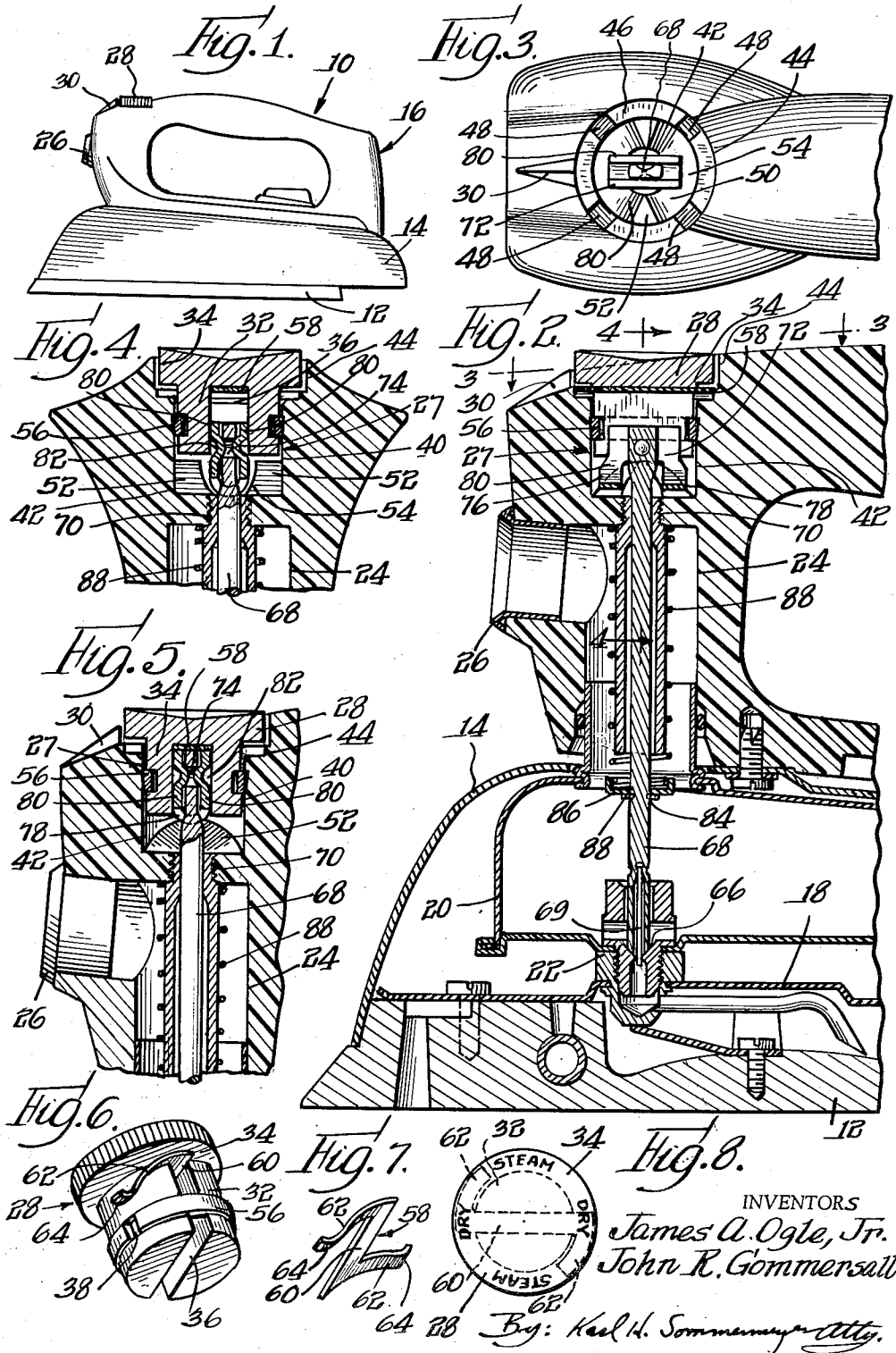


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CONTROL KNOB CONSTRUCTION

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CONTROL KNOB CONSTRUCTION

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This invention relates to control-knobs, useful for example in water-valve controls for steam irons.

A flash-boiler steam iron may have a valve between the water reservoir and the steam generator which may be closed for dry ironing.

It is an object of the present invention to provide an improved simple construction for a control knob for the water-feed control of a steam iron.

Another object of the instant invention is to provide a control knob construction which is simple and economical to produce.

A still further object of the herein disclosed invention is to provide a control mechanism which is easily disassembled and assembled for fabricating, maintaining and repairing it.

Other objects and uses of the present invention will be come apparent to those skilled in the art upon a reading of the following description in view of the drawings, in which:

FIG. 1 is a side view of a steam iron embodying the present invention;

FIG. 2 is a vertical longitudinal sectional view of the forward portion of the iron shown in FIG. 1;

FIG. 3 is a plan view taken on line 3-3 in FIG. 2, but with the knob removed;

FIG. 4 is a fragmentary sectional view taken on line 4-4 in FIG. 2;

FIG. 5 is a fragmentary sectional view similar to a portion of FIG. 2 but showing the control knob in a second position;

FIG. 6 is a perspective view of the control knob forming a part of the present invention;

FIG. 7 is a perspective view of a detent normally associated with the control knob; and

FIG. 8 is a plan view of the knob.

Referring now to the drawings, and more particularly to FIG. 1, there will be seen an electric steam iron 10 of the flash boiler type. Iron 10 is similar to prior steam irons in that it includes a sole plate 12, a shell 14 attached to said sole plate and a handle 16 mounted on the shell.

Turning now to FIG. 2, it will be seen that iron 10 also includes a steam generator 18 comprised in part by the sole plate 12. A water reservoir 20 is mounted within the shell. A water control valve 22 between the reservoir and the generator controls the flow of water therebetween. The handle includes a water passage 24 which provides access for water to the water reservoir 20. The water passage has a metallic annular insert 26 at one end to provide a pleasing appearance and to reinforce the passage opening.

A valve control generally indicated by numeral 27, provides a means for regulating the position of the valve 22 selectively to open or close the valve. When the valve is open, water flows from the reservoir to the steam generator and the iron may be used as a steam iron. When the valve is closed, no water flows from the reservoir and the iron may be used as a dry iron.

The valve control includes knob 28 which is rotatably mounted in handle 16. The knob 28 (see FIG. 6) includes a cylindrical body 32 and an annular flange 34 integral with one end of the body. The periphery of the flange 34 is knurled to provide a convenient grasping

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surface. The body 32 has an axial slot 36 therein, and an annular groove 38 in the outer surface of the body adjacent the bottom end thereof. Said knob has on its upper surface the legend shown in FIG. 8, that is, "dry" and "steam." The knob is mounted at the front of the handle 16, and the handle includes an indicator 30 integral therewith which cooperates with the legend to indicate to an operator whether the valve is open or closed.

The handle 16 has a knob-receiving cavity 40 in the forward portion thereof proximate the indicator 30. The knob-receiving cavity has a lower cylindrical portion 42 and an upper cylindrical portion 44 which is not as deep as the lower portion 42 but has a greater diameter, thereby providing a horizontal surface or out-facing shoulder 46 in the handle. The surface 46 has four equally spaced indentations 48 as may be seen in FIG. 3. The bottom or inner end of the cavity 42 has a cam face 50 integral with the handle 16 as may be seen in FIGS. 4 and 5. The cam face 50 has a pair of opposed rises 52 and a pair of opposed indentations 54 spaced at right angles thereto.

Knob 28 is held within the cavity 40 by a split ring retaining spring 56 which is mounted loose in annular groove 38. The retaining spring frictionally engages the wall of the lower cylindrical portion of opening 40 frictionally to hold knob 28 in place. Due to the loose fit of the spring 56 in the groove 38, the knob 28 is free to rotate relative to the handle but is retained from moving axially. To increase the resistance to removal of the knob 28 and ring 56, the outer face of ring 56 is tapered, or conical shape, with the larger diameter at the top or outermost edge. The metal of the ring is preferably harder than the material of the molded handle 16, and accordingly the upper edge of ring 58 may be made sharp, so that when the knob and ring are withdrawn, the edge will cut into the handle and thereby increase the force required for removal.

A detent member 58 which is best shown in FIGS. 6 and 7 is received in the slot 36 above the spring ring 56 and releasably locks the knob in an angular position relative to the handle. The detent member is generally Z-shaped, and includes a cross member 60 and a pair of resilient spring fingers 62 on the ends of the cross member. The spring fingers 62 have deflected tips for engaging pairs of the indentations 48 to lock the knob in angular adjustment. The fingers 62 are arcuate and coaxial with the knob.

The aforementioned valve 22 includes a valve body having a seat 66, a valve stem 68, closing against the seat, and a needle 69 for metering the flow of water. The stem 68 extends through a stem guide 70 threaded in the handle, and connects to a cam follower 72. The stem has a transverse hole 74 in its upper end. The cam follower 72 is a single sheet of metal, centrally apertured at 76 to provide clearance for the valve stem 68, folded over to provide a curved cam-follower surface 78, and dimpled at 82 pivotally to engage the hole 74 in the valve stem. When the folded, sheet-metal follower 72 is in place in the slot 36 of knob 28, it fills that slot and is thereby held against spreading. Consequently the knob 28 holds the dimples 82 in engagement and assembled relation with the hole 74 of the valve stem.

The follower is kept in engagement with the cam face and the valve is constantly urged to a closed position by a spring 88 encircling and abutting the valve stem. A spring disk or stop 86 is positioned by a C-washer 88 in a groove 84 in the stem. Thus, the spring both urges the valve stem 68 down to a closed position, and holds follower 72 in constant engagement with cam face 50, at the bottom or inner end of cavity 40.

It may be seen that as knob 28 is rotated within opening 40, the cam follower rides on the cam face. When

the cam follower is in indentation 54, the valve is closed. However, when the knob 28 is rotated 90 degrees, the follower rides up on rises 52 and the stem 68 is raised against the force of spring 88, thereby opening valve 22 so that water may flow from the water reservoir to the steam generator. When it is desired to close the valve, the knob 28 is rotated 90 degrees in either direction so that the follower rides down the cam face 50 and the valve is closed. The detent member 58 holds the knob in any of the foregoing positions while the legend on the top of the knob indicates whether the iron is set for steam or dry ironing.

While a specific embodiment of the instant invention has been shown and described above, it is understood that variations may be made without departing from the scope of the invention as defined in the appended claims.

We claim:

1. In an electric iron the combination of a member having a cylindrical open-end cavity, a control knob rotatable in said cavity, said knob having a circumferential groove in the part within said cavity, and a resilient ring loosely disposed in said groove and frictionally gripping the walls of said cavity for retaining said knob therein, said knob being thereby rotatable in said cavity and in said ring, said ring being harder than the wall of the cavity and having a projecting edge that indents the wall of the cavity for increasing the force required for its withdrawal.

2. The combination of claim 1 wherein said ring has a peripheral surface that is slightly conical, the corner is sharp at the large diameter edge, and said large diameter edge lies toward the opening of the cavity.

3. In combination a member having a cylindrical open-end cavity, a control knob rotatable in said cavity, said knob having a circumferential groove in the part within said cavity, and a resilient ring loosely disposed in said groove and frictionally gripping the walls of said cavity for retaining said knob therein, said knob being thereby rotatable in said cavity and in said ring, said knob further having an axial slot and a detent member lying in said slot, said detent member including a pair of resilient fingers engaging the surface of said cavity, said cavity surface having indentations engageable by said resilient fingers for releasably holding the knob against rotation.

4. The combination of claim 3 wherein said detent has a symmetrical Z shape, with a central part lying in said slot and two resilient fingers extending circumferentially of said knob.

5. The combination of claim 4 wherein said detent consists of an approximately flat spring and said indentations engaged by said fingers are in an out-facing shoulder of said cavity.

6. The combination of claim 5 wherein said knob includes a flange for covering and concealing the fingers of said detent.

7. The combination of claim 5 wherein said axial slot extends part way through said knob from the inner, concealed end thereof, said circumferential groove and ring are intermediate said detent and said inner end of said knob, and the outer end of said knob includes a flange overhanging and concealing the shoulder of said cavity and the fingers of said detent.

8. In combination a member having a cylindrical open-end cavity, a control knob rotatable in said cavity, said knob having a circumferential groove in the part within said cavity, a resilient ring loosely disposed in said groove and frictionally gripping the walls of said

cavity for retaining said knob therein, said knob being thereby rotatable in said cavity and in said ring, the inner end of said cavity including a cam face and said knob having an axial slot in which a cam follower lies to be rotated by said knob and thereby have its axial position controlled by said cam face, and a rod extending into said cavity through the inner end thereof, said rod having a flat and cross-perforated end, said cam follower consisting of a centrally perforate plate of flat material bent U-shape to provide smoothly-curved surfaces at the bend for engaging said cam face, said rod extending through the central perforation, said plate having dimples extending into the cross-perforation of said rod, said assembled rod and cam-follower filling the slot in said knob whereby said knob holds said dimples in the perforation of the rod and prevents said cam follower from disengaging said rod.

9. In an electric iron the combination of a member having a cylindrical open-end cavity, a generally cylindrical control knob rotatable in said cavity, said knob having a circumferential groove in the part within said cavity, a resilient ring loosely disposed in said groove and frictionally gripping the walls of said cavity for holding said knob against axial movement relative to said cavity, said knob being thereby rotatable in said cavity and in said ring, said ring being harder than the wall of the cavity and having a projecting edge that indents the wall of the cavity for increasing the force required for its withdrawal, an axial cam face disposed within said cavity, a cam follower engaging said cam face for movement by said cam face axially of said cavity, means for connecting said cam follower to said knob for rotation with and axial movement relative to said knob, said connecting means including an axial slot within said knob and said cam follower being disposed within said slot, and an elongated rod extending into said cavity and fixedly attached to said cam follower for movement with said cam follower, whereby rotation of said knob varies the axial position of said rod.

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