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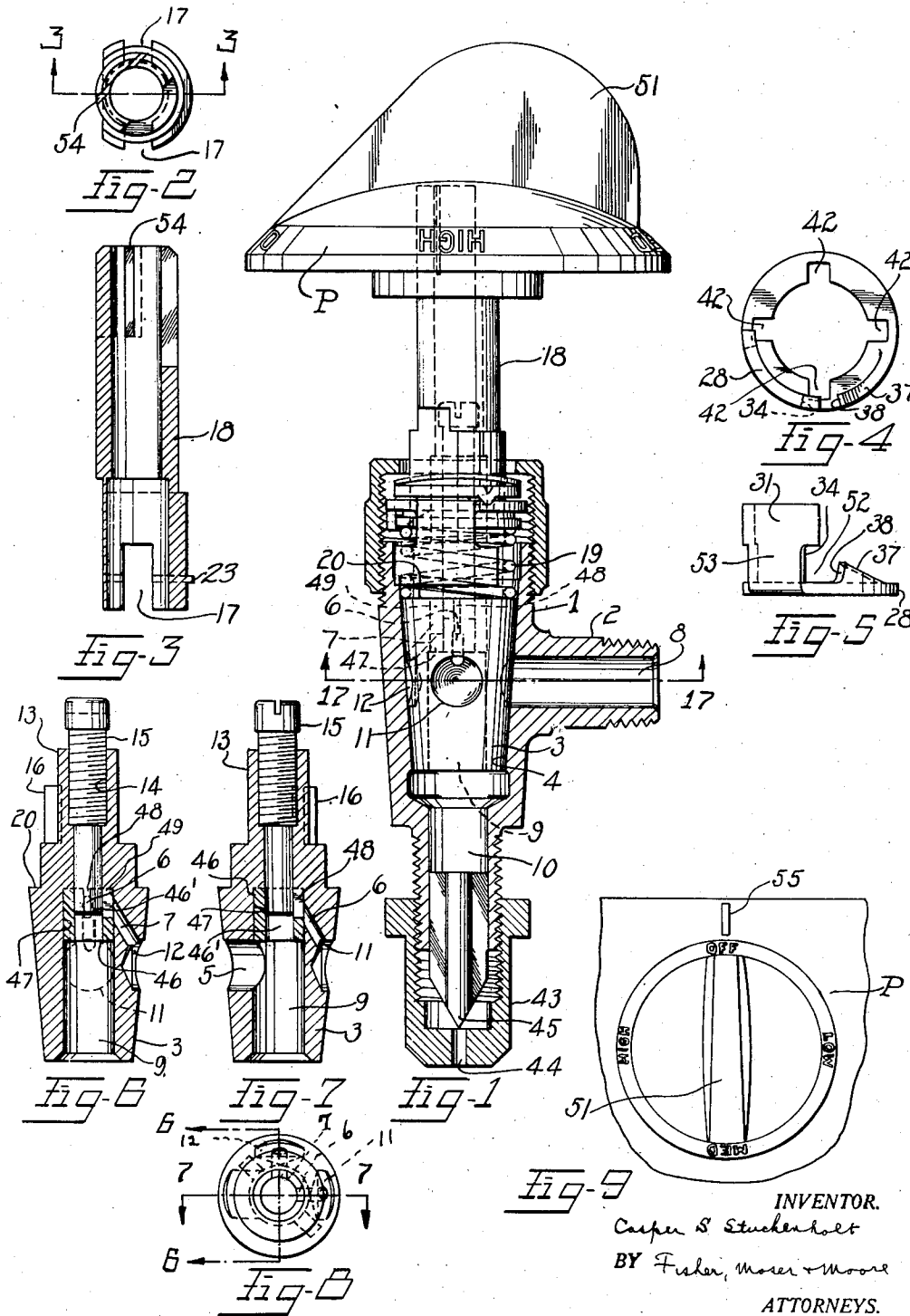
C. S. STUCKENHOLT

2,262,703

VALVE

Filed Dec. 3, 1940

2 Sheets-Sheet 1



INVENTOR.
Casper S. Stuckenholt
BY Fisher, Moser & Moore
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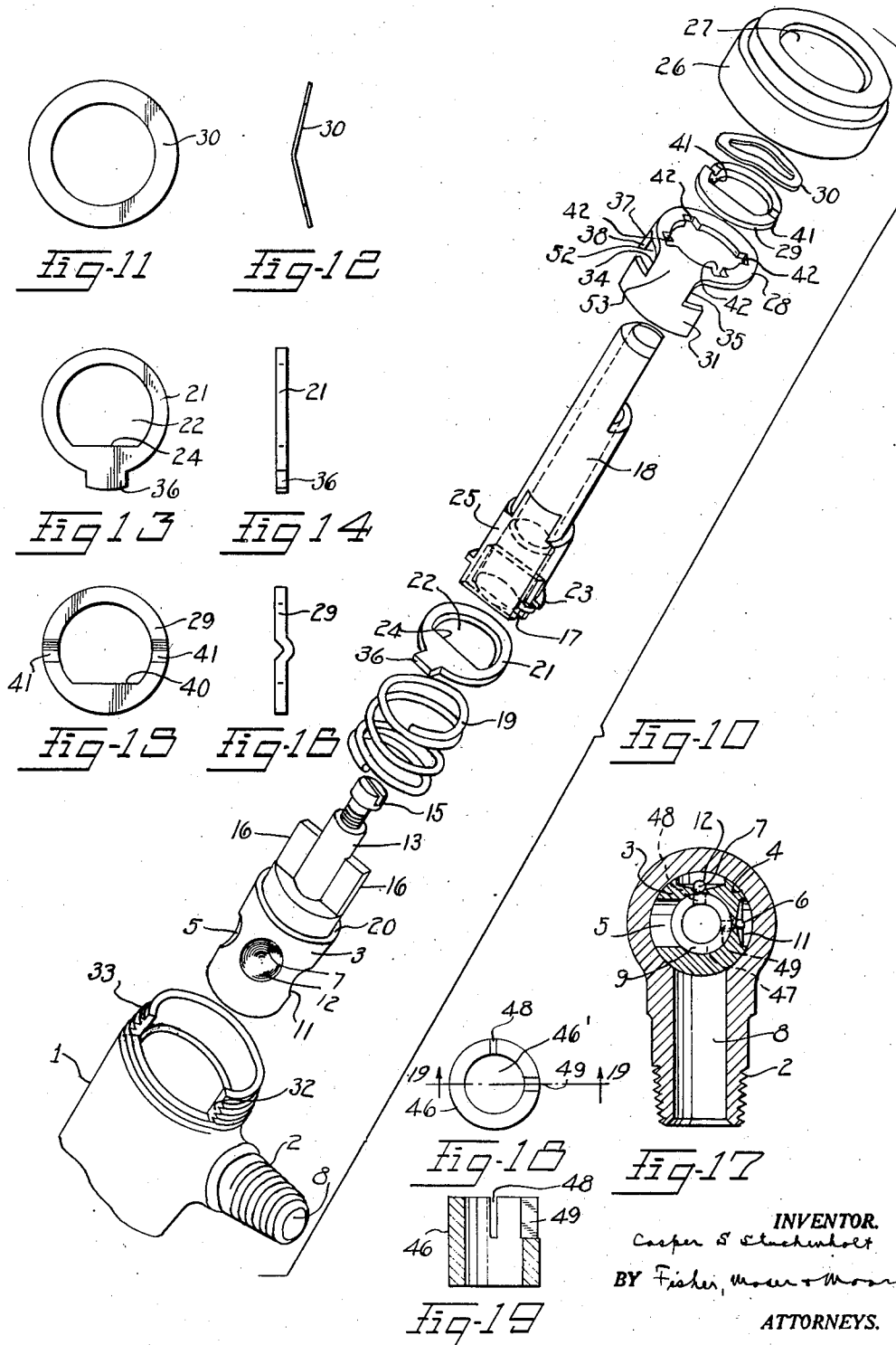
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UNITED STATES PATENT OFFICE

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VALVE

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Application December 3, 1940, Serial No. 368,393

2 Claims. (Cl. 251—163)

This invention relates to valves for gas stoves and equivalent cooking and heating appliances and more particularly relates to single outlet valves having a plurality of flow positions of the general type disclosed in Patent No. 2,224,566, dated December 10, 1940, assigned to the present assignee.

The principal object of the invention is to provide a conveniently operable valve of this type in which the valve becomes locked when moved to one position and apprises the operator, by means of an audible signal, when the valve plug has completed its movement from one position to another.

Another object of the invention is to provide a valve having a plurality of fixed flow positions with a single throttling means for adjusting the flow in the several reduced flow positions, and having means for audibly indicating to the operator by a clicking sound when movement of the valve from one position to certain other positions has been effected and also having other means for locking the valve in one position and for indicating by a clicking sound when said locked position has been reached.

Other objects and advantages of the invention will be apparent as the specification is considered in connection with the accompanying drawings, in which:

Figure 1 is a side view of the valve partly in section;

Figure 2 is an end view of the outer valve stem;

Figure 3 is a section on line 3—3 of Figure 2;

Figure 4 is an end view of the latching and clicking ring;

Figure 5 is a side view of the ring shown in Figure 4;

Figure 6 is a section through the valve plug on the line 6—6 of Figure 8;

Figure 7 is a section taken on the line 7—7 of Figure 8;

Figure 8 is an end view of the valve plug;

Figure 9 is a face view of the handle;

Figure 10 is an exploded view of the valve casing, valve plug and associated parts;

Figure 11 is a plan view of the spring tension washer;

Figure 12 is a side view of the tension washer;

Figure 13 is a plan view of the lock and click washer;

Figure 14 is a side view of the lock and click washer;

Figure 15 is a plan view of the clicking washer;

Figure 16 is a side view of the clicking washer;

Figure 17 is a section taken on the line 17—17 of Figure 1;

Figure 18 is a plan view of the sleeve insert; and

Figure 19 is a section taken on line 19—19 of Figure 18.

Referring more particularly to the drawings, the valve body or casing 1 has the inlet extension 2, adapted for connection with a manifold or other suitable source of gas supply not shown. In the particular embodiment of the invention disclosed the extension 2 threads into the gas manifold from the top. A rotatable valve plug 3 for controlling the flow of gas through the casing seats within the tapered bore 4. The valve 3 is formed with three inlet passages, a large or full flow passage 5, and smaller reduced flow passages 6 and 7 respectively adapted to be moved into and out of communication with supply passage 8 in extension 2, thus providing three open or on positions and a closed or off position. An axial passage or bore 9 in the plug places the transverse passages 5, 6 and 7 in communication with the axial outlet passage 10 in the casing. The reduced flow passages 6 and 7 lead from depressions or recesses 11 and 12 preferably equal in size to and in a common plane with the full flow passage 5.

The valve plug 3 is formed with an inner hollow stem portion 13, the bore 14 of which is threaded to receive a throttle screw 15 for a purpose hereinafter described. Oppositely disposed longitudinally extending ribs 16 formed on the inner stem portion 13 are adapted to be slidably but non-rotatably received within oppositely disposed slots 17 formed in the inner end of a hollow outer stem portion 18. As the ribs 16 are of rectangular shape in cross section and the slots 17 correspond in size and shape with the ribs, the outer stem member while free to slide relative to the inner stem portion locks the latter and the valve plug 3 against independent rotation with respect to the outer stem portion. A coil spring 19 seats at one end against a shoulder 20 on the valve plug and at its other end seats against or resiliently engages the inner face of a latch and click washer 21. This washer 21, which is provided with an opening 22 for slidable but non rotatable connection with the outer stem portion 18, is resiliently forced by the spring 19 against an interrupted annular rib 23, on the outer stem member or portion 18. The spring 19 thus resiliently opposes limited inward movement of the outer stem member relatively to the inner stem member, when the valve parts are assembled. Independent relative rotary movement of the lock and click washer with respect to the

outer stem member is prevented by the engagement of a flat wall 24 of the washer opening with a flat face 25 formed on the outer stem portion.

A cap 26, having a central opening 27 through which the outer stem portion 18 of the valve extends serves to confine the valve plug 3 within the valve casing. The cap also loosely receives and houses a latching and clicking ring 28, a clicking washer 29 and an irregularly bent spring tension washer 30, sleeved over the outer end of the outer stem member or portion 18, in the order named. The latching and clicking ring seats upon the outer face of interrupted annular rib 23 previously mentioned as being formed on the inner end of the outer stem portion and the click washer 29 seats on the outer face of latching and clicking ring 28 and is resiliently held in place, in an obvious manner, when the cap 26 is screwed home on the casing and into clamping engagement with the spring washer 30. A handle 51 provides convenient means for turning the valve to its off and various flow positions. These several positions of the valve are indicated visually by the marker 55 on the panel P in Figure 9.

The latching and clicking ring 28 is formed with an arcuate flange 31 extending inwardly from the periphery thereof which fits snugly into a correspondingly shaped gap or cut out portion 32 in the outer threaded casing extension 33, and is held therein by the cap 26 when the latter is screwed home on the threaded extension 33, thus anchoring the latching and clicking ring to the casing. The ring 28 is also formed with two shoulders 34 and 35 formed in opposite edges of the arcuate flange 31, which are engaged by a radially extending stop lug or finger 36 on the periphery of washer 21, for positively limiting rotation of the valve plug. This member 28 is also formed with an inclined flange 37 terminating adjacent the stop shoulder 34 to form a stop and latch shoulder 38 which latches the valve plug against rotation in one direction when the finger 36 rides off the inclined flange and snaps into the gap or space 52 between the shoulders 34 and 38.

The clicking washer 29 is formed with a straight wall or flat portion 40 for engagement with the flat face 25 formed on the outer stem portion 18 thus locking this washer against relative rotation with respect to the stem and valve plug but leaving the same free for slight axial movement. The washer 29 is also formed with radially and oppositely disposed offset portions or ribs 41 adapted for resilient clicking engagement with corresponding radially extending depressions or slots 42 formed in the latching and locking ring 28. Under the action of spring tension washer 30 a readily audible sound is made by the clicking washer as the ribs 41 are brought into register with and are forced into the depressions 42, thus indicating to the operator that movement of the valve from one flow position to another has been effected.

The outlet end of the casing 1 has an orificed hood 43 in screw threaded engagement with the reduced threaded outlet end portion thereof, the hood having a discharge outlet or orifice 44 with which a needle point or valve 45, fixed to or integrally formed with outlet end of the casing 1, cooperates. A tubular insert sleeve or member 46 having a press fit in a socket or seat 47 in the inner end of axial plug passage 9, is formed with spaced elongated longitudinally disposed rectangular slots 48 and 49 respectively, opening

through the inner peripheral edge of the insert for a purpose presently understood. The low and medium flow restricted inclined inlet passages 6 and 7 respectively, preferably correspond in size with and are spaced apart similarly to and communicate at their inner ends with these slots 48 and 49, which in turn place the inclined passages in communication with the passage 9, the flow being upwardly and inwardly to and through the slots 48 and 49 and thence outwardly through the cylindrical bore 46' of the member 46 to passage 9 and finally out through outlet orifice 44. The relative width of slots 48 and 49, as made when valve is manufactured, determines the ratio of the low and medium flow to each other. The extent of this flow is controlled by means of the partially threaded elongated throttle valve 15 mounted in the axial partially threaded bore 14 formed in the inner valve stem 13 and communicating with the interior of the open ended insert or sleeve 46. The inner unthreaded portion of the bore 14 is of the same size and axially aligned with the bore of the insert, the latter being adapted to snugly receive the reduced smooth cylindrical inner blunt end of the throttle valve 15 when the latter is screwed home in an obvious manner. Inward movement of the valve 15, causes the valve to overlie and of course cut down the effective area of the narrow slots 48 and 49 in the insert member 46, and movement in an opposite direction progressively uncovers the slots with reverse effect. It will also be seen that when adjustment is made the flow in either flow position of the plug valve is accurately proportional to the flow which occurred in either position before such adjustment was made. Adjustment of the throttle valve is made by engaging the slot in the threaded end thereof with a suitable tool.

When the valve structure is installed on a gas range or the like the hood 43 will be set with respect to the outlet needle valve or point 45 so as to establish an orifice 44 corresponding to the "High" position of the valve plug, at which time maximum flow is obtained through supply passage 8, large inlet opening 5 direct to plug bore 9 and thence out through orifice 44 to the burner, not shown. Thereafter there will be no adjustment of the hood which thus remains in fixed position. The inclined low and medium inlet passages 6 and 7, which lead from gas receiving recesses 11 and 12 in the valve plug, are much smaller than the inlet opening 5, low and medium inlet passage 7 has approximately twice the capacity of low passage 6 so that these respective passages when brought into register with supply passage 8 will accommodate sufficient gas to support a "Low" and "Medium" burner flame respectively, on all kinds of gases. The operator also generally finds it necessary, when installing the range, to adjust the throttle valve 15 so as to procure the desired accurate reduced flows, according to the kind and quality of gas being used in the particular locality in which the installation is made, and of course depending upon the nature of the burner being serviced.

It may be noted here that with the handle 51 occupying the position marked "Off" there will be no flow of gas through the valve; but when the handle is turned in a clockwise direction from "Off" to "High" and thence to "Medium" and finally to "Low" in steps of approximately ninety degrees; or in a reverse direction from "Low" to "Medium" and "High" in the order named, the supply passage 8 will register with the respective

inlet orifices in the plug valve and the appropriate volume of gas will flow through the valve. There is a dead area 53 of approximately ninety degrees between the "Off" and "Low" flow position direct to "Off" in a clockwise direction, it being necessary to turn the handle in an anticlockwise direction in going from "Low" to "Off" positions. Stop shoulders 34 and 35 on the latch and stop ring 28, are engaged by the stop lug 36 on washer 21, in the "Low" and "Off" positions respectively.

For convenience in assembling the valve parts, the valve stem and the valve plug are rotated so as to bring the finger 36 on lock and click washer 21 into the latched or off position with the shoulders 34 and 38 preventing rotation of the plug valve in anticlockwise and clockwise directions respectively, before screwing cap 26 upon the casing extension 33. To unlatch or unlock the valve from its "Off" position it is necessary to force the outer stem member 18 and the washer 21 inwardly against the tension of coil spring 19 until the finger 36 of washer 21 is clear of the lock shoulder 38. Clockwise movement of the stem then causes the valve plug to move first to "High" and then to "Medium" and finally to "Low" flow positions. As these respective positions are reached the housewife is informed by reason of the fact that the ribs 41 snap into the depressions 42 in latching ring 28, with an audible click, under the action of spring tension washer 30. In turning the valve in a reverse or anticlockwise direction from "Low" through "Medium" and "High" to "Off" flow positions the same clicking sound is repeated but when "Off" position is reached the washer finger 36 not only snaps into the gap or space 52 between shoulders 34 and 38, but the finger becomes locked against rotation in either direction.

From the foregoing it will be seen that movement of the valve to certain flow positions is indicated to the operator by an audible click and that when the valve reaches "Off" position the operator in addition to being apprised of this fact by means of the audible clicking of the latch and clicking washer 21, is prevented from accidentally turning the valve to any other position.

The handle 51 is formed with a substantially D-shaped centrally disposed recess for receiving the correspondingly shaped outer end of the outer stem portion 18. To insure a tight resilient clamping fit between the stem and handle, the former is split as at 54 to permit of some little

resilient movement of the split stem when the handle is forced thereon.

What I claim is:

1. In a valve having a body and a rotatable valve member, an inner stem portion formed on said valve member, an outer stem portion slidably and non-rotatably secured to the said inner stem portion, a cap secured to the body and through which the outer stem portion extends, said outer stem portion having a rib adjacent its inner end, a latching ring sleeved over said outer stem portion and having a locking notch, said ring seating against the outer face of said rib and being keyed to said valve body and having depressions in its outer face, a washer slidably and non-rotatably sleeved over said outer stem portion and formed with ribs for engaging in said depressions when the valve member is rotated, resilient means between the cap and washer for forcing the washer against the locking ring, washer means slidably and non-rotatably sleeved over the inner end of said outer stem portion and formed with a projection functioning with said notch for locking the valve member against rotation, and means for forcing said washer means against the inner face of said rib.

2. In a valve having a body and a rotatable valve member having an extension thereon, a stem slidably and non-rotatably secured to the said extension, a cap secured to the body and through which the stem extends, a latching ring sleeved over said stem and formed with a locking notch and radially extending recesses, stop means on said stem against the outer face of which said ring seats for limiting the inward sliding movement of said ring on said stem, co-operating means on said ring and valve body for keying said ring to said valve body, a washer slidably and non-rotatably sleeved over said stem and formed with ribs adapted for functioning with the radially extending recesses on the said ring when the valve member is rotated, resilient means between the cap and washer for forcing the locking ring against the stop means and the washer into close contact with the ring, washer means slidably and non-rotatably sleeved over the stem inwardly of said stop means and formed with a projection cooperating with said notch for locking the valve member against rotation, and resilient means for forcing said washer means against the inner face of said stop means.

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