

PRESSURE RELIEF VALVE

FIELD OF INVENTION

The present invention relates to a pressure relief valve and in particular although not solely to a pressure relief valve for use with pressurized flexible air hose.

BACKGROUND

Pressure relief valves of various kinds for use in pneumatic systems are known. Pneumatic systems will include a pressurized air source and a flexible hose detachably connected to a pressure relief valve by means of a quick disconnect coupler.

In such systems, when the flexible hose is disconnected from the pressure relief valve after the supply of pressurized air is shut off, the pressurized air which remains in the pressure relief valve and the flexible hose causes the flexible hose to lash out from the pressure relief valve. This sudden lashing of the flexible hose poses danger to a user.

Hence, it is desirable to have a device that permits a release of the captive pressurized air from within the pressure relief valve before disconnecting the flexible hose from the pressure relief valve. There are known prior art devices that are capable of releasing the pressurized air prior to disconnecting the flexible hose. However, the same problem of having the flexible hose lashing out still exist in the event that the user forgets to release the pressurized air prior to disconnecting the flexible hose. This is because the prior art devices require a manual release of pressure from the pressure relief valve.

Hence, it is accordingly an object of the present invention to provide a pressure relief valve which addresses the abovementioned disadvantages or which will at least provide the public with a useful choice.

BRIEF DESCRIPTION OF THE INVENTION

Accordingly in a first aspect the present invention consists a pressure relief valve comprises

a valve body defining a fluid inlet passage and a first fluid outlet passage (herein after "delivery passage") and a second fluid outlet passage (herein after "pressure relief passage") each being in valve controlled fluid communication with each other, the valve controlling such communication to

(i) as a first flow condition, allow flow of fluid from the inlet passage to the delivery passage and

(ii) as a second flow condition, allow flow of fluid from the delivery passage to the pressure relief passage

said delivery passage including an outlet end to receive a push-fit coupling

a latch dependent from said valve body, the latch including a movable to the valve body latching portion engagable with a latching surface of the push-fit coupling, said latching surface presenting an outward normal, projecting towards the direction of decoupling of the push-fit coupling, the latch providing movement of the latching portion between

(a) a latching surface engaged condition preventing decoupling of said coupling means from said outlet end and

(b) a coupling means disengaged condition allowing decoupling from said outlet end

said valve rotationally mounted about an axis of rotation with said valve body and including externally disposed valve control means for control of rotation thereof,

the valve control means including a latch movement control means rotatable with the valve control means about the axis of rotation and presented

a. for engagement with the latch at least when said valve is in the first flow condition and to restrain the latching portion from moving to the coupling means disengaged condition and

b. to allow movement of the latching portion to the coupling means disengaged condition when said valve is in said second flow condition.

Preferably said latch includes a latch movement control means engagement surface presented with its outward normal directed away from said axis of rotation, said latch movement control means engaged with said latch movement control means engagement surface when said latch is in said coupling means disengaged condition thereby preventing movement of said latching portion to said coupling means disengaged condition.

Preferably said latch is pivotally disposed from said valve body to move said latching portion in a direction lateral to the decoupling direction between the coupling means disengaged condition and coupling means engaged condition.

Preferably said latch is pivotally disposed from said valve body, with the pivot axis thereof parallel to the axis of rotation of said valve.

Preferably said latch is a resiliently flexible sheet material and includes a mounting region engaged to said valve body and an arm region extending between said mounting region and said latching portion.

Preferably said latch is a resiliently flexible sheet metal material formed in part by out of plane folding of a planar sheet.

Preferably said arm region extends in the direction of de-coupling.

Preferably said latching portion is provided by a latching arm extending transverse to said arm region.

Preferably said latch includes a reaction surface having an outward normal, directed towards said axis of rotation, said valve control means including an ejection means rotatable therewith said ejection means engagable with said reaction surface to push there against when said valve is in the second flow condition to displace said latching region from said coupling means engaged condition to said coupling means disengaged condition.

Preferably said latch movement control means includes said ejection means and is located within a camming slot of said latch the camming slot cooperating with said latch movement control means to actively control the movement of said latch during movement of said valve by said valve control means between the first and second flow conditions.

In a second aspect the present invention consists a pressure relief valve comprises

a valve body defining a fluid inlet passage and a first fluid outlet passage (herein after "delivery passage") and a second fluid outlet passage (herein after "pressure relief passage") each being in valve controlled fluid communication with each other, the valve controlling such communication to

(i) as a first flow condition, allow flow of fluid from the inlet passage to the delivery passage and

(ii) as a second flow condition, allow flow of fluid from the delivery passage to the pressure relief passage

said delivery passage including an outlet end to receive a push-fit coupling, said outlet or said push-fit coupling including a means to control the coupling/decoupling of said push-fit coupling,

a latch dependent from said valve body, the latch including a movable to the valve body latching portion engagable with a latching region of the means to control, said latching region presenting a reaction surface, the latch providing movement of the latching portion between

(a) a latching region engaged condition preventing movement of said means to control to decouple said coupling means from said outlet end and

(b) a latching region disengaged condition allowing movement of said means to control allowing decoupling of said push-fit coupling from said outlet end

said valve rotationally mounted about an axis of rotation with said valve body and including externally disposed valve control means for control of rotation thereof,

the valve control means including a latch movement control means rotatable with the valve control means about the axis of rotation and presented

- a. for engagement with the latch at least when said valve is in the first flow condition and to restrain the latching portion from moving to the coupling means disengaged condition and
- b. to allow movement of the latching portion to the coupling means disengaged condition when said valve is in said second flow condition

This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred form of the present invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a perspective and partially exploded view of the pressure relief valve,

Figure 2 is a perspective view of the assembled pressure relief valve in the lock mode,

Figure 3 is a perspective view of the pressure relief valve in the unlock mode,

Figure 4 is a side view of the pressure relief valve in the lock mode,

Figure 5 is a side view of the pressure relief valve in the unlock mode,

Figure 6 is a plan view of an alternative arrangement of the latch mechanism,

Figure 7 is a plan view of either a further alternative to the latch mechanism, and

Figure 8 is still a further alternative plan view of a latch mechanism.

DETAILED DESCRIPTION OF THE INVENTION

With reference to Figure 1 the pressure relief valve 1 of the present invention preferably includes an inlet connection 2, an outlet connection 3 and a ball valve unit 4 having an inlet 5 and an outlet 6 connected by internal passage for allowing air flow to occur between the two. Each may be disposed opposing one another from the valve portion of the unit. One end 7 of the inlet connection 2 is detachably connected to the inlet 5 of the ball valve unit 4 and the other end of the inlet connection 2 is detachably connected via a hose line to a pressurized air source (not shown). The outlet connection 3 is detachably connected to the outlet 6 of the ball valve unit 4. In an alternative form of the ball valve unit 4, the inlet connection 2 may be of a unitary structure.

The ball valve unit 4 further includes a lever arm 10 pivotably mounted to the ball valve body 8 in a movable manner. A pivot point of the lever arm is preferably positioned intermediate the inlet 5 and the outlet 6 of the ball valve unit 4. The lever arm 10 is used to control flow of the pressurized air within the pressure relief valve.

The ball valve unit 4 also includes a pressure relieve opening 9. The lever operates a ball valve (not shown) internal of the valve unit which is pivotally mounted to the valve body to control air flow from the inlet to the outlet and also to the pressure relieve opening. The lever preferably acts directly on the ball valve. The pressurized air that is held within the pressure relief valve and the outlet connection 3 (and any hose connected thereto) after supply of the pressurized air is cut off from the pressurized air source, escapes through the pressure relief opening 9. As shown in figure 1, the pressure relief opening is provided intermediate the inlet 5 and the outlet 6 of the ball valve unit 4, and is in fluid communication at least with the outlet opening.

To open the pressure relief valve 1 for allowing pressurized air from the pressurized air source to pass to the outlet opening 6, the lever arm 10 is pivotably turned to a position parallel to the outlet of the ball valve unit 4 as shown in Figure 2 (hereinafter called the "open" position) air can flow from the inlet 5 to the outlet 6 via the unit 4 in this position. To shut or close the pressure relief valve 1 to stop the

pressurized air flow, the lever arm 10 and hence the ball valve is pivotably turned to a position perpendicular to the inlet/outlet direction of the ball valve unit 4, which is also in a position that is parallel to the pressure relief opening 9 as shown in Figure 3 (hereinafter called the "closed" position). Moving the lever arm 10 from an "open" to a "closed" position opens the pressure relief opening 9 for releasing the pressurized air that is held within the pressure relief valve 1 and/or the outlet connection 3 and outlet hose.

The pressure relief valve 1 is provided with a locking or latching device preferably in the form of a pawl 11 as shown in Figure 1. The pawl 11 is mounted to the pressure relief valve unit preferably on the opposite side of the pressure relief opening 9 of the ball valve unit 4, to the outlet 6. The pawl 11 is preferably a plate having a main panel 12, first side panel 13 and a second side panel 14 and made from a sheet material such as a metal material. The plate is fastened to the valve body by fastening the first side panel 13 to the inlet side of the main body 8. A washer 7 is used to fasten the first side panel 13 at or proximate to the inlet 5 as shown in Figure 2. The first side panel 13 includes an aperture or relief 16 that lies parallel to the inlet/outlet direction of the ball valve unit 4 when the first side panel 13 is fastened to the ball valve unit 4.

The outlet 6 includes or is defined by a female coupler which couples with a male coupler or outlet connection 3 that is releasably connected to the outlet 6 and to one distal end of a flexible hose (not shown). The female coupler 6 includes an elongate member 26 having an inlet engaging end and a male coupler engaging end, a nut 19 detachably connected to the elongate member 26 proximate the inlet engaging end and a biasing sleeve member 20 constructed and arranged to encircle a portion of the elongate member 26 proximate the male coupler engaging end. A push-fit or substantially axial movement coupling can be established between the male and female coupling. The gap 21 between the nut 19 and the biasing sleeve member 20 defines a distance upon which the biasing sleeve member 20 slides when connecting or disconnecting of the flexible hose is carried out.

The second side panel 14 of the plate 11 includes a cut-out 23, which acts as a latching region or portion preferably of a semi-circular shape. This shape and size preferably correspond to the shape and size of part of the circumference of the elongate member of the female coupler 6. The second side panel 14 operates as part of the pressure relief valve 1 by having the cut-out disposed on a portion of the elongate member 26 of the female coupler 6 disposed within the gap 21. The placing of the cut-out in this position locks the female coupler 6 and that in turn, prevents disconnecting of the outlet coupler 3 and the flexible hose.

As shown in Figure 2, extending from the pivot point 29 of the lever arm 10 is a clamping member 30 that lies perpendicular to the lever arm 10 and normal to the pivot axis 29. When the lever arm 10 is actuated to the "open" position, the clamping member 30 latches onto the pawl 11 to press or hold the pawl 11 towards the pressure relief valve body 4 for placing the cut-out within the gap 21 to lock the female coupler 6. Conversely, when the lever arm 10 is actuated to the "closed" position, the clamping member 30 moves to release the grip on the plate. The cut-out moves or is able to move or be moved away from the gap 21 to unlock the female coupler 6. This creates a space sufficient for the operation of the biasing sleeve member 20 for disconnecting the flexible outlet hose from the valve body.

Irrespective of which direction the release ring biasing sleeve member 20 is displaced in order to allow for the release of the male coupling 3 from the female coupling of the valve unit, the second side panel 14 which provides the latching region or portion of the pawl or latching device 11 engages against a surface of the biasing sleeve member 20 which is or includes a surface directed towards the direction that the sleeve member 20 needs to move in order to effect the decoupling. In Figure 5, the sleeve member 20 is shown to be engaged by the second end region of the latch or pawl member 11 where the surface thereby engaged is directed away from the valve body. In this configuration the sleeve member 20 is actuated to effect the release of the coupling 3 by movement away from the valve body. Such movement is prevented by the second end member 14. In an alternative configuration however the biasing sleeve may be moved towards the valve body in

order to affect the release of the coupling 3 and as such the second end portion 14 of the pawl 11 needs to be provided to locate against the surface of the sleeve member 20 directed towards the valve body.

In general it can be seen that the valve body is of a substantially T-shaped plan shape. The inlet, outlet and pressure relief directions form a substantially T-shaped configuration wherein the inlet and outlet directions are in line and the pressure relief outlet is at a right angle to such directions, all of the directions lying in a single plane.

The movement of the lever 10 to move the valve from the open to the closed condition is substantially through an angle of 90°. Between the movement of the 90° arc of the handle, the ball valve internal of the valve body 4 moves to fully open and fully close the fluid communications as hereinbefore described.

When connecting the flexible hose to the pressure relief valve, the lever arm 10 is first positioned in the "closed" position (i.e. where no fluid communication exists between the inlet and outlet or relief openings but where the relief opening is open to the outlet). The male coupler 3 connected to the flexible hose is then brought to engagement with the female coupler 6 of the pressure relief device. Connection is achieved by sliding the biasing sleeve member 20 towards the pressure relief valve body 4 and while holding the biasing sleeve 20 in that position, the male coupler 3 is inserted. Upon releasing the biasing sleeve member 20 of the female coupler, the male coupler interlocks with the female coupler 6. The lever arm 10 can then be actuated to the "open" position to release pressurized air from the pressurized air source. This actuation at the same time brings the clamping member 30 in engagement with the pawl 11 to lock the female coupler 6 to avoid undesired disconnecting of the flexible hose. Pressurized air from the pressurized air source enters the pressure relief valve via the inlet connection 2, passes through the ball valve unit 4 and out to the flexible hose via the outlet connection 3.

Before a user is able to disconnect the flexible hose from the pressure relief valve, the user must first shut off the supply of the pressurized air from the

pressurized air source by moving the lever arm 10 to the "closed" position. Upon moving the lever arm 10 to the "closed" position, the clamping member of the lever arm 10 releases its engagement with the pawl 11 and thereupon, unlocks the female coupler 6. Pressurized air held within the pressure relief valve is simultaneously released through the pressure relief opening 9. The pressurized air having then been released, allows the flexible hose to then be disconnected from the pressure relief valve by a simple action of sliding the biasing sleeve member 20 of the female coupler towards the pressure relief valve body 4 and removing the male coupler 3 that is connected to the flexible hose simultaneously from the female coupler 6 without any significant pressure remaining in the valve unit or hose.

The pawl 11 makes it mandatory for the user to release the pressurized air held within the pressure relief valve unit 4 before disconnecting the flexible hose.

The locking pawl or latching device 11 is preferably made from a resiliently flexible material. Such a resiliently flexible material may for example be a metal material such as a steel or stainless steel. It has preferably been formed by an out of plane folding to define the preferred U-shaped form. When the pawl 11 is engaged with the body of the valve unit 4, the natural position of the main panel 12 and second side panel 13 is preferably in a position where the cut-out 23 is removed from the female coupler 6. The pawl 11 is hence formed such that the device is biased towards a non engaging condition with the female coupler. In order for the locking device to be moved such that the cut-out 23 does engage with the female coupler, a force needs to be applied to the pawl 11 to achieve such a mode. However in an alternative form, the natural mode of the pawl 11 is such that the cut-out 23 makes contact with the female coupler and it requires the application of a force e.g. by the hand of a user, to move the pawl 11 from engagement with the female coupler once the clamping arm 30, has been released from the pawl 11. In either form, the pawl 11 is secured at its first side 13 to the body of the valve unit 4 or an extension therefrom, and the side panel 12 and second end panel 14 are positioned to pivot or bend relative to the first side panel 13.

Whilst the pawl 11 has been shown to engage to the valve unit 4 on the one side of the ball valve of the valve unit 4 and disposes its cut-out 23 in a position on the opposite side to the ball valve, alternative configurations of engagement of the pawl 11 can be provided to be secured to the valve unit 4 to allow for it to present a region to clamp with the female coupler and simultaneously be captured by a clamping member such as a clamping member 30 which is disposed and operated simultaneously as the operation of the handle 10 which operates the ball valve for the control of the flow of compressed air.

Figure 6 is a plan view of an alternative arrangement of that shown in Figure 5, wherein the pawl 11 has been configured to be engaged to the valve unit at the engagement region 40 being on the same side as the outlet 3. Whilst the preferred form is a substantially U-shaped form as for example shown in Figure 4, it can be seen with reference to Figure 6 that the pawl 11 may take alternative forms in order to allow for it to present a cut-out or locking region 23 which can engage with the female outlet in order to thereby prevent the movement of the female outlet when the valve is in the open position to prevent the removal of the outlet connection 3 from the valve unit 4.

With reference to Figure 1, it can be seen that the pawl 11 may include a tab 41 which is presented for engagement by the clamp member 30. The tab 41 preferably includes a region 42 outstanding from the main panel 12 and a region 43 folded transverse to the main plane of the main panel 12. The panel 42 is presented to engage with the clamping member 30 which itself includes a downstand 44 for engaging with the surface of the region 42 presented away from the valve body 4 as for example shown in Figure 2. To allow for the pawl 11 to be operated substantially solely by the movement of the lever 10, the tab 41 includes a ramped region 46 which is preferably a straight or curved ramp region presented to allow for the upstand 44 of the clamping member 30 to gradually engage to become positioned against the outwardly directed surface of the region 42 of the tab 41. The ramped region 46 will ensure that a gradual bringing in of the cut-out 42 towards the valve unit occurs as the lever 10 is moved from the closed position to

the open position. The ramping and relative location of the tab is such that when the valve is in the opening condition the cut-out 23 is engaged with the female coupler to prevent it from disengaging the outlet connector or coupler 3. When the valve is moved to the closed condition where the handle is as shown in Figure 1 or 3, the pawl 11 is freed for movement.

With reference to Figure 2, it can be seen that the lever 10 also includes a second projection 49 which is a tab which is presented when the handle is moved from the open condition as shown in Figure 2 to the closed condition as shown in Figure 3, engages with the region 43 of the tab 41 to move the pawl 11 to the condition disengaged from the female coupler. The region 43 also includes a ramped portion 50 which allows for a gradual engagement of the tab 41 by the projection 49 as the handle is moved from the opened condition to the closed condition. The projection 49 becomes engaged with the tab to push the tab and as a result push the pawl 11 from engagement with the female coupler. As a consequence of this preferred pushing of the pawl 11 by the projection 49 from the lever 10, it can be seen that it is not of particular significance which way the preferred bias of the pawl 11 operates. In a bias in either direction (whether engaging towards the female coupler or away therefrom), either the clamping member 30 or the projection 49 can operate with the pawl 11 to move it and/or restrain it from movement in the opposite directions.

Release of the pawl 11 by the arm 30 of the handle 10, to allow for the second end portion 14 of the pawl 11 to be freed from the ring 20 does not occur until at least in part, further communication has been established between the outlet opening and the pressure relief opening. In the most preferred form a significant fluid communication has been established prior to such release being effected such that the pressure in the valve unit and the outlet hose has in at least a substantial part been discharged through the pressure relief opening 4.

In an alternative embodiment, the latch 11 may be replaced or include a cam mechanism 51 as portrayed in Figure 7 and Figure 8. The use of such may be beneficial for the simple replacement of the units if the instance occurs where

differing shaped coupling means are used. In both figures, the cam mechanism 51 remains pivotally engaged at pivot 56, at for example the first end of a lever arm 90, to a securing means 53 which remains fixably attached to the body. The pivoting axis 56 remains parallel to the axis of rotation of the valve and lever 10 providing rotational movement of the opposing distal end of the lever arm 90 into a position of engagement with the coupling means 3 and or sleeve 6. In the embodiment shown in Figure 7, the cam unit exhibits a cut-away region or slot 55 exposing a capture point 54 allowing secure engagement with the catch 44 of the arm 30 in the said open position. The cut-away represents an internal engagement point from which 30 provides secure restraint of the cam and therefore the coupling means.

In a further alternate position, Figure 8 identifies a capture point whereby a projection 55 extends upwardly from the top surface 52 of the lever 52 and is appropriately positioned and geometrically shaped to provide secure engagement with the tab 44 of the arm 30 in the said open position. In both instances shown in Figure 7 and 8, the elevation of the upper surface of the cam with respect to the body is such that effective engagement with the arm 30 provides secure restraint substantially similar to that between 46 and 44.

The attachment of the cam unit to the valve body by the securing means 53 is demonstrated in two embodiments in Figure 7 and 8 respectively. Figure 7 shows the attachment means resides internally at the pivot point 56. Such may be the case where increased elevation of the upper cam surface 51 is required to permit the secure engagement of tab 44. Figure 8 shows the configuration where the cam unit remains internal to the securing means.

WE CLAIM:

1. A pressure relief valve comprising;

a valve body defining a fluid inlet passage and a first fluid outlet passage (herein after "delivery passage") and a second fluid outlet passage (herein after "pressure relief passage") each being in valve controlled fluid communication with each other, the valve controlling such communication to

(i) as a first flow condition, allow flow of fluid from the inlet passage to the delivery passage and

(ii) as a second flow condition, allow flow of fluid from the delivery passage to the pressure relief passage

said delivery passage including an outlet end to receive a push-fit coupling

a latch dependent from said valve body, the latch including a movable to the valve body latching portion engagable with a latching surface of the push-fit coupling, said latching surface presenting an outward normal, projecting towards the direction of decoupling of the push-fit coupling, the latch providing movement of the latching portion between

(a) a latching surface engaged condition preventing decoupling of said coupling means from said outlet end and

(b) a coupling means disengaged condition allowing decoupling from said outlet end

said valve rotationally mounted about an axis of rotation with said valve body and including externally disposed valve control means for control of rotation thereof,

the valve control means including a latch movement control means rotatable with the valve control means about the axis of rotation and presented

a. for engagement with the latch at least when said valve is in the first flow condition and to restrain the latching portion from moving to the coupling means disengaged condition and

b. to allow movement of the latching portion to the coupling means disengaged condition when said valve is in said second flow condition.

2. A pressure relief valve as claimed in claim 1 wherein said latch includes a latch movement control means engagement surface presented with its outward normal directed away from said axis of rotation, said latch movement control means engaged with said latch movement control means engagement surface when said latch is in said coupling means disengaged condition thereby preventing movement of said latching portion to said coupling means disengaged condition.
3. A pressure relief valve as claimed in claim 1 wherein said latch is pivotally disposed from said valve body to move said latching portion in a direction lateral to the decoupling direction between the coupling means disengaged condition and coupling means engaged condition.
4. A pressure relief valve as claimed in claim 1 wherein said latch is pivotally disposed from said valve body, with the pivot axis thereof parallel to the axis of rotation of said valve.
5. A pressure relief valve as claimed in claim 1 wherein said latch is a resiliently flexible sheet material and includes a mounting region engaged to said valve body and an arm region extending between said mounting region and said latching portion.
6. A pressure relief valve as claimed in claim 1 wherein said latch is a resiliently flexible sheet metal material formed in part by out of plane folding of a planar sheet.
7. A pressure relief valve as claimed in claim 1 wherein said arm region extends in the direction of de-coupling.
8. A pressure relief valve as claimed in claim 1 wherein said latching portion is provided by a latching arm extending transverse to said arm region.
9. A pressure relief valve as claimed in claim 1 wherein said latch includes a reaction surface having an outward normal, directed towards said axis of rotation, said valve control means including an ejection means rotatable therewith said ejection means engagable with said reaction surface to push there against when said valve is in the second flow condition to displace said latching region from said coupling means engaged condition to said coupling means disengaged condition.

10. A pressure relief valve as claimed in claim 1 wherein said latch movement control means includes said ejection means and is located within a camming slot of said latch the camming slot cooperating with said latch movement control means to actively control the movement of said latch during movement of said valve by said valve control means between the first and second flow conditions.

11. A pressure relief valve comprising;

a valve body defining a fluid inlet passage and a first fluid outlet passage (herein after "delivery passage") and a second fluid outlet passage (herein after "pressure relief passage") each being in valve controlled fluid communication with each other, the valve controlling such communication to

(i) as a first flow condition, allow flow of fluid from the inlet passage to the delivery passage and

(ii) as a second flow condition, allow flow of fluid from the delivery passage to the pressure relief passage

said delivery passage including an outlet end to receive a push-fit coupling, said outlet or said push-fit coupling including a means to control the coupling/decoupling of said push-fit coupling,

a latch dependent from said valve body, the latch including a movable to the valve body latching portion engagable with a latching region of the means to control, said latching region presenting a reaction surface, the latch providing movement of the latching portion between

(a) a latching region engaged condition preventing movement of said means to control to decouple said coupling means from said outlet end and

(b) a latching region disengaged condition allowing movement of said means to control allowing decoupling of said push-fit coupling from said outlet end

said valve rotationally mounted about an axis of rotation with said valve body and including externally disposed valve control means for control of rotation thereof,

the valve control means including a latch movement control means rotatable with the valve control means about the axis of rotation and presented

- a. for engagement with the latch at least when said valve is in the first flow condition and to restrain the latching portion from moving to the coupling means disengaged condition and
- b. to allow movement of the latching portion to the coupling means disengaged condition when said valve is in said second flow condition.