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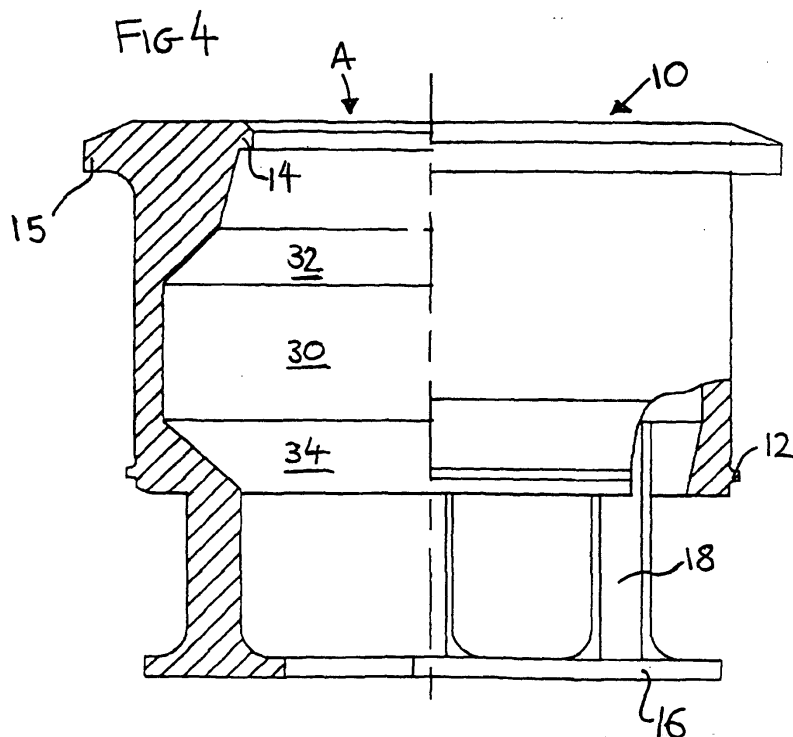
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(54) **Beer keg and valve fitting**

(57) A fitting (F) for a fluid storage barrel (B) comprises an integral housing (10) including a valve having a seal (24) and spring (20) for biasing the seal (24) against the valve seat (14) to close the aperture (A). The fitting (F) is located within the opening (O) of the barrel (B) directly, for example by welding. The fitting includes

an annular cavity substantially larger than aperture (A) for larger flow volume past opened seal (24) and relatively large apertures between legs (18) enhance flow and a bottom plate (16) that diverts incoming fluid laterally to the barrel sides. The spring (20) and seal plate (22) each includes means to avoid accidental removal from the fitting.



EP 1 477 456 A2

Description

[0001] The invention relates to kegs or barrels used' for holding fluids such as beer. In particular, the invention relates to a fitting for such a barrel which enables efficient transfer of fluid in and out of the barrel as well as other advantages set out below.

[0002] It is known to store fluid such as beer under pressure in kegs having a fitting comprising a valve which enables transfer of the fluid in and out of the barrel. Since the fluid is stored under pressure, the valve needs to be effective over a range of fluid pressures. Such valves generally comprise a spring under compression which has been known to cause problems with ejection of components from the barrel due to tampering for example. Additionally, the fitting should preferably be robust in its own right to safeguard against damage for example due to the barrel being dropped or another barrel being dropped directly on to the fitting. Additionally, the fitting should enable efficient transfer of fluid in and out of the barrel.

[0003] Known barrels generally comprise a top wall having an integral neck which defines a bore into the barrel. A spear is then provided for attachment to the neck in order to locate a down tube to the bottom of the barrel and provide a valve within the neck. The spear is usually attached to the neck using co-operating threading. These type of barrels do not provide all of the objectives set out above and accordingly the invention seeks to provide an improved fitting for a barrel.

[0004] According to one aspect of the invention there is provided a barrel for storage of fluids comprising a flat top wall defining an aperture into the barrel, a fitting located within the aperture and attached directly to the barrel top for example by welding, wherein the fitting enables transfer of fluid in and out of the barrel. Beneficially therefore the fitting can comprise a valve and down tube in a readily assembled form which can be directly attached to a barrel for example by welding. Such a fitting can therefore be very robust and the barrel can be easily assembled or completed.

[0005] In addition, or independently thereof, the invention provides a fitting comprising an integral housing having an aperture, a valve seat and means for co-operating with valve biasing means, the fitting further comprising a valve having a seal and means for biasing the seal against the valve seat to close the aperture. The housing can be directly attached to the top of the barrel for example by welding therefore removing the need for any co-operating screw threads for attachment to a neck for example.

[0006] The housing can comprise means such as an annular flange for providing attachment to a pipe connector for example. The flange provided can be integral with the housing and therefore can be defined by smooth surfaces without any grooves or inlets thereby preventing collection of any dirt for example. Accordingly, the housing near the connection flange can be con-

tinuous or uninterrupted.

[0007] Preferably the fitting comprises a plate positioned within the barrel and preferably below the barrel wall comprising the inlet aperture. Beneficially the plate acts to divert incoming fluid laterally towards the side of the barrel. Preferably the plate depends from the housing and can be integral with the housing for example being separated by one or more legs from the main part of the housing. Beneficially therefore it is possible to define apertures in the side of the housing between the main part and the plate which allows movement of fluid laterally into the barrel. Preferably the circumferential width of the leg or legs is minimised in order to maximise the aperture space. For example, the width of the leg or legs around the circumference is preferably less than a fifth of the circumference, and more preferably less than one tenth of circumference. For example, the legs might occupy an angle of about 36° enabling fluid transfer through the remaining 324° of the apertures. Preferably, the separation of the plate from the main part of the housing is in the order of 20 mm and can be 18 mm for example.

[0008] According to another feature, the housing defines a chamber below the inlet aperture. The chamber can be wider than the inlet aperture and preferably can comprise a fluid guide out of the chamber which narrows to direct the fluids towards the plate.

[0009] In one form, the fitting comprises a tube or centre piece placed positioned within the fitting. The centre piece can comprise an end which lies within the inlet aperture of the housing thereby partly to define the top of the fitting. The centre piece can comprise a down tube which enables flow of fluid from the bottom of the barrel up to the fitting aperture through a central bore and through apertures near the top end. Preferably, the centre piece comprises means for co-operating with the housing to locate the centre piece in use. Co-operating means for locating the centre piece in a fixed axial position with respect to the housing can comprise a lug and slot (or keyway) arrangement. For example, the centre piece can comprise one or more pairs of lugs which radially protrude from the centre piece. The plate can comprise one or more co-operating slots such that a first of a pair of lugs is able to pass through the slot but a second larger lug of the pair is unable to pass through the slot. Accordingly, location of the centre piece after passing the first lug through the slot enables the centre piece to be located axially with respect to the housing. Preferably there is also provided means for locating the centre piece rotationally with respect to the housing.

[0010] Accordingly minimum movement of the centre piece and down tube therefore occurs when moving a barrel. For example, co-operating means can be provided by the spring, plate and centre piece in order rotationally to locate the centre piece. In a particular form, a co-operating slot is provided in the bottom plate and centre piece which when aligned enable a lug to be lo-

cated therein. However, once the lug is located in the aligned slots it is sufficiently large to prevent rotation of the centre piece and plate away from each other. Preferably, the position of the co-operating apertures locates the centre piece such that the pair (or pairs) of axial limiting lugs are positioned proximal a housing leg which connects the plate to the main part of the housing. For example, the axial locating lugs might be positioned in radial alignment with such a housing leg.

[0011] An embodiment of the invention will now be described, by way of example only with reference to the accompanying drawings in which:

FIGURE 1 is a schematic sectional side elevation view of a barrel according to the invention;

FIGURE 2 is a partial sectional side elevation view of a fitting according to the invention in a partial assembled form;

FIGURE 3 is a view of the fitting shown in Figure 2 when assembled;

FIGURE 4 is a partially sectional side elevational view of a housing forming part of the fittings shown in Figures 2 and 3;

FIGURE 5 is a plan elevation of a plate forming part of the housing shown in Figure 4;

FIGURE 6 is a centre piece forming part of a fitting according to the invention;

FIGURES 7 and 8 are a partial sectional side elevation view and plan elevation view of the centre piece shown in Figure 6;

FIGURES 9 and 10 are a plan and side elevation view of a spring for a fitting according to the invention;

FIGURES 11 and 12 are a partial sectional side elevation view and plan view of a plate for a fitting according to the invention; and

FIGURE 13 is a partial sectional side elevation view of a seal process in accordance with the invention.

[0012] In a particular form the invention provides a barrel B having a top wall 2 which defines an orifice O in which is located a fitting F. The fitting F comprises a housing 10 having a lower annular flange 12. Flange 12 abuts the rim of orifice O and can for example be welded to the top wall T of the barrel in order to securely locate the fitting F to the barrel.

[0013] The housing 10 comprises another annulus or flange 14 which defines an aperture A for allowing egress and ingress of fluid to the barrel. A further flange

in the form of outer annulus 15 is also provided to enable attachment of a pipe connector to the barrel in order to allow transfer of fluid therefrom. Housing 10 further comprises a bottom plate 16 connected to the main part of the housing by legs 18. Here, three legs are provided each angularly spaced by 120°C. The housing 10 further defines a cavity 30 which as a larger diameter than aperture A. The cavity shown is defined in part by an upper shoulder 32 and lower shoulder 34 which narrows the cavity in the direction of plate 16. Preferably housing 10 is formed from an integral moulding and legs 18 flare at one end in order to provide good attachments to plate 16. In the form shown, the circumferential width of the legs 18 at their inner radial edge is approximately one tenth the circumference thereby providing relatively large apertures for flow of fluid there through.

[0014] Referring to Figure 5, it can be seen that bottom plate 16 comprises an aperture 36 for locating centre piece 28. The aperture is defined by a rim in plate 16 which in this embodiment has three slots 38.

[0015] Centre piece 28 provides an outlet tube which can be a two part construction having a closed upper end 48, a substantially cylindrical wall defining a through bore from an open end to apertures 46 in the side wall near end 38. Centre piece 28 carries three pairs of protruding lugs. The pairs of lugs comprise a first smaller lug 42 and a second larger lug 40 which protrudes radially from the centre piece 28. The three pairs of protruding lugs are equally spaced at 120° separations around the circumference of the centre piece 28. The open end of centre piece 27 is adapted to receive down tube 26 thereby to form a relatively long substantially cylindrical centre piece for location in aperture 36 of plate 16 and housing 10. The centre piece 28 further comprises a groove 44 preferably located substantially halfway between two pairs of lugs, as shown in Figure 6.

[0016] Fitting F further comprises a spring 20, plate 22 and seal 24. The spring can be a helical winding of stainless steel wire for example. The spring preferably comprises a flat upper end 50 for attachment to plate 22, and a flat opposite end comprising a radially protruding lug 52 and an axially depending foot 54. Lug 52 can be formed by bending the wire radially outwardly and then curving it back in as shown in figure 9. Foot 54 can be formed also from wire simply by straightening wire in the downward direction shown in Figure 10.

[0017] Plate 22 shown in Figures 11 and 12 comprises a upper curved surface 56 for receiving seal 24 and a lower curved surface 58 for receiving end 50 of spring 20. Plate 22 further comprises three crimping lugs 60 which depend from the outer circumference of plate 22 and enable the plate to grip the end 50 of spring 20. The seal 24 is shown in detail in Figure 13 and providing a lower surface 62 for seating in the plate 22. The seal further comprises an inner somewhat cylindrical surface 64 for gripping centre piece 28, and an annular region 66 which abuts flange 14 in use.

[0018] To assemble fitting F, once housing 10 is at-

tached to barrel B, the centre piece 28 comprising down tube 26 is inserted through aperture A of housing 10 and aperture 36 of plate 16, until the first lug 42 of the pairs of lugs on centre piece 28 abut plate 16. The centre piece is then rotated to align lugs 42 with slots 38 enabling the centre piece 28 to move axially further into the barrel. When first lugs 42 have passed beyond plate 16, the centre piece 28 is rotated to align groove 44 with one of these slots 38. In so doing, each of the pairs of lugs 40 and 42 is radially aligned with a leg 18. This has the benefit of enabling effective transfer of force from the centre piece 28 to legs 18 and housing 10, in the event that the closed end 48 of centre piece 28 is hit by a large force.

[0019] Spring 20 is then passed into housing 10 by tilting the spring so to pass foot 54 and lug 52 into chamber 30 before aligning the longitudinal axis of spring 20 with the axis of centre piece 28 and passing the spring 20 downwardly until foot 54 is located in groove 44 and the previously aligned slot 38.

[0020] The bottom end of spring 20 adjacent lug 52 thus rests on the upper surface of lugs 40 on the centre piece. This arrangement thus forces the centre piece against plate 16 in use.

[0021] Plate 22, if not already attached to end 50 of spring 20, can then be attached and lugs 60 crimped inwardly to grip the spring. Seal 24 is then passed downwardly into plate 22. In order to continue this movement to effect location of seal 24 against flange 14 as shown in Figure 3, a large mechanical force is required to pass seal 24 over the top end 48, having annulus 49 of centre piece 28. This can be achieved by hand using a lever mechanism.

[0022] Accordingly, when assembled, fitting F has the form shown in Figure 3. The integral housing 10 is securely fastened to the barrel B and a strong effective valve is formed due to the co-operation of plate 16 and flange 14 of housing 10, and spring 20 which biases seal 20 into position. An effective seal is made against the securely located centre piece 28 due to annular surface 68 of seal 24 against flange 49 of centre piece 28, and due to the further closure of aperture A by the abutment of annulus 66 against seat 14. In order to pass fluid in or out of barrel B, the seal 24 is displaced inwardly against the force of spring 20. Beneficially, seal 24 passes into cavity 30 which is larger than the aperture A thereby allowing passage of a large volume of fluid in or out of the barrel.

[0023] In regular usage, a connector is attached to fitting F by gripping flange 15. When securely located, seal 24 is pressed inwardly so that when a second valve is open to a lower pressure, the pressurised fluid within the barrel is able to pass up through down tube 26 and out through apertures 4, 6 and eventually aperture A in order to go through a communicating tubing attached to the connector.

Claims

1. A valve fitting for a fluid storage barrel comprising an integral housing having an aperture, a valve seat and means for co-operating with valve biasing means, the fitting further comprising a valve having a seal and means for biasing the seal against the valve seat to close the aperture, and a fluid diversion plate operably positioned below the barrel wall comprising an inlet aperture, whereby the plate is separated by one or more legs from a main part of the housing.
2. A fitting according to any preceding claim wherein the plate acts to divert incoming fluid laterally towards the side of the barrel.
3. A fitting according to any preceding claim wherein the circumferential width of the leg or legs is minimised in order to maximise the aperture space.
4. A fitting according to any preceding claim wherein the width of the leg or legs around the circumference is less than about a fifth of the circumference, and more preferably less than about a one tenth of the circumference.
5. A fitting according to any preceding claim wherein the separation of the plate from the main part of the housing is in the order of 20 mm and can be 18 mm for example.
6. A fitting according to any preceding claim wherein the housing defines a chamber below the aperture which chamber is wider than the inlet aperture and preferably can comprise a fluid guide out of the chamber which narrows to direct the fluids towards the fluid diversion plate.
7. A fitting according to any preceding claim wherein the fitting comprises a tube or centre piece positioned within the fitting, and wherein the centre piece preferably comprises an end which lies within the housing aperture thereby partly to define the top of the fitting, and comprising means for locating the centre piece rotationally with respect to the housing, such as co-operating means provided by the valve biasing means or a spring, the plate and the centre piece in order rationally to locate the centre piece.
8. A fitting according to Claim 7 comprising a co-operating slot in both the plate and centre piece which when aligned therewith enable a lug to be located therein, and preferably the lug is sufficiently large to prevent rotation of the centre piece and plate away from each other.
9. A fitting according to Claim 8 wherein the position

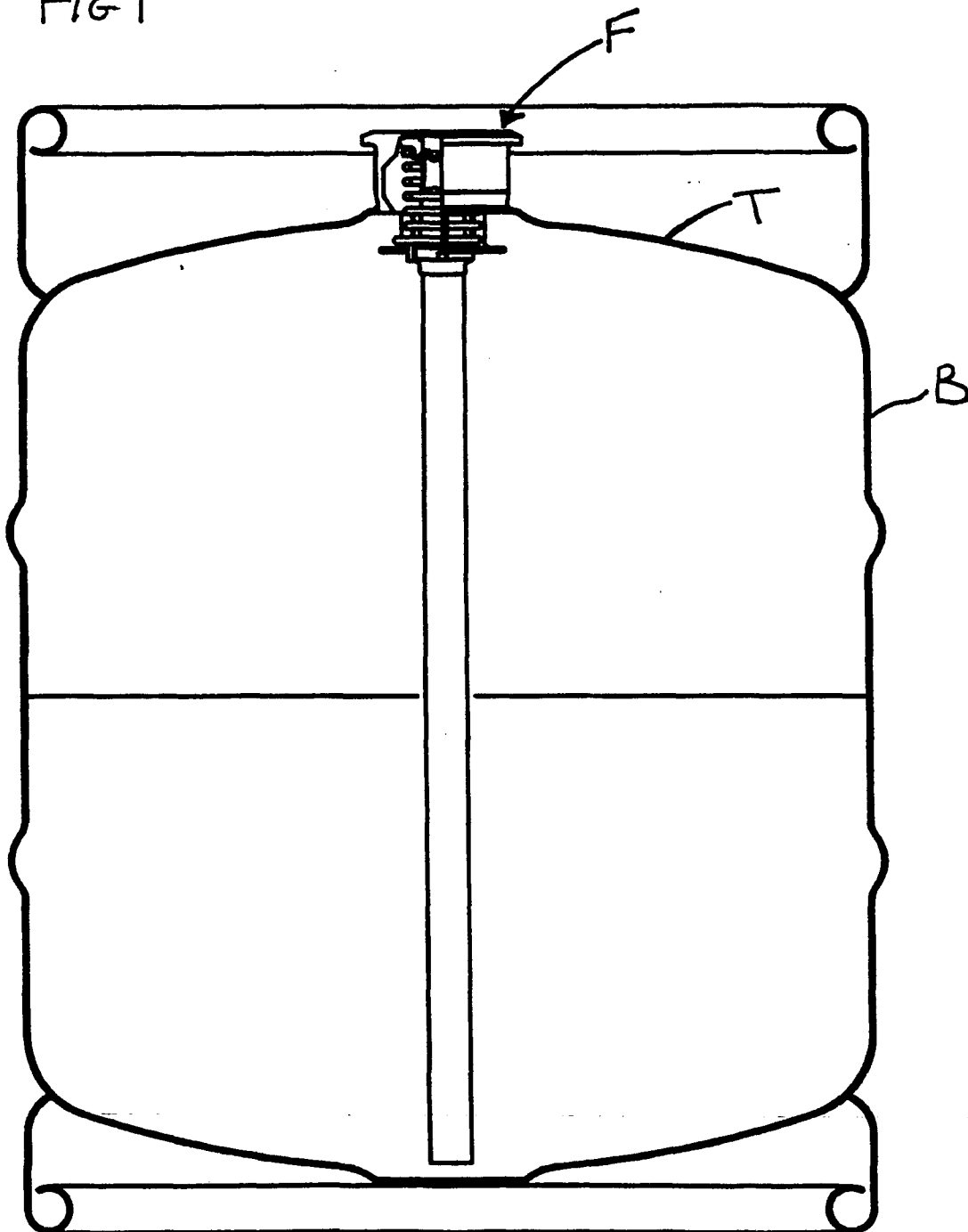
of the co-operating slot locates the centre piece such that the pair (or pairs) of axial limiting lugs are positioned proximal a housing leg which connects the plate to the main part of the housing.

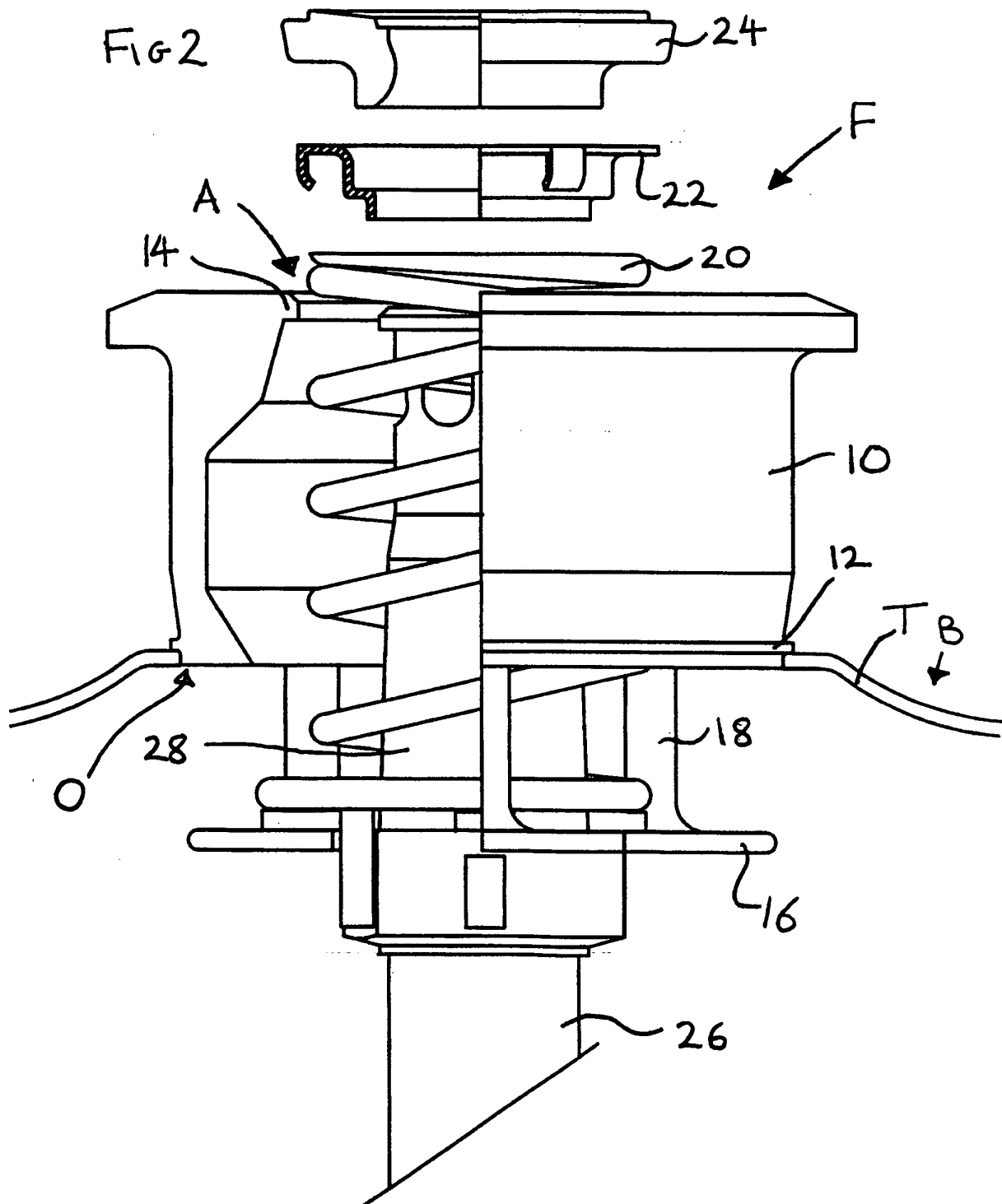
10. A fitting according to Claim 9 wherein the axial locating lugs are positioned in radial alignment with such a housing leg. 5
11. A barrel for storage of fluids comprising a top wall defining an aperture into the barrel, a fitting according to any of Claims 1 to 10 located within the aperture and attached directly to the barrel top for example by welding, wherein the fitting enables transfer of fluid in and out of the barrel. 10
12. A safety spring for co-operating with a valve fitting on a barrel to enable controlled opening and closing of a seal against part of the housing, wherein the fitting comprises an aperture for filling the barrel and removing fluid from the barrel and the spring comprises an integrally formed means for preventing accidental removal thereof through said aperture which means comprises a radially protruding lug kinked outwardly and turned back towards the spring. 20 25
13. A spring according to Claim 12 having a diameter less than a first dimension along the majority of its length and the means for preventing accidental removal comprises a radially protruding means providing a region of a second dimension greater than said first dimension. 30
14. A spring according to Claim 12 or 13 comprising a helical spring winding, and/or preferably is formed at least in part from a steel wire. 35
15. A valve fitting for a barrel which comprises a spring according to any of claims 12 to 13 a seating for a seal and means for co-operating with the spring, thereby to enable sealing by a seal at the seating to prevent movement of fluid through an aperture in the fitting, and thus also preventing accidental removal of the spring. 40 45
16. A barrel comprising a valve fitting according to Claim 15.
17. A spring and plate assembly for use in a valve fitting having an aperture for fluid flow in or out of a barrel, wherein the plate is adapted to carry a seal for preventing fluid flow in and out of the barrel and the assembly further comprises means for preventing accidental removal of the plate from the spring. 50 55
18. An assembly according to Claim 17 wherein the preventing means comprises a mechanical fixing such

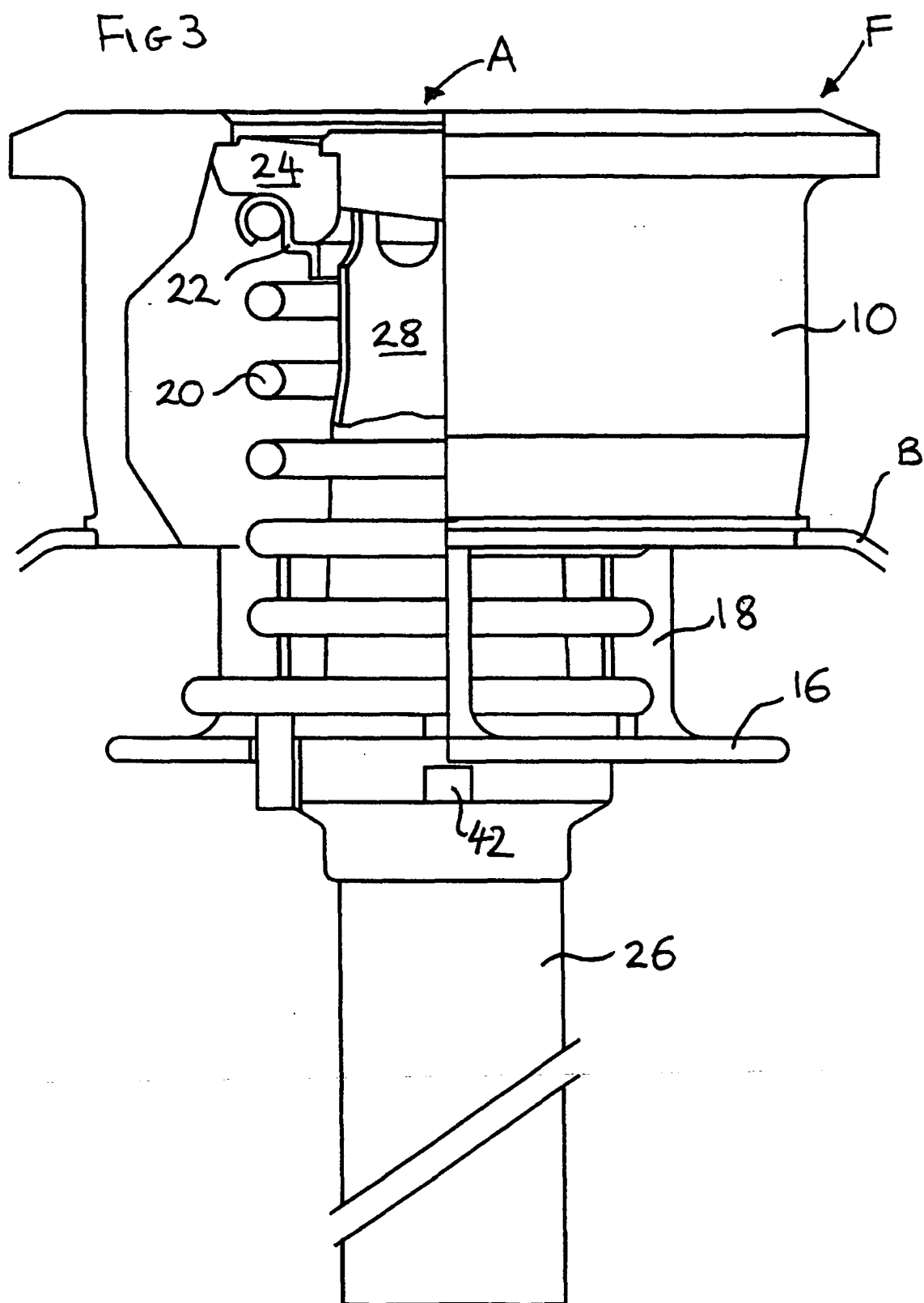
as one or more crimped lugs.

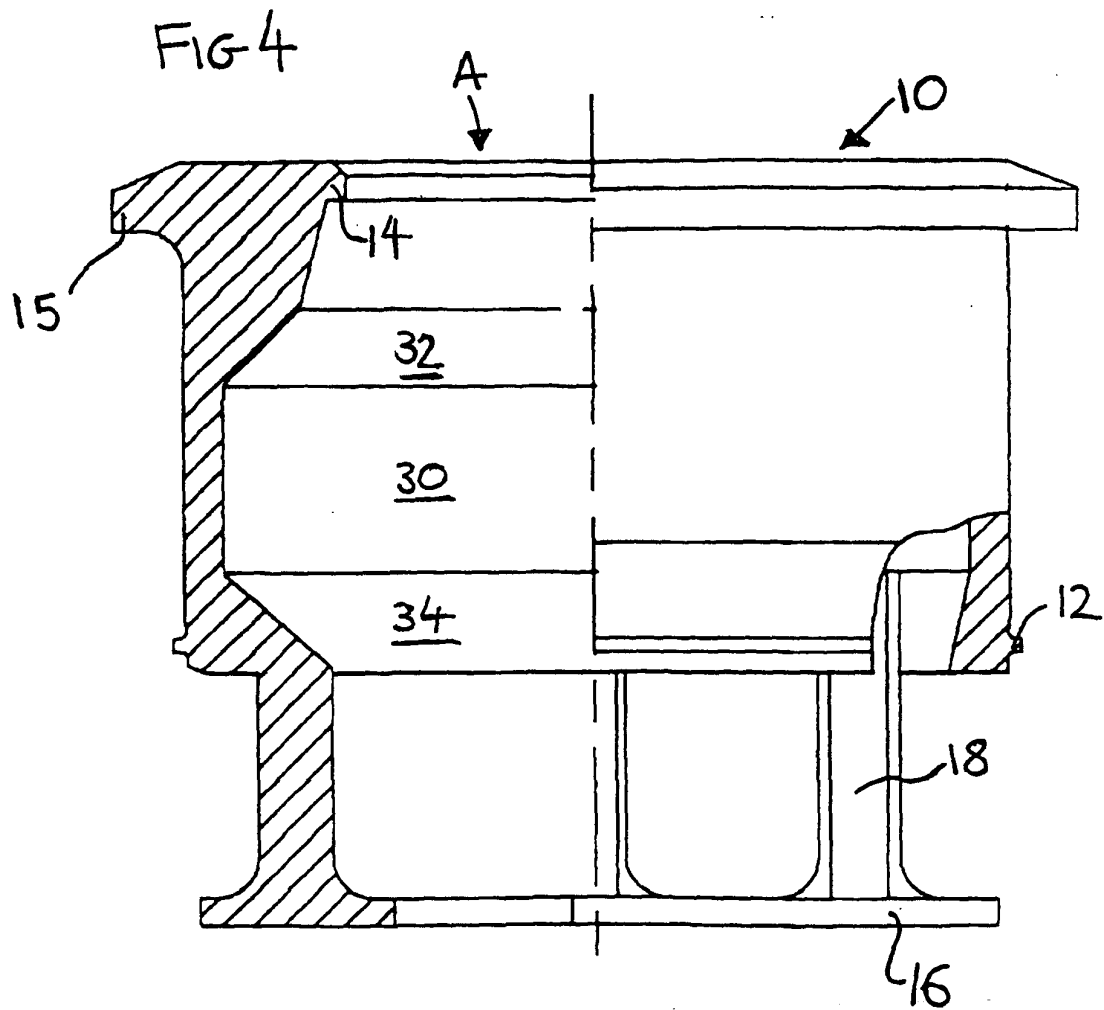
19. An assembly according to Claim 17 or 18 wherein the plate is substantially annular and comprise two or more protruding lugs which can be crimped to attach to a winding on the spring; and/or wherein the preventing means comprises a soft solder which can be applied for example at 230°C; and/or wherein the spring and plate are welded together; and/or wherein the spring comprises a helical wire having a substantially circular or flat end.
20. A valve fitting for a barrel for a pressurised fluid comprising a housing for direct attachment to the barrel for example by welding, which housing comprises an aperture for fluid communication with the barrel and a valve seat proximal the aperture, the fitting further comprising a valve having a seal, biasing means, such as a coiled spring, for forcing the seal against the seat and means for inhibiting accidental removal of the spring from the fitting.

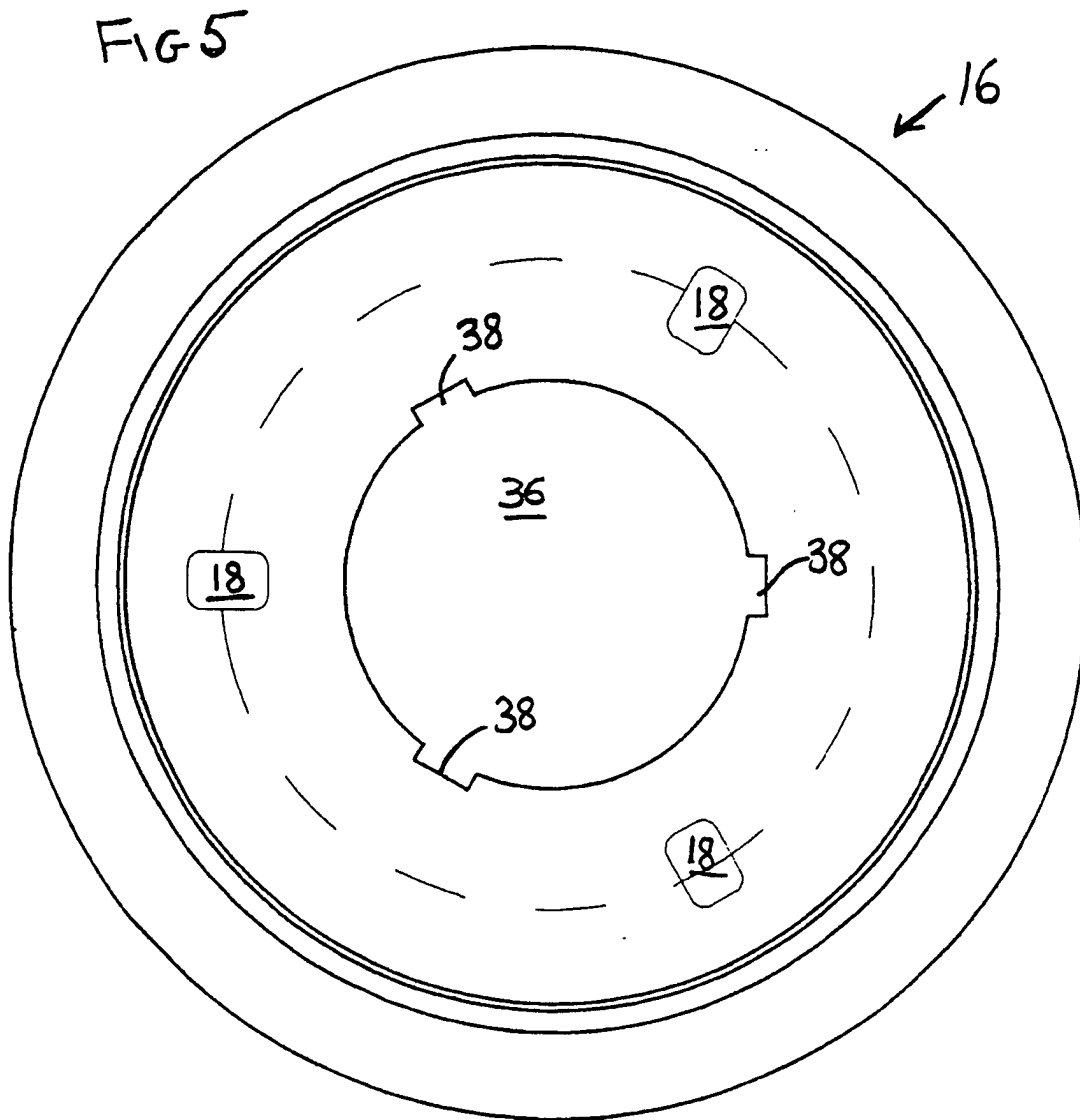
FIG 1

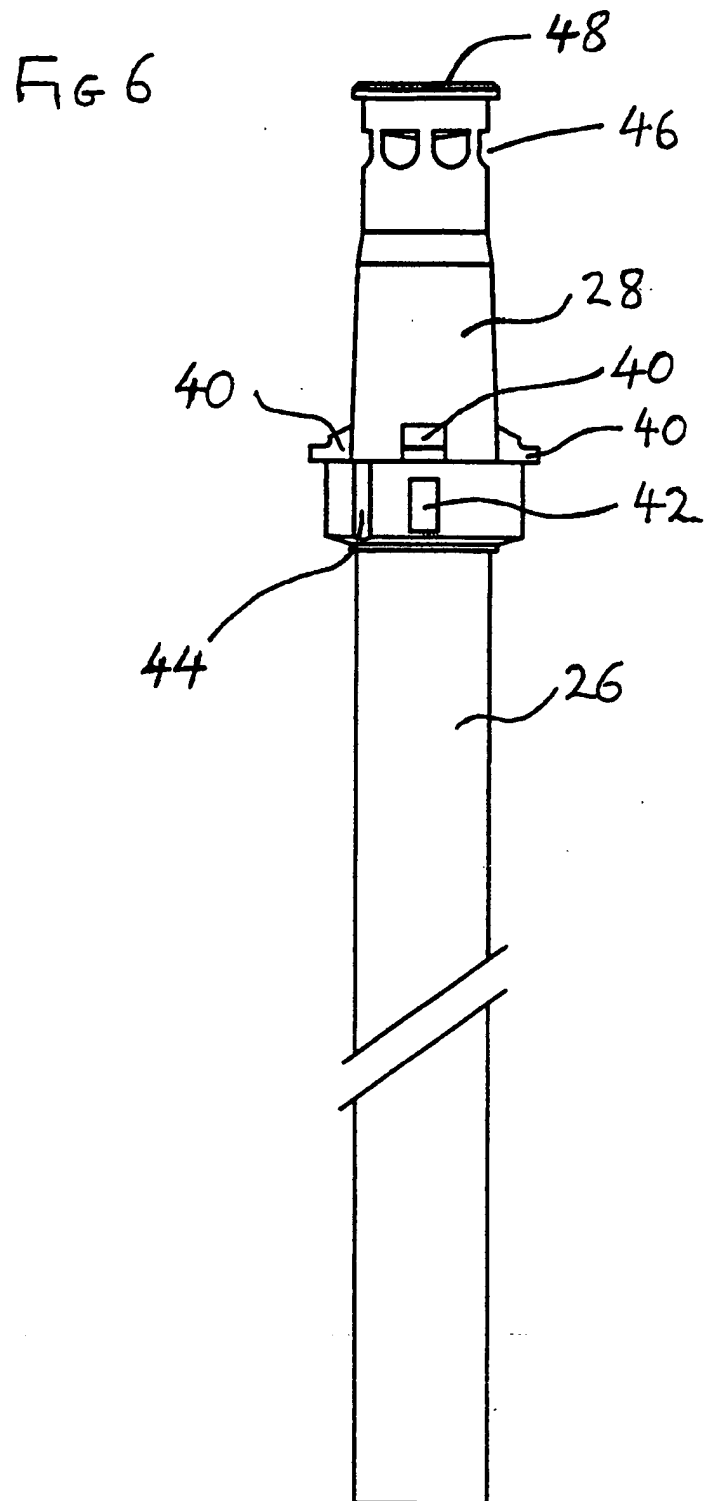












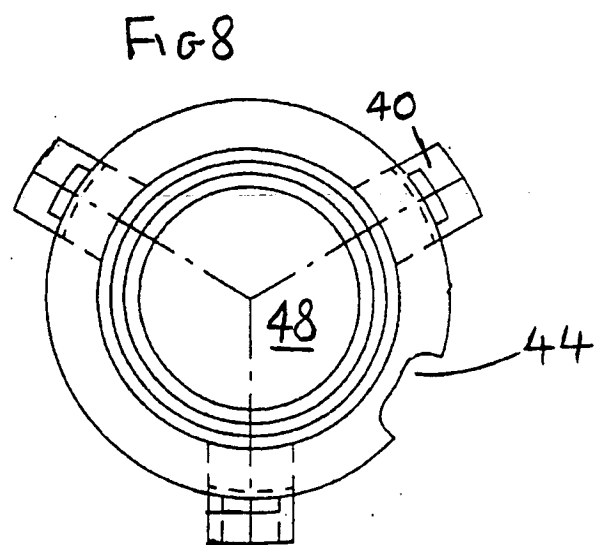
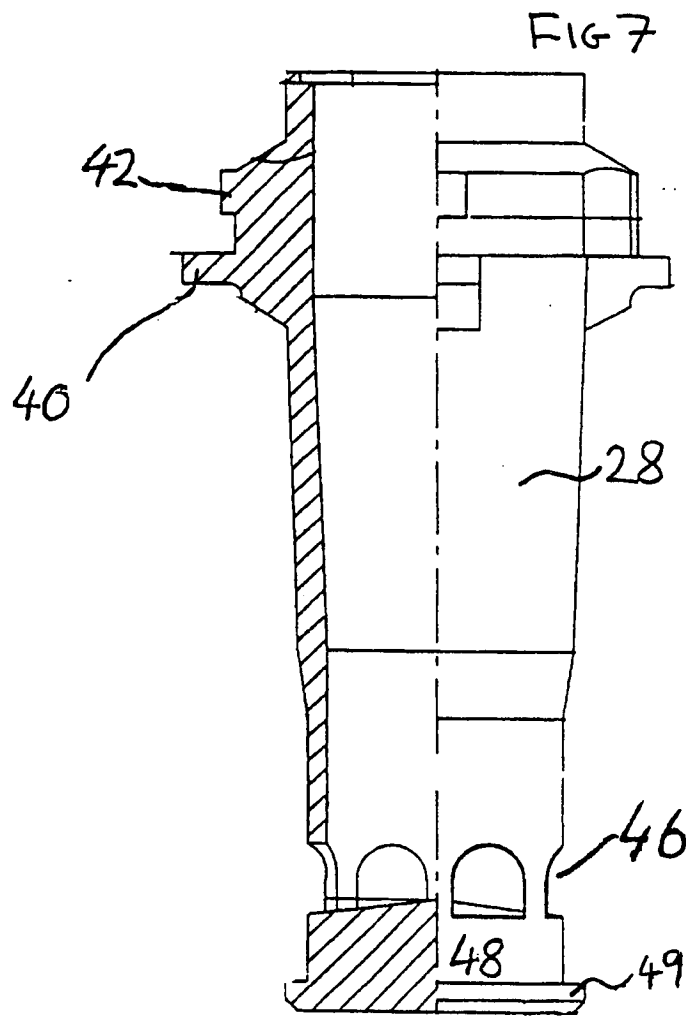


FIG 9

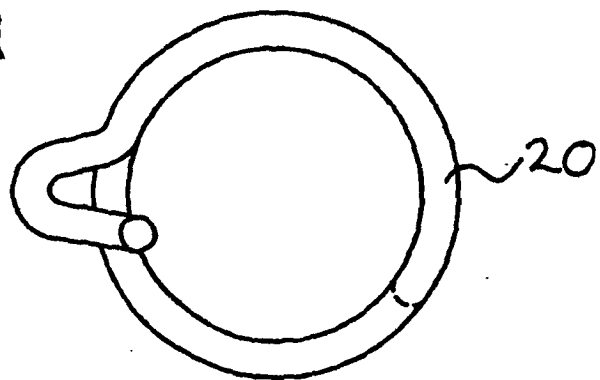


FIG 10

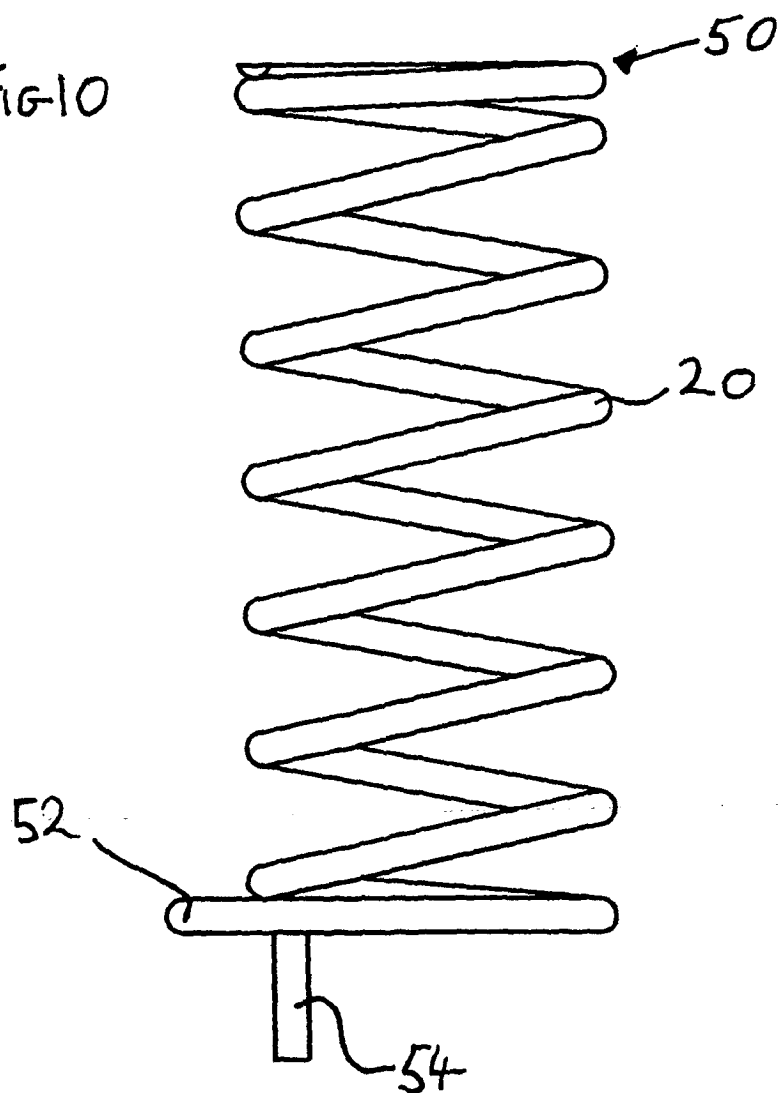


FIG 11

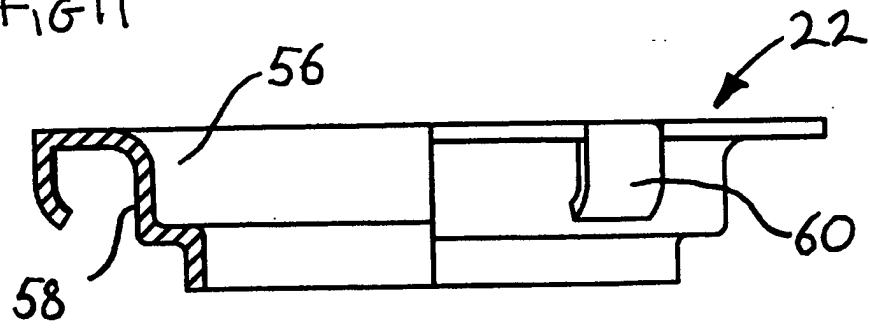


FIG 12

