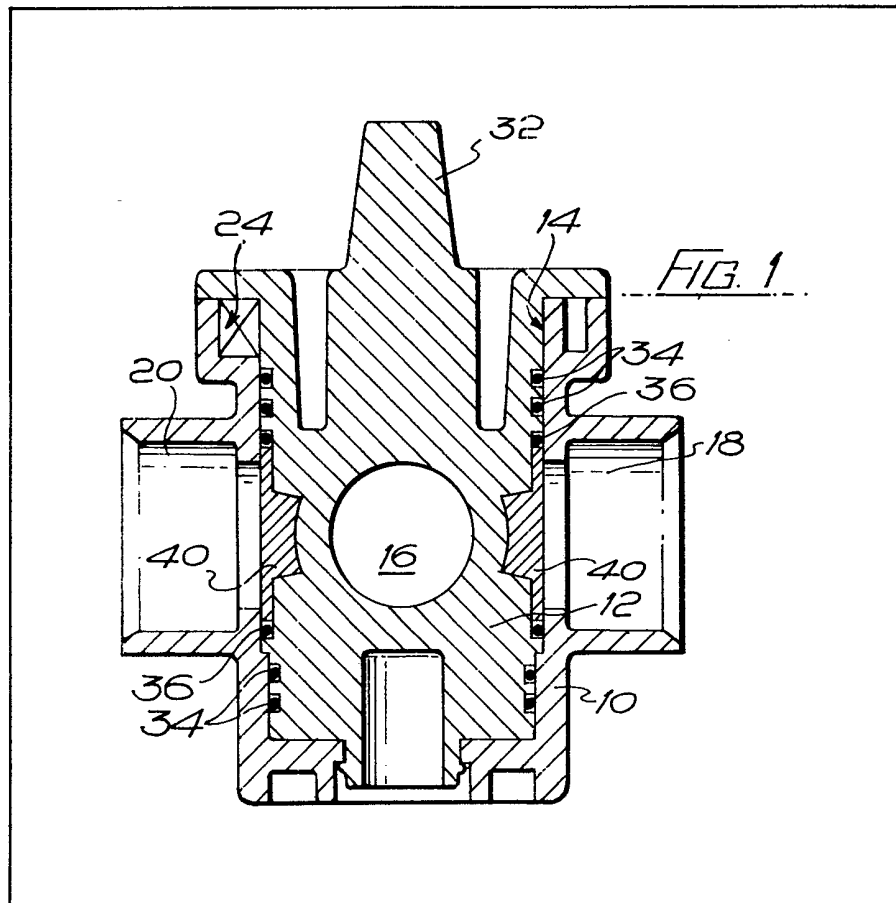


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GB 1144653
GB 1126881
GB 1048022
GB 1038614
GB 1021334
GB 728351
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(54) Rotary plug valve

(57) A plug valve with an O-ring seal (36) arranged to surround the inlet passage (18) or the outlet passage (20) when the valve is closed, the O-ring seal being retained in an annular depression in the wall of the plug element (12) of the valve by means of a locating member (40) secured in an aperture in the wall of the plug element. The locating member has a flared outermost part conforming to the curvature of the plug element (12) and partially embracing the O-ring seal (36) to retain it in the annular depression against any tendency for it to be displaced therefrom when the plug element (12) is rotated in the body (10). The rotary plug may be cylindrical or conical.



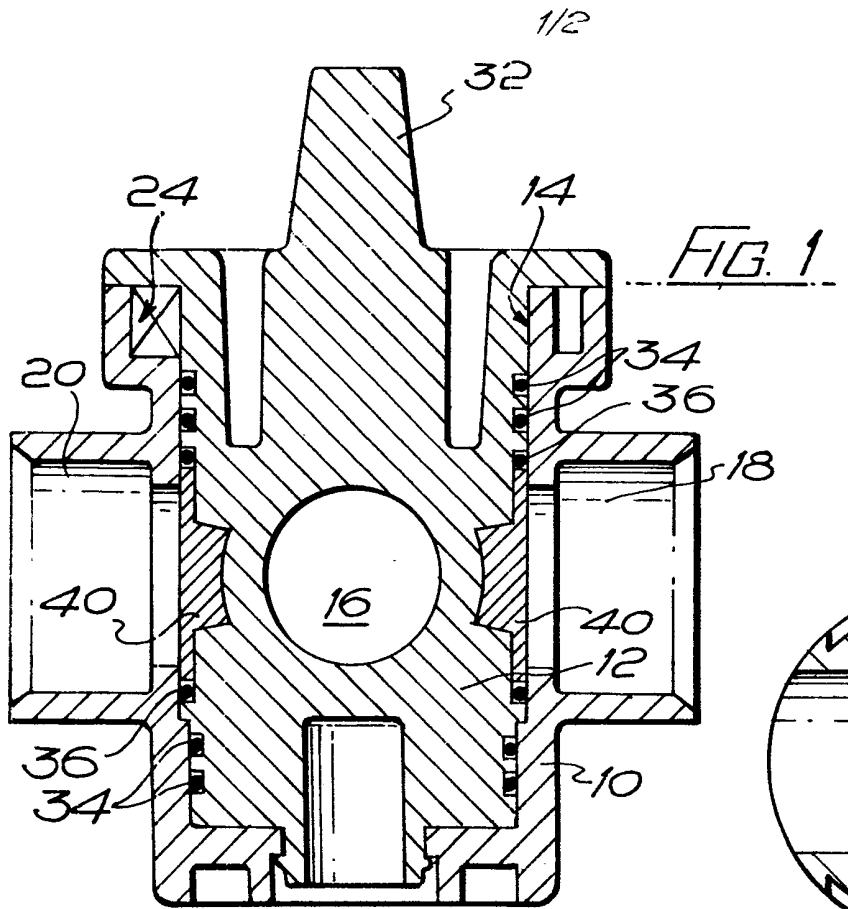


FIG. 1

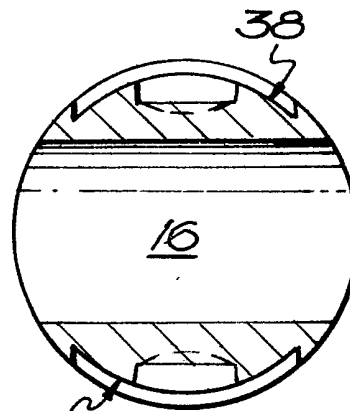


FIG. 3

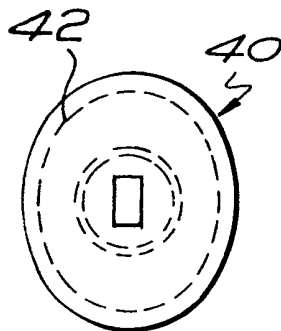


FIG. 4

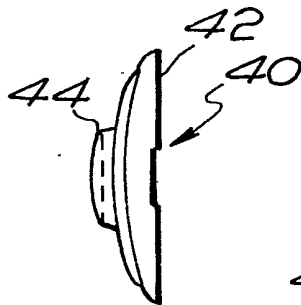


FIG. 5

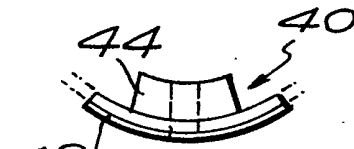


FIG. 6

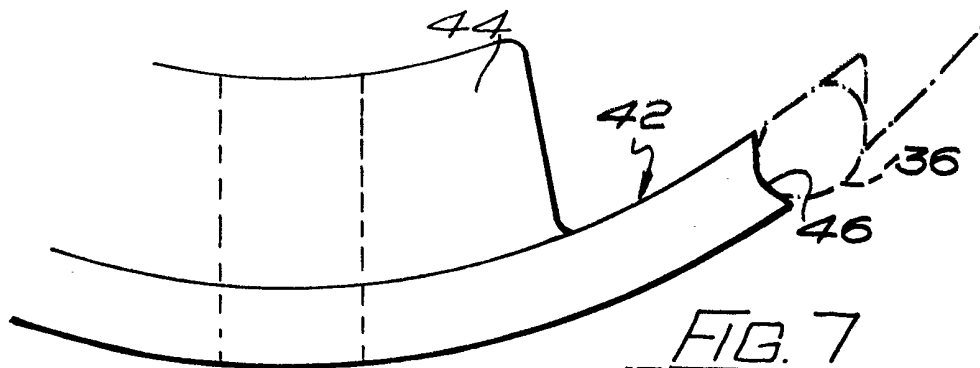


FIG. 7

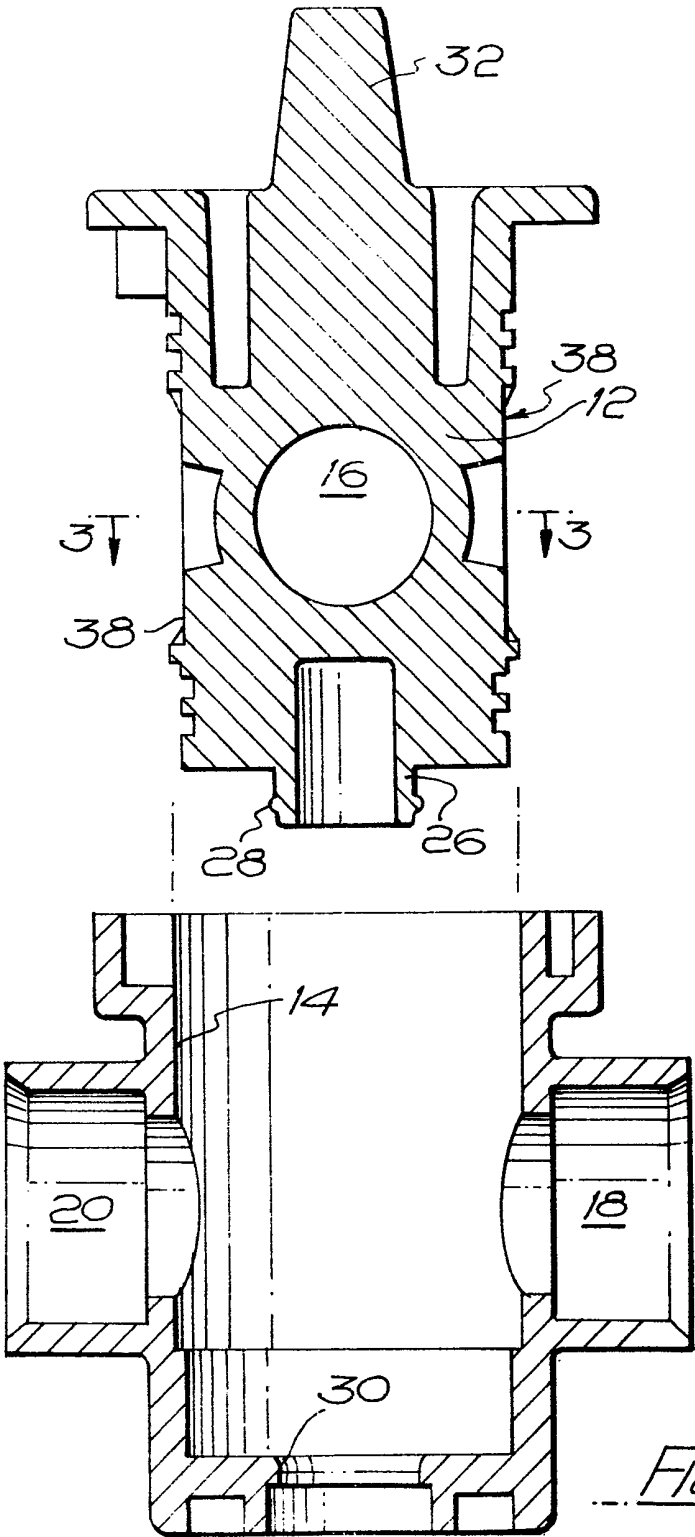


FIG. 2

SPECIFICATION

An improvement in or relating to plug valves

5 The invention relates to plug valves and has for its object to provide an improvement therein.

Plug valves are well known for controlling the flow of liquids and gases and are generally of very simple construction, having a body with either a cylindrical or frusto-conical bore and a plug element of similar shape, said plug element having a diametrical flow passage and being capable of being disposed so that said flow passage is aligned with respective inlet and outlet flow passages in the body whereby the valve is open or, alternatively and selectively, of being disposed so that said flow passage extends at right angle to a plane containing the inlet and outlet passages whereby the valve is closed. In such a valve, the plug element can fairly easily be provided with sealing means to guard against the leakage of the liquid or gas from the valve, that is to say leakage axially along the plug element, but it is rather more difficult to provide sealing means for guarding against leakage of the liquid or gas around the plug element, that is to say from the inlet passage to the outlet passage when the valve is closed.

According to the invention, there is provided a plug valve the plug element of which has a diametrical flow passage and, in a plane at right angles to a plane containing the flow passage, an O-ring seal arranged to surround the inlet passage or the outlet passage, within the bore of the body part, when the valve is closed, the O-ring seal being retained in an annular depression in the wall of the plug element by means of a locating member fixedly secured in an aperture in the wall of the plug element, the locating member having a flared outermost part conforming to the curvature of the plug element and partially embracing the O-ring seal to retain it in the annular depression against any tendency for it to be displaced therefrom when the plug element is rotated in the body. The locating member may be fixedly secured in the aperture in the wall of the plug element by means of an adhesive or by fusion jointing or by means of a screw. Inter-engaging portions of the locating member and of the aperture in which it is located may be provided to ensure that the flared outer end of the locating member is correctly orientated relative to the plug element, that is to say so that it conforms to the curvature of the plug element. Means may be provided for limiting the rotation of the plug element within the valve body so that when moved to the limit of its travel in one direction it fully opens the valve and when moved to the limit of its travel in the other direction it fully closes the valve.

The plug element may be retained in the valve body by means of the snap fit location of a spigot portion of the plug element in a hole in the body co-axial with the bore in which the plug element is located.

60 In order that the invention may be fully understood and readily carried into effect, the same will now be described, by way of example only, with

reference to the accompanying drawings, of which:—

65 Fig. 1 is a sectional view of a plug valve embodying the invention,

Fig. 2 is an exploded part-sectional view of the valve,

Fig. 3 is a sectional view on the line 3-3 in Fig. 2,

70 Figs. 4, 5 and 6 are respective front, side and plan views of a locating member forming part of a plug element of the valve, and

Fig. 7 is an enlarged view of a part of the locating member.

75 Referring now to the drawings, the plug valve there illustrated includes a valve body 10 and a generally cylindrical plug element 12 located within a cylindrical bore portion 14 of the body. Both the valve body and the plug element are made of a moulded synthetic plastics material. The plug element is provided with a diametrical flow passage 16 and is capable of being disposed so that said flow passage is aligned with respective inlet and outlet flow passages 18 and 20 in the valve body, whereby the valve is open or, alternatively and selectively, being disposed so that said flow passage 16 extends at right angles to a plane containing the inlet and outlet passages whereby the valve is closed. Means are provided for limiting the rotation of the plug element within the valve body so that when moved to the limit of its travel in one direction it fully opens the valve and when moved to the limit of its travel in the other direction it fully closes the valve. These means are constituted by an abutment member 22 which is formed on the plug element and which is located in a channel 24 which extends only part way around the upper portion of the body, the opposite ends (not shown) of the channel constituting abutment surfaces which limit the extent of movement of the abutment member along the channel and limit the rotation of the plug element.

The plug element is provided at its lower end with a spigot portion 26 having a circumferential ring part 28 which is a tight push fit through a hole 30 in the body co-axial with the bore portion 14. The plug element thus has snap fit location in the body and no other means are provided for retaining the plug element in position. At its upper end, the plug element is provided with an upstanding square shaped projection 32 to which a handle (not shown) can be connected for opening and closing the valve. Around upper and lower portions of the plug element there are formed circumferential grooves for the location of O-ring seals 34 which serve to prevent the leakage of liquid or gas from the valve.

115 Referring now in particular to Fig. 3, it will be seen that the plug element is provided, in a plane at right angles to a plane containing the flow passage 16, with respective O-ring seals 36 arranged to surround the inlet and outlet passages within the bore of the body part when the valve is closed. Each O-ring seal 36 is retained in an annular depression 38 in the wall of the plug element by a locating member 40 fixedly secured in an aperture in the wall of the plug ele-

ment. The locating member 40 is illustrated in Figs. 4 to 7 and it will be seen that a cap portion 42 thereof conforms to the curvature of the plug element. A tapering spigot portion 44 of the locating member is

5 secured by an adhesive in a similarly shaped aperture in the plug element.
As best seen in Fig. 7, the cap portion of each locating member is of slightly smaller size than the depression in the wall of the plug element in which it is disposed so that an annular space is formed for receiving the O-ring seal 36. However, the cap portion is shown to be provided with a flared outermost part 46 which partly overlies the O-ring seal (shown in chain-dotted lines in Fig. 7). In this way, the seal is

15 retained in the annular depression against any tendency for it to be displaced therefrom when the plug is rotated in the valve body.
Thus there is provided a plug valve of very simple construction and provided with an O-ring seal (or a pair of O-ring seals) located in the plug element in a manner which has been found to very effectively retain the or each seal against any tendency for it to be displaced when the plug element is rotated in the valve body (and it will be understood that the working conditions for the or each seal are particularly rigorous by virtue of the fact that it has to pass across the inlet or outlet flow passage as the plug element is rotated to open or close the valve).

20 Various modifications may be made without departing from the scope of the invention. For example, the plug element could be provided with but a single O-ring seal instead of a pair of oppositely disposed seals. It will also be understood that, if preferred, the plug element could be retained in the valve body by means other than a snap fit retention arrangement. The locating member for retaining the or each O-ring seal in its annular depression in the wall of the plug element need not be fixedly secured in its aperture in the plug element by means of an adhesive. On the contrary, it could be secured by means of a screw or by fusion jointing.

30 It will be understood that since the cap portion of the locating member illustrated is of a constant thickness to suit the shape of a portion of the moulded aperture in the plug element which is of a constant depth, the proper seating of the locating member in its aperture will ensure that its outermost part will conform to the curvature of the plug element. However, other means may be provided for ensuring the correct orientation of the or each locating member in its aperture in the plug element. For example, the locating member could be provided with a non-circular socket portion for the reception of a locating element forming part of an assembly jig. Alternatively, or in addition to this, the spigot portion of the or each locating member could be of non-circular shape for securement in a similarly non-circular shaped aperture in the plug element. The invention is of course equally applicable to the kind of plug valve having a frusto-conical plug element, but of course in this case the locating member will be of a slightly different shape to conform to the curvature of the plug element.

CLAIMS

65 1. A plug valve the plug element of which has a

diametrical flow passage and, in a plane at right angles to a plane containing the flow passage, an O-ring seal arranged to surround the inlet passage or the outlet passage, within the bore of the body part, when the valve is closed, the O-ring seal being retained in an annular depression in the wall of the plug element by means of a locating member fixedly secured in an aperture in the wall of the plug element, the locating member having a flared outermost part conforming to the curvature of the plug element and partially embracing the O-ring seal to retain it in the annular depression against any tendency for it to be displaced therefrom when the plug element is rotated in the body.

2. A plug valve according to claim 1, in which the locating member is fixedly secured in the aperture in the wall of the plug element by means of an adhesive or by fusion jointing or by means of a screw.

3. A plug valve according to either one of the preceding claims, in which interengaging portions of the locating member and of the aperture in which it is located are provided to ensure that the flared outer end of the locating member is correctly orientated relative to the plug element, that is to say so that it conforms to the curvature of the plug element.

4. A plug valve according to any one of the preceding claims, provided with means for limiting the rotation of the plug element within the valve body so that when moved to the limit of its travel in one direction it fully opens the valve and when moved to the limit of its travel in the other direction it fully closes the valve.

5. A plug valve according to any one of the preceding claims, in which the plug element is retained in the valve body by means of the snap fit location of a spigot portion of the plug element in a hole in the body co-axial with the bore in which the plug element is located.

6. A plug valve constructed, arranged and adapted to operate substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings.