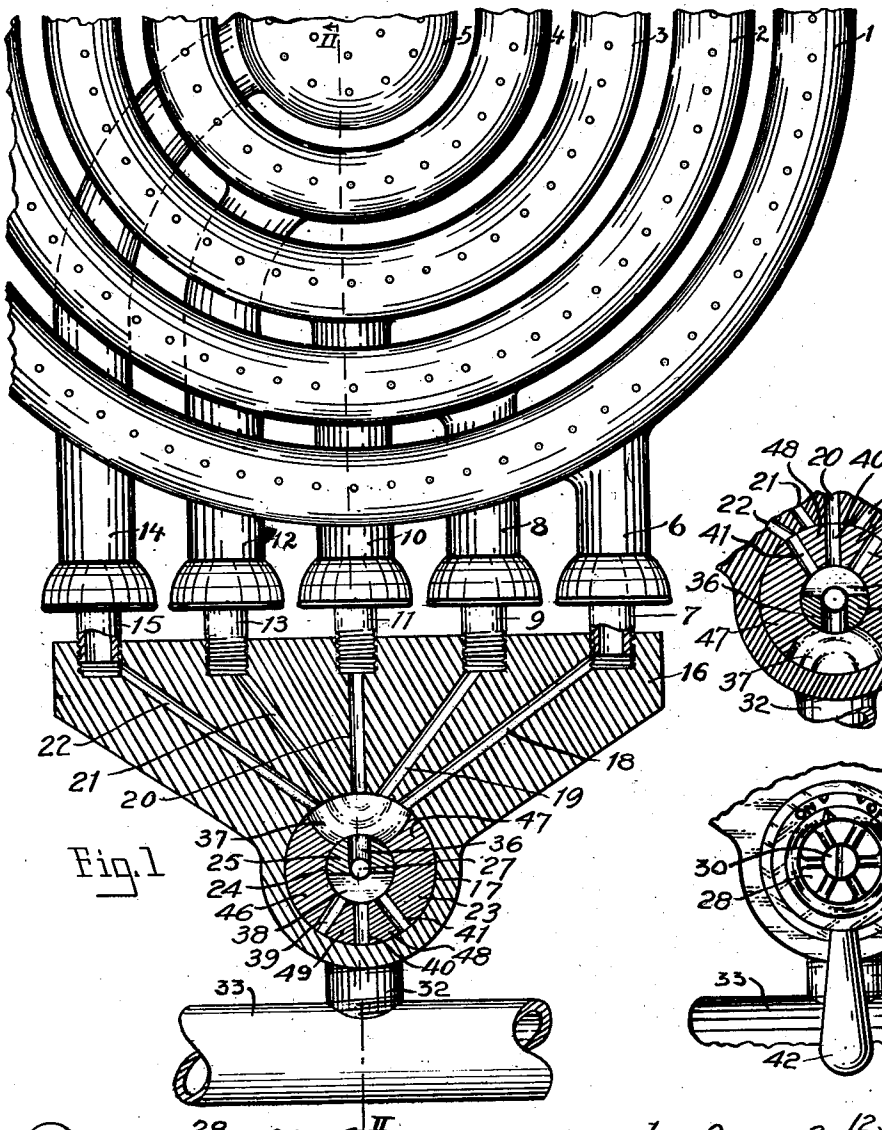


Fig. 1

Fig. 3

Fig. 4

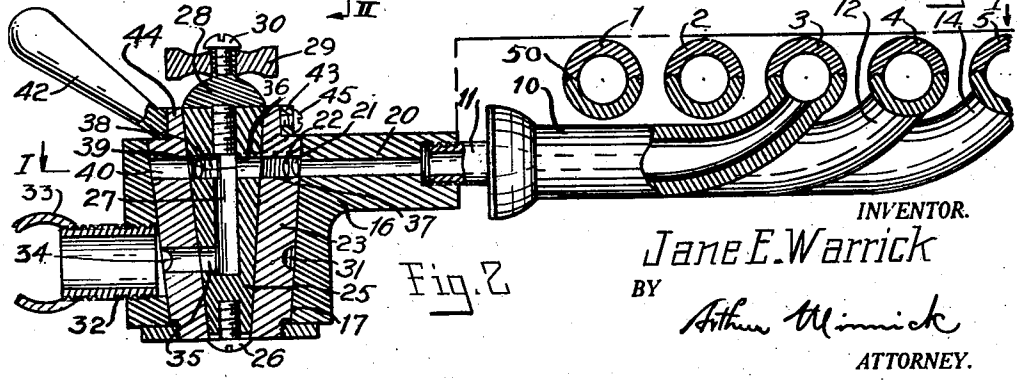


Fig. 2

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VALVE

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9 Claims. (Cl. 277—69)

The present invention is illustrated as applied to a gas burner giving even heat for cooking and having a gas supply which may be distributed to any particular part of a cooking vessel whether large or small. The principal object is to provide a valve for such a burner in which the location and distribution of the flame may be changed at will by the use of a single valve and in which the quantity of gas supplied to the burners may be controlled at any selected distributive position of the valve.

To this end, there is provided a burner having a plurality of substantially concentric sections with gas openings so arranged that the heat will be even, each section having a separate gas supply controlled by a distributor valve movable to give different arrangements of flame so that heat may be furnished selectively to any particular part of the cooking vessel in successive zones, so that if cooking is advancing too rapidly at the center, gas may be shut off from the central section and turned on where cooking is too slow as at the outer edge of a large frying pan.

A still further object of the invention is to provide a valve for a burner such as described which may be moved to open the gas supply passages beginning either at the outer ring-like section or at the central section and proceeding in serial order until all sections are opened, the valve then being movable to close sections in serial order from either the center or from the outermost section.

Another object is to provide an arrangement in which the alternate sections only may be opened to give a more diffused flame.

In the accompanying drawing showing a preferred form of the invention, Figure 1 is a plan view with portions broken away of a plurality of sections connected to a valve casing and valve shown in section on the line I—I of Fig. 2; Fig. 2 is a vertical section on the line II—II of Fig. 1; Fig. 3 is a fragmentary horizontal section as in Fig. 1, with the valve turned through 180° from the position of Fig. 1; and Fig. 4 is a fragmentary plan view of the valve.

The gas burner shown in Fig. 1 consists of five sections designated as 1, 2, 3, 4, and 5, each section comprising an annular chamber having a supply pipe leading to a gas inlet secured within a valve casing and communicating with a gas outlet passage in the casing controlled by a gas cock.

The supply pipe 6 of outer section 1 leads directly to gas inlet 7; supply pipe 8 of the next section, 2, leads to inlet 9 after passing beneath section 1; supply pipe 10 of section 3, passing beneath sections 1 and 2, leads to inlet 11; supply pipe 12 of section 4, passing beneath sections 1, 2, and 3, leads to inlet 13; and supply pipe 14 of the innermost section, 5, passing beneath sections 1, 2, 3, and 4, leads to inlet 15. The valve casing 16 has a tapered bore 17 from which gas outlet passages 18, 19, 20, 21, and 22 extend to the gas inlets 7, 9, 11, 13, and 15 respectively, the ends of the gas outlet passages within the bore preferably lying in the same horizontal plane and being spaced uniformly from each other. A tapered distributor plug 23, fitting with a ground bearing for rotation within the tapered bore 17, is provided with a tapered bore 24 to receive a correspondingly tapered plug 25 which may be held in the plug 23 by a screw 26. The plug 25 has an axial bore 27 which may be closed at its upper end by a closure member 28 upon which a wheel or other handle member 29 is secured as by a screw 30.

An annular groove 31 is formed around the plug 23 opposite an opening in the casing 16 which receives the nipple 32 connecting the valve casing with the main gas supply pipe 33. From this groove 31, a bore 34 extends through the wall of the plug to the bore 24. A similar bore 35 is formed in the plug 25 to register with the bore 34 in one position of the plug 25 and to be moved out of register with the bore when the plug 25 is rotated in either direction through a distance equal to the width of the bore 34.

At the upper end of the bore 27, a bore 36 leads through the wall of the plug to a passage 37 milled or otherwise formed in the plug 23 and having a width at its outer side somewhat greater than the space within which lie the ends of the gas outlet passages 18, 19, 20, 21, and 22. Diametrically opposite the bore 36, the plug 25 has formed, as by milling, a passage 38 communicating with the axial bore 27 and having a width at its outer side somewhat greater than the space within which lie the inner ends of three passages 39, 40, and 41 formed through the plug 23 opposite the passage 37. As a means for rotating the plug 23, a handle 42 is shown as formed with a sleeve surrounding the upper end 44 of the plug 23 and secured thereto by a screw 45.

In the position of parts illustrated in Figs. 1 and 2, gas from the pipe 33 may flow through bores 34, 35, 27 and 36 to the passage 37 leading to all five of the passages 18, 19, 20, 21, and 22 radiating outwardly to the inlets 7, 9, 11, 13, and 15 supplying all five sections of the burner.

If the plug 23 is turned in a clockwise direction,

the solid portion 46 will move across the passage 22, shutting off gas from the central burner section 5 but permitting sections 1, 2, 3, and 4 still to remain supplied with gas. Further clockwise rotation will close passage 21 to shut off gas from section 4, section 5 still remaining closed, but sections 1, 2, and 3 will still be supplied with gas. Still further clockwise movement will close passage 20 without opening passages 21 or 22 but leaving sections 1 and 2 supplied with gas. The next further clockwise movement will close passage 19, leaving section 1 only still supplied with gas and further movement will close passage 18 and thus shut off gas from all five sections, the solid portion 46 of the plug being of sufficient length of arc to close all five passages.

Starting again with the valve position shown in Fig. 1 and rotating the plug 23 in a counterclockwise direction, the solid portion 47 of the plug 23 will act to close passage 18 first, shutting off gas from section 1 but leaving sections 2, 3, 4, and 5 supplied with gas. Further rotation counterclockwise will close passage 19, then passage 20, then passage 21, and finally passage 22, shutting off the gas supply of the sections from the outside inward successively toward the center, the solid portion 47 of the plug 23 being of sufficient length of arc to close the ends of all five passages at once.

If the plug 23 is rotated through 180° to the position shown in Fig. 3, the passages 39, 40, and 41 will register with passages 18, 20, and 22 respectively, passages 19 and 21 being closed by the solid portions 48 and 49 of the plug. Sections 1, 3, and 5 of the burner will thus be supplied with gas and sections 2 and 4 will be shut off. Rotation of the plug clockwise will close passages 18, 20, and 22 and will open passages 19 and 21 to supply sections 2 and 4 while the other sections are closed. Still further clockwise rotation of the plug will close passages 19 and 21 and open passages 18 and 20, the solid portion 47 of the plug closing passage 22 as well as passage 21, leaving only sections 1 and 3 supplied with gas. The next clockwise movement will close passages 18 and 20 and open passage 19 alone to furnish gas only to section 2, and further clockwise movement will close passage 19 and open passage 18 to gas for section 1 only.

Rotation of the plug 23 from the position of Fig. 3 counterclockwise will also first close passages 18, 20, and 22 and then open passages 19 and 21 to passages 39 and 40, to supply gas to sections 2 and 4, the apparent effect being the same as if the movement had been clockwise as previously described, but further counterclockwise rotation will open passages 20 and 22, this arrangement supplying gas to the small central burner section 5 and to the burner section 3, giving a somewhat larger area of flame than with the arrangement previously described in which only sections 4 and 5 were open. Additional counterclockwise rotation will close passages 20 and 22 and then open passage 21 to supply gas only to section 4, the solid portion 46 closing passages 18, 19, and 20, and the solid portion 49 of the plug closing passage 22. The next counterclockwise movement will close passage 21 and open passage 22 for gas to section 5, all other passages to the burner sections being closed.

It will be seen that by this simple rotation of the single valve plug 23, the distribution of the gas supply and hence of the flame may be varied by the selection of the different combinations of sections available, and with any distribution selected, the quantity of gas delivered may be regulated from a full supply to a complete shutoff by rotation of the plug 25.

For convenience in cleaning, the burners may be made separable, preferably with an inverted V joint as indicated at 50 in Fig. 2.

The constructions described and shown in the drawing are to be considered as merely illustrative, since it will be evident that many changes in form, proportions, number of sections, and other details of construction and arrangement of parts may be made without departure from the essentials of the invention as claimed.

Multiple-section gas burners of the type shown being old in the art, and multiple-control valves being capable of use for many purposes, the claims are not limited to the specific use described and illustrated herein, but are intended to cover any fluid pressure device having a valve operating in substantially the manner described.

I claim:

1. A device comprising a plurality of sections, fluid inlets communicating with said sections, a valve casing having a bore for a plug and having an inlet for fluid communicating with said bore and having a plurality of outlets also communicating with said bore and with the inlets of said sections, a movable distributor plug in said bore having a passage in communication with the inlet of the casing in all positions of the plug and having an outlet passage capable of registration with each of said outlets of the casing, said distributor plug having a bore for a regulator plug and a movable regulator plug in said bore having an inlet passage capable of registration with the inlet passage of the distributor plug in one position and movable out of registration therewith in another position and having an outlet passage communicating with the outlet passage of the distributor plug, the arrangement being such as to permit the regulator plug to open and close the inlet passage of the distributor plug in any position of said distributor plug.

2. A structure as in claim 1, in which the distributor plug has means for closing off spaced fluid outlets while establishing communication with the outlets between those closed off.

3. A device comprising a plurality of sections, fluid inlets communicating with said sections, a valve casing having a bore for a plug and a fluid inlet communicating with said bore, and having a plurality of fluid outlets also communicating with said bore and with the fluid inlets of said sections, a movable distributor plug in said bore having a fluid inlet passage in communication with the fluid inlet of the casing at all positions of the plug, and having a fluid outlet passage capable of registration with each of the fluid outlets progressively, said distributor plug having a tapered bore for a regulator valve plug, and a rotatable tapered regulator valve plug fitted in said bore controlling the passage of fluid from the distributor plug inlet passage to the distributor plug outlet passage.

4. A device comprising a plurality of sections, fluid inlets communicating with said sections, a valve casing having a bore for a distributor plug and having a fluid inlet passage communicating with said bore, said casing having a plurality of spaced fluid outlet passages also communicating with said bore and communicating with the fluid inlets of the sections, a movable distributor plug in said bore having a fluid inlet passage communicating with the fluid inlet passage of the

casing at all positions of the plug and having a plurality of spaced fluid outlet passages capable of registration successively with the fluid outlet passages of the casing, the arrangement being such that movement of the plug in one direction will open the outlet passages of the casing in order (beginning with all passages closed) until all are opened; then continued movement in the same direction will close the outlet passages in the same order in which they were opened until all are closed; then continued movement in the same direction will first open a passage and then close it, will open another passage and then close it, will then open the first mentioned passage and simultaneously open a third passage different from the second passage opened; will then close both passages; will open another two alternate passages and then close them, this opening and closing of alternate passages continuing until the last passage is reached, whereupon the last two passages will be opened and closed singly, leaving all passages closed ready for a repetition of the same order of operations.

5. A device having a plurality of inner and outer sections each having a fluid passage, a valve having a distributor element arranged to control the flow of fluid to said passages by movement in either of two directions, the arrangement being such that movement in one direction will open the passages in order beginning with the outermost section and movement in the opposite direction will open the passages in order beginning with the innermost section, and a regulating element movable within the distributor element and adapted to regulate the quantity of fluid supplied to said passages in any position of the distributor element.

6. A device having more than two sections substantially concentric with each other, fluid inlets communicating with said sections, a valve assembly having a plurality of passages communicating with the inlets, a valve element for opening and closing the passages and movable in either of two directions, the arrangement being such that movement in one direction will open the passages progressively beginning with the passage communicating with the outermost section until all the passages are open, and continued movement in the same direction will close the passages progressively beginning with the passage communicating with the outermost section, until all the passages are closed, the valve element having a means rotatable therein for regulating the quantity of fluid supplied to the passages.

7. A device having more than two sections substantially concentric with each other, fluid inlets communicating with said sections, a valve assembly having a plurality of passages communicating with said inlets, a valve element for opening and closing the passages and movable in two directions, the arrangement being such that beginning with the position in which all passages are closed, movement in one direction will open the passages progressively beginning with the passage communicating with the outermost section until all the passages are open, and continued movement in the same direction will close the passages progressively beginning with the passage communicating with the outermost section until all the sections are closed, while the reverse movement of the valve element from this closed position will open the passages progressively beginning with the innermost section until all the passages are open, and continued movement in the same direction will close the passages progressively beginning with the passage communicating with the innermost section until all the passages are closed.

8. A device having a plurality of sections each having a fluid passage, a valve having a distributor element arranged to control the flow of fluid in said passages by movement in either direction from a closed position, the arrangement being such that movement of the valve in one direction will open said passages in order beginning with one section until all the passages are open, and movement in the opposite direction from the same closed position will open the passages in order beginning with another section, until all the passages are open, and a regulating element movable within the distributor element and adapted to regulate the quantity of fluid supplied to said passages in any position of the distributor element.

9. A device having more than two sections, fluid inlets communicating with said sections, a valve element for opening and closing the passages and movable in two directions, the arrangement being such that beginning with a position in which all passages are closed, movement of the valve element in one direction will open the passages progressively beginning with one passage, until all passages are open, and continued movement in the same direction will close the passages progressively beginning with the passage first opened until all the passages are closed, while reverse movement of the valve element from the same closed position will open the passages progressively beginning with another section from that first mentioned until all the passages are opened and continued movement in the same direction will close the passages progressively beginning with the passage first opened by said reverse movement, until all passages are closed.

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