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INSULATED HANDLE AND KNOB ASSEMBLY FOR FLUID CONTROL VALVES

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FIG. 1

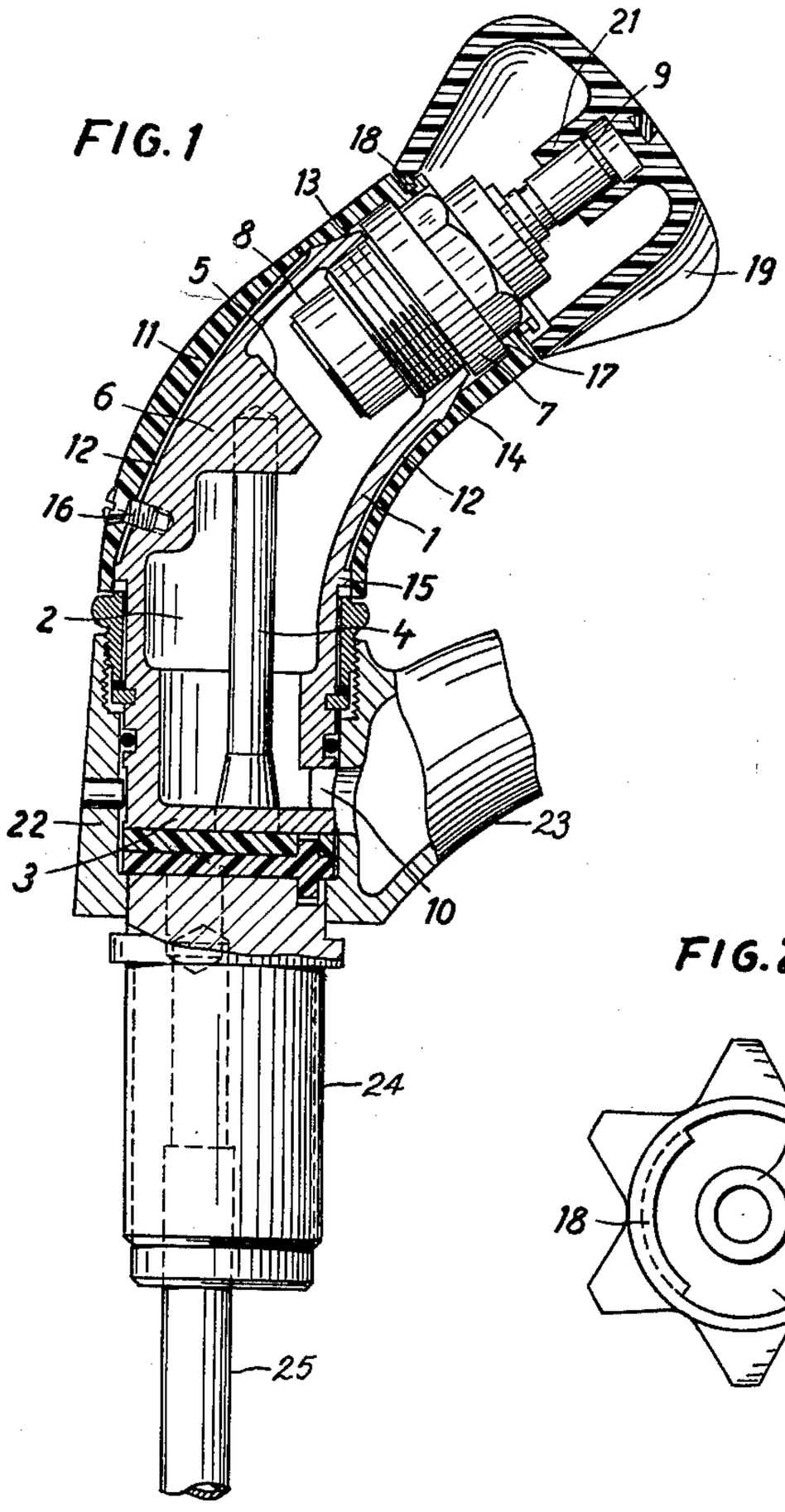

FIG. 2

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INSULATED HANDLE AND KNOB ASSEMBLY FOR FLUID CONTROL VALVES

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5 Claims. (Cl. 16—116)

This invention relates to fluid flow control valves which are actuated by a handle which is exposed to the action of the temperature of the medium flowing through the valve and which forms a part of a valve, and the invention relates more particularly to one-handled mixing valves.

In these valves, the end of the shaft which is disposed in the valve housing forms or carries the closure member of the valve which is in the form, for example, of a sealing disc and the shaft comes into contact with the hot fluid with the result that the shaft which projects out of the valve housing is heated to such a high temperature that it is no longer possible to hold the handle, which greatly interferes with the operation of the valve.

It is an object of this invention to obviate this difficulty by providing the free part of the swingable shaft which forms a part of the valve and which can be touched, with an insulating covering which is fitted over it and preferably consists of synthetic material. For this purpose the covering may be in the form of a hood or cap or the like or can be formed from a sheet or foil.

It is preferable that the insulating covering should only contact the shaft at spaced points and that an air gap should be left between the points of contact. The air gap increases the heat insulation and prevents the different coefficients of heat expansion having a disadvantageous effect. The air gap is preferably closed at the ends of the covering so that the covering does not collect dirt.

Preferably, the end of the shaft remote from the valve housing has a collar which tapers conically towards this end and the covering has, at the corresponding place, an internal shoulder of the same conicity as this collar, and the end of the shaft adjacent the valve housing has a rib over which the covering is fitted.

The insulating covering can be fixed to the shaft at the end adjacent the valve housing. The fixing at this end in combination with the conical surface of contact between the shaft and the covering at the other end enables the covering to be stretched to a certain exent relative to the shaft, so that the covering always retains a firm grip on the shaft independently of alterations in length due to the effect of heat.

The end of the covering remote from the valve housing can be made to form an internal shoulder, so that the covering fits on the shaft like a cap.

If the swinging shaft is provided with a rotatable knob at the end remote from the valve housing for actuating a valve arranged in the interior of the shaft then, in accordance with the invention, the knob is rotatably mounted on the end of the covering remote from the valve housing, and as usual in rotatable knobs, the end of the covering to be overlapped by the knob has a peripheral groove and the opening in the knob, which is of greater cross-sectional area than the end of the covering over which is engages, has on one side an inwardly projecting radial rib having the same radius of curvature as the peripheral groove for engagement therein, and the handle knob has an opening coaxial with the overlapped end of the covering for the reception of the likewise coaxial end of the spindle of a valve which is provided in the swinging shaft

when the covering is fitted over the swinging shaft after the rotatable knob has been attached to the end of the covering. Of course, the connection between the cover and the handle knob can be reversed, the end of the covering receiving the handle knob or the handle knob being inserted in the end of the covering.

The invention enables the swinging shaft to be hollow and to be formed with a through-flow or mixing chamber, which is of particular advantage for one-handled mixing valves.

A one-handled mixing valve may be constructed in such a way that the bottom of the mixing chamber which is formed by the swinging shaft and is situated in the interior of the valve housing has two openings, one of which is intended for cold water and the other for hot water, and a rising pipe extends from each opening and both pipes end in an extension of the inner wall of the mixing chamber which forms a common seating for the valve in the interior of the mixing chamber which is actuated by the handle knob, an outlet opening for the mixing water being then provided in the wall of the chamber at and above the bottom of the chamber.

The invention is not limited to one-handled mixing valves although it is preferably used for such mixing valves.

A one-handled mixing valve in accordance with the invention is illustrated, by way of example, in the accompanying drawings, in which:

FIGURE 1 is a longitudinal section through the swinging shaft and the valve housing; and

FIGURE 2 shows the handle knob viewed from the underside.

Referring to the drawing, the swinging shaft **1** consists of a hollow metal body forming a chamber **2**. Its straight end is inserted in a valve housing which comprises an upper portion **22** including an integral outlet or spigot **23** and a lower tubular portion **24** having a passage-way for connecting the rising pipe **4** to an inlet pipe **25**. The straight end of the shaft **1** forms with its bottom **3** in combination with a washer or sealing disc the closing means for the inflow of hot and cold water. Inlets for the hot and cold water are provided in the bottom **3** of the chamber. According to the position into which the shaft **1** is rotated, more cold water or more hot water can flow through the bottom **3** or only cold water or only hot water or no water at all can flow into the chamber **2**.

A rising pipe **4** is provided at each of the two inlet openings. These pipes open into a seating **5** which is formed by an extension **6** on the inner wall of the chamber. A bearing **7** for valve spindle **9** on which the valve cone **8** is mounted is inserted in the end of the shaft **1** remote from the valve housing. By rotating the valve spindle **9** the valve cone is pressed against the seating **5** or separated from it, whereby the valve is closed or opened. Depending on the degree to which the mouths of the pipes **4** have been opened by the spindle **9**, more or less water flows into the mixing chamber from the two rising pipes and through the outlet **10** at the bottom of the mixing chamber and an outlet in the valve housing to the place of use.

The portion of the shaft which projects out of the valve housing has a covering or a cap **11** of heat-insulating material which is fitted over it. There is an air gap **12** between the shaft and the cap. At the end remote from the valve housing the shaft is provided with a collar **13** which is in the form of a cone which tapers towards the end remote from the valve housing. The interior of the cap is of similar conical form at the corresponding place **14**. A cylindrical collar **15** is formed on the shaft at the end of the cap adjacent the valve housing and the cap is pushed over this collar. The cap is also fixed to this end of the shaft, for example by a set screw **16**.

The end of the cap which projects beyond the shaft has an internal shoulder **17** which overlaps the bearing **7** of the valve spindle **9** and bears against it. In the projecting end there is an annular groove in which a rib **18** engages. The rib is disposed at one side on the inner edge of the opening in the knob **19**, and is curved to the same curvature. The cross-sectional area of the opening **20** in the handle knob **19** is greater than that of the part of the cap **11** which it overlaps. The rib leaves free a section of the opening so that the handle knob can be inserted over the end of the cap. An extension **21** with an opening for insertion of the valve spindle **9** is provided in the interior of the handle knob. The opening is situated in the central axis of the handle. The valve spindle **9** is coaxial with the end of the cap.

Before the cap **11** is inserted over the shaft the handle knob is inserted over the end of the cap **11**. After this, the handle knob, together with the cap **11**, is pushed over the shaft, the extension **21** being fitted over the spindle **9**. For this purpose the cap must be displaced radially in order that the axis of the spindle **9** may be aligned with the axis of the opening in the extension **21**. By the radial displacement the rib **18** comes into engagement with the peripheral groove at the end of the cap and maintains this engagement, since it is secured against radial displacement by the spindle **9**. When the handle knob is rotated, the spindle **9** is rotated with it by the extension **21**.

We claim:

1. In a mixing valve for mixing hot and cold water having a single valve operating handle comprising a straight inner portion extending into the valve housing and a curved outer portion having a valve spindle mounted in its outer end supporting a rotatable handle knob, an insulating cap consisting of a flebible, tubular covering slidable over said curved outer end for disposition in spaced relation thereon, said insulating cap having inner circumferential portions in sealing contact around said curved outer end, said inner circumferential portions providing a sealed air space to reduce heat transfer from said outer end of said handle to said insulating cap.

2. In a mixing valve for mixing hot and cold water having a single valve operating handle comprising a straight inner portion extending into the valve housing and a curved outer portion having a valve spindle mounted in its outer end supporting a rotatable handle knob, an insulating cap consisting of a flexible, tubular covering slidable over said curved outer end for disposition in spaced relation thereon, a conically reduced collar on said operating handle at the end remote from said housing,

a corresponding conical inner shoulder on said cap sealingly engaging said conically reduced collar,

and a collar at the end edjacent said housing and sealingly engaging the inner surface of said cap.

3. The operating handle according to claim 2 including a fastening element for securing said cap to said outer end adjacent said housing.

4. The operating handle according to claim 2 comprising

a radially directed flange on said cap at its end remote from said housing and providing an inner shoulder facing said housing,

said valve spindle having a bearing sleeve disposed between said outer end of said operating handle and said inner shoulder of said insulating cap.

5. The operating handle according to claim 4 comprising

a peripheral groove in the end of said cap remote from said housing,

said handle knob having a rib extending inwardly along one side of its opening facing said cap and adapted to engage said groove for sliding movement therein, and an axially projecting tubular extension for securely engaging the outer end of said spindle.

References Cited by the Examiner

UNITED STATES PATENTS

1,475,654	11/23	Shea	16—116
1,609,117	11/26	Hansen	16—116.1
1,965,354	7/34	Patock	16— 116 X
2,231,222	2/41	Rosenheimer	16—116
2,703,967	3/55	Jester	137—381 X
2,815,527	12/57	Hollaway	16—116

FOREIGN PATENTS

507,374	9/30	Germany.
741,825	12/55	Great Britain.

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