

PATENT SPECIFICATION

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(54) FLUID FLOW CONTROL TAPS

(71) We, IMI OPELLA LIMITED, a British Company, of Kynoch Works, Witton, Birmingham B6 7BA do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to fluid flow control taps and more particularly but not exclusively to taps wherein an outlet spout is or may be required to be pivotally mounted in a tap body.

In tap constructions having pivotally mounted outlet spouts, it is known to provide an external flange on the spout whereby the spout may be retained in pivotable manner by means of an internally flanged collar screw threadedly engaged on the tap body and also engaging the flange of the spout.

It is also known to retain a flanged spout within a tap body by means of a circlip disposed in an internal groove in the tap body and engaging with the flange of the spout. However, the provision of screw threads or internal grooves in components lead to difficulties in manufacture and increased manufacturing costs.

According to the present invention, a fluid flow control tap comprises a tap body having passageway for flow of fluid, and an outlet opening from the passageway, an outlet spout having one end portion mounted in said outlet, said end portion having a circumferentially extending channel in its outer surface which receives keying means which co-operates with the body to retain the spout in fluid flow connection with the passageway, said keying means comprising an arcuate segment of a hollow cylinder which is releasably retained in the outlet of the body by means of a pin mounted in the body and extending into engagement with the segment to prevent relative rotation of the segment with respect to the body. The pin pre-

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ferably enters an aperture in the segment. This form of the invention permits the spout to be rotatably mounted in the body and is applicable more particularly to spouts of moulded plastics material wherein a recess of rectangular cross-section may be moulded in the spout.

If the spout is required to be non-rotatably mounted in the body, a second arcuate segment is disposed in the channel of the spout to abut with the first segment, the second segment having an aperture which locates around a projection of the spout and extending into the channel of the spout thereby to prevent the rotation of the spout with respect to the arcuate segments.

The keying means may also comprise a collar mounted around the end portion of the spout, the collar having an internal circumferential rib located in a circumferentially extending channel of the spout, and an external circumferentially extending channel which receives an arcuate segment releasably retained in the tap body. This form of the invention is applicable more particularly to spouts made from drawn metal tube wherein a narrow channel of semi-circular cross-section is conveniently formed in the tube material.

Advantageously the collar is slotted from one end to a position beyond the internal rib to permit radial expansion of the collar whilst it is being mounted on the end portion of the spout.

Embodiments of the invention will now be described by way of example only with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view of part of a tap according to a first embodiment;

Figure 2 is a view similar to Figure 1 but showing a second embodiment of the invention;

Figure 3 is an axial cross-sectional view

of a tap according to a third embodiment;

Figure 4 is a perspective view of a part of the tap of Figure 3, and

Figure 5 is a cross-sectional view along line V-V of Figure 3 but showing a modification of the third embodiment.

Referring to Figure 1, a fluid flow control tap, for example, a domestic water tap, has its major parts of moulded plastics material and comprises a tap body 10 having a passageway 11 for flow of water, and a cylindrical outlet 12, opening from the passageway. An outlet spout 13 has an end portion 14 for mounting in the outlet and is provided with a circumferentially extending channel 15 in its outer surface. Between the channel 15 and the adjacent end of the spout an O-ring seal 16 is disposed in an appropriate groove. The channel 15 is of rectangular cross-section and receives a keying means in the form of an arcuate segment 17 which subtends an angle of 180° and is dimensioned to be slidably engaged in the channel 15. An aperture or hole 18 extends through the segment at its centre to receive the plain end of a countersunk head pin 19 of which a screw threaded portion is engaged in a hole in the tap body.

To assemble the tap, the segment 17 is located in the channel 15 and the end portion of the spout is then inserted into the outlet 12 until the pin 19 can be entered into the hole 18 of the segment. The spout is thus retained in the outlet 12 by virtue of the keying arrangement of the segment 17 with the channel 15 and with the pin 19 but the spout is also rotatable in the outlet.

In this first embodiment the channel 15 extends completely around the end portion of the spout but in a modification, not shown, the channel may extend around part only of the end portion so that the ends of the channel form abutment surfaces for the arcuate segment to limit rotational movement of the spout. The arcuate length of the segment may also be suitably varied to provide a limited rotational movement of the spout.

In a second embodiment (Figure 2) the general arrangement of the tap is similar to that of the first embodiment and the same reference numbers have been used for the like parts. For the second embodiment the spout 13 is modified by the provision of a location peg 20 formed integrally with the spout and projecting radially outwardly from the base of the channel 15. A second semi-circular segment 21 is provided having a hole 22 to engage around the peg 20 when the segment is seated in the channel 15.

Upon assembling the tap the two segments 17 and 21 constitute a collar around the end portion of the spout but the spout is prevented from rotating by means of the peg 20 engaging with the segment 21 which, in turn,

is prevented from rotation by means of the segment 17 and pin 19.

In a third embodiment (Figures 3 and 4) a domestic mixer tap for mixing hot and cold supplies of water comprises a body 23 having passageways 24 for the flow of water (one passageway only is shown in the drawing). The passageways 24 open into an outlet 25. The outlet is stepped as at 26 to form a recess which receives an O-ring seal 27, and is again stepped at 28 to provide a bore 29.

A spout 30 is made from drawn tube and an end portion 31 has a circumferential channel 32 of semi-circular cross-section.

A keying means for this third embodiment comprises a collar 33 mounted around the end portion 31 of the spout. The collar has an internal circumferential rib 34 of semi-circular cross-section which locates in the channel 32 of the spout. The collar also has an external circumferential channel 35 of rectangular cross-section to receive an arcuate segment 36, this segment having a hole to receive the end of a pin 37 screw threadedly engaged in the body 23. In order to assemble the collar onto the end portion of the spout, the collar is slotted from one end at diametrically opposed positions to provide axially directed slots 38 (Figure 4) which extend beyond the rib 34 and open into ends of circumferentially extending slots 39. The provisions of the slots 38 and 39 permit the collar to expand radially outwards whilst the collar is being mounted on the spout and the rib 34 is sliding along the end portion before the rib locates in the channel 32.

In the third embodiment as described above either the spout is rotatable within the collar through 360°, or the collar and spout may rotate together relative to the tap body 23.

In a modification of the third embodiment, the collar tightly engages the spout and has a rib 40 (Figure 5) extending across the channel 35 which limits the rotational movement of the collar and spout by abutting the ends of the segment 36.

The above constructions of tap according to the invention provide taps wherein the outlet spouts may be rotatably or non-rotatably mounted in tap bodies and obviate the provision of screw threads to couple the spout to the body, and obviate internal grooves in the tap parts.

WHAT WE CLAIM IS:—

1. A fluid flow control tap comprising a tap body having a passageway for flow of fluid, and an outlet opening from the passageway, an outlet spout having one end portion mounted in said outlet, said end portion having a circumferentially extending channel in its outer surface which receives keying means which co-operates with the body to retain the spout in fluid flow connection with the passageway, said keying



of a tap according to a third embodiment;

Figure 4 is a perspective view of a part of the tap of Figure 3, and

Figure 5 is a cross-sectional view along line V-V of Figure 3 but showing a modification of the third embodiment.

Referring to Figure 1, a fluid flow control tap, for example, a domestic water tap, has its major parts of moulded plastics material and comprises a tap body 10 having a passageway 11 for flow of water, and a cylindrical outlet 12, opening from the passageway. An outlet spout 13 has an end portion 14 for mounting in the outlet and is provided with a circumferentially extending channel 15 in its outer surface. Between the channel 15 and the adjacent end of the spout an O-ring seal 16 is disposed in an appropriate groove. The channel 15 is of rectangular cross-section and receives a keying means in the form of an arcuate segment 17 which subtends an angle of 180° and is dimensioned to be slidably engaged in the channel 15. An aperture or hole 18 extends through the segment at its centre to receive the plain end of a countersunk head pin 19 of which a screw threaded portion is engaged in a hole in the tap body.

To assemble the tap, the segment 17 is located in the channel 15 and the end portion of the spout is then inserted into the outlet 12 until the pin 19 can be entered into the hole 18 of the segment. The spout is thus retained in the outlet 12 by virtue of the keying arrangement of the segment 17 with the channel 15 and with the pin 19 but the spout is also rotatable in the outlet.

In this first embodiment the channel 15 extends completely around the end portion of the spout but in a modification, not shown, the channel may extend around part only of the end portion so that the ends of the channel form abutment surfaces for the arcuate segment to limit rotational movement of the spout. The arcuate length of the segment may also be suitably varied to provide a limited rotational movement of the spout.

In a second embodiment (Figure 2) the general arrangement of the tap is similar to that of the first embodiment and the same reference numbers have been used for the like parts. For the second embodiment the spout 13 is modified by the provision of a location peg 20 formed integrally with the spout and projecting radially outwardly from the base of the channel 15. A second semi-circular segment 21 is provided having a hole 22 to engage around the peg 20 when the segment is seated in the channel 15.

Upon assembling the tap the two segments 17 and 21 constitute a collar around the end portion of the spout but the spout is prevented from rotating by means of the peg 20 engaging with the segment 21 which, in turn,

is prevented from rotation by means of the segment 17 and pin 19.

In a third embodiment (Figures 3 and 4) a domestic mixer tap for mixing hot and cold supplies of water comprises a body 23 having passageways 24 for the flow of water (one passageway only is shown in the drawing). The passageways 24 open into an outlet 25. The outlet is stepped as at 26 to form a recess which receives an O-ring seal 27, and is again stepped at 28 to provide a bore 29.

A spout 30 is made from drawn tube and an end portion 31 has a circumferential channel 32 of semi-circular cross-section.

A keying means for this third embodiment comprises a collar 33 mounted around the end portion 31 of the spout. The collar has an internal circumferential rib 34 of semi-circular cross-section which locates in the channel 32 of the spout. The collar also has an external circumferential channel 35 of rectangular cross-section to receive an arcuate segment 36, this segment having a hole to receive the end of a pin 37 screw threadedly engaged in the body 23. In order to assemble the collar onto the end portion of the spout, the collar is slotted from one end at diametrically opposed positions to provide axially directed slots 38 (Figure 4) which extend beyond the rib 34 and open into ends of circumferentially extending slots 39. The provisions of the slots 38 and 39 permit the collar to expand radially outwards whilst the collar is being mounted on the spout and the rib 34 is sliding along the end portion before the rib locates in the channel 32.

In the third embodiment as described above either the spout is rotatable within the collar through 360°, or the collar and spout may rotate together relative to the tap body 23.

In a modification of the third embodiment, the collar tightly engages the spout and has a rib 40 (Figure 5) extending across the channel 35 which limits the rotational movement of the collar and spout by abutting the ends of the segment 36.

The above constructions of tap according to the invention provide taps wherein the outlet spouts may be rotatably or non-rotatably mounted in tap bodies and obviate the provision of screw threads to couple the spout to the body, and obviate internal grooves in the tap parts.

WHAT WE CLAIM IS:—

1. A fluid flow control tap comprising a tap body having a passageway for flow of fluid, and an outlet opening from the passageway, an outlet spout having one end portion mounted in said outlet, said end portion having a circumferentially extending channel in its outer surface which receives keying means which co-operates with the body to retain the spout in fluid flow connection with the passageway, said keying



- means comprising an arcuate segment of a hollow cylinder which is releasably retained in the outlet of the body by means of a pin mounted in the body and extending into engagement with the segment to prevent rotation of the segment with respect to the body.
2. A tap according to claim 1 wherein the pin enters an aperture in the segment.
3. A tap according to claim 1 or claim 2 wherein a second arcuate segment is disposed in the channel of the spout to abut with the first segment, the second segment having an aperture which locates around a projection of the spout and extending into the channel of the spout, thereby to prevent rotation of the spout with respect to the arcuate segments.
4. A tap according to claim 1 or claim 2 wherein the keying means further comprises a collar mounted around the end portion of the spout, the collar having an internal circumferential rib located in a circumferentially extending channel of the spout, and an external circumferentially extending channel which receives the arcuate segment releasably retained in the tap body.
5. A tap according to claim 4 wherein the collar is slotted from one end to a position beyond the internal rib to permit radial expansion of the collar whilst it is being mounted on the end portion of the spout.
6. A fluid flow control tap constructed and arranged substantially as described herein with reference to, and as shown in Figure 1 of the accompanying drawings.
7. A fluid flow control tap constructed and arranged substantially as described herein with reference to, and as shown in Figure 2 of the accompanying drawings.
8. A fluid flow control tap constructed and arranged substantially as described herein with reference to, and as shown in Figures 3 and 4 of the accompanying drawings.
9. A fluid flow control tap constructed and arranged substantially as described herein with reference to, and as shown in Figures 3 and 4 and as modified in Figure 5 of the accompanying drawings.

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