Nov. 2, 1943. H. C. GRANT, JR 2,333,100

CONTROL DEVICE

Filed Aug. 14, 1941

Fig. 1

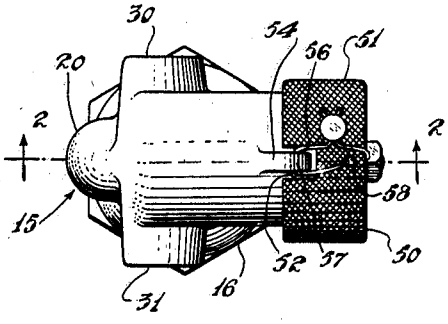


Fig. 3

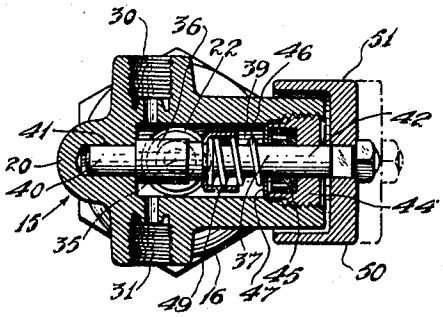


Fig. 2

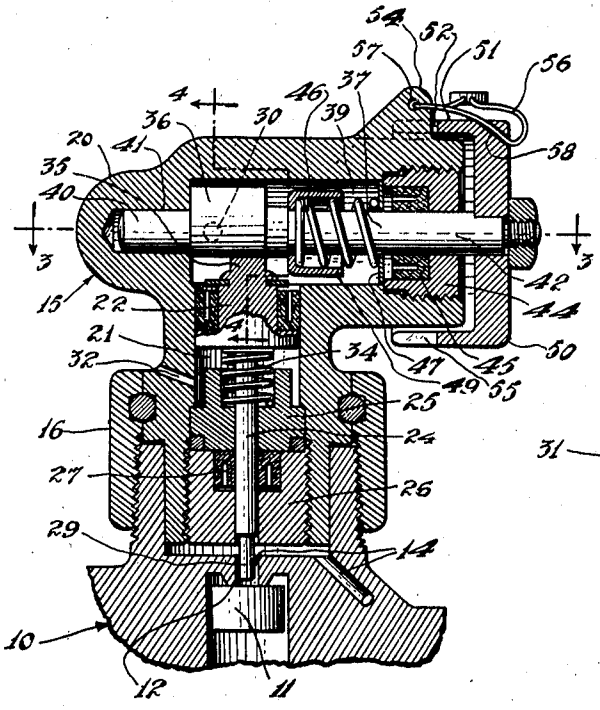
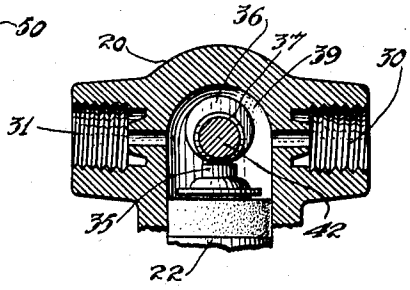


Fig. 4



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UNITED STATES PATENT OFFICE

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CONTROL DEVICE

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8 Claims. (Cl. 121—38)

The present invention relates to control devices, and more particularly to a device for controlling the operation of valves used in connection with systems for dispensing a fluid medium under high pressure.

In systems for dispensing or releasing a fluid pressure medium such as carbon dioxide for extinguishing fires or for other purposes, it is customary to provide one or more cylinders or containers containing the pressure medium, each having a valve or similar means for releasing the pressure medium contained therein. A suitable valve for this purpose may comprise a spring seated piston operated valve member adapted to be opened by a pilot valve which normally is closed by the pressure in the cylinder and which may be opened to bleed a portion of the pressure medium in back of the piston.

An object of the invention is to provide a simple inexpensive device for controlling the operation of valves for releasing a fluid medium under high pressure.

Another object is to provide a control device which is compact and is constructed of a minimum number of parts.

Another object is to provide a control device which connot be operated unintentionally but is reliable in operation when operated intentionally.

Another object is to provide a control device which can be operated either manually or by a pressure medium.

A further object consists in the construction and arrangement of the parts of the device whereby the foregoing objects may be attained.

Other and further objects, not specifically enumerated above, will be apparent when described in greater detail in connection with the accompanying drawing, wherein:

Figure 1 is a top view of a control device, illustrating an embodiment of the invention.

Figure 2 is a sectional view taken substantially along the line 2—2 on Figure 1.

Figure 3 is a sectional view taken substantially along the line 3—3 on Figure 2.

Figure 4 is a sectional view taken along the line 4—4 on Figure 2.

Referring more particularly to the drawing, there is shown a portion of a valve assembly 10 for releasing a pressure medium from a cylinder wherein the valve means (not shown) are actuated by a pilot valve member 11 normally held against a valve seat 12 to close a by-pass port 14 through which the pressure medium may be conducted to actuate the valve means. As shown in Figure 2, a control device 15, in accordance with the invention, for operating the pilot valve member 11 may be attached to the upper end of the valve assembly 10 by a suitable coupling nut 16 or the like.

The control device comprises a casing or housing 20 which is substantially L-shaped, and has an inner bore providing a chamber 21 in one of the branches of the L for receiving a pressure operable piston 22 carrying a stem or rod member 24. The stem 24 is slidably disposed in the bore and chamber 21 by a bushing 25 having an aperture for receiving the stem. The bushing 25 is held in place within the bore by a screw threaded plug 26 also having an aperture for receiving the stem 24 and preferably housing a packing or sealing gland 27 which extends about the stem. The lower end 29 of the stem is adapted to project outwardly from the aperture of the plug 26 and is positioned adjacent the pilot valve member 11, so that upon downward movement of the stem the pilot valve member is adapted to be engaged and unseated to effect operation of the valve means. Instead of utilizing the stem for unseating a valve member, it will be understood that the stem could be utilized for other purposes, for example, operating an electrical switch or tripping a latch mechanism.

The stem is adapted to be operated by fluid pressure medium or by manually operable mechanical means. To effect pressure operation the housing may be provided with an inlet port 30 (Figure 3) for admitting pressure above the piston 22 to drive it downwardly in the chamber 21 which acts as a cylinder for the piston. In addition, an outlet port 31 may be provided in the housing, preferably diametrically opposite the inlet port 30, for conducting the actuating pressure to a second control device 15 which may be connected in series with the control device shown. Air resistance in the chamber 21, which may impede downward movement of the piston 22, may be eliminated by providing a vent or duct 32 in the side of the housing 20 adjacent the chamber 21. Return or upward movement of the piston 22 may be facilitated by a resilient member such as a cylindrical helical spring 34 having its lower end seated on the bushing 25 and having its upper end engaging the underside of the piston to urge it upwardly.

In order to operate the control device manually, the upper end of the stem 24 projects above the piston 22 and is provided with a head, boss or cap portion 35 adapted to be engaged by the face of a wide rotatable cam 36 or other eccentric member (Figure 4) mounted on a rotatable

shaft 37 disposed in a bore 39 in the other branch of the substantially L-shaped housing 20.

The shaft 37 is mounted substantially transversely or perpendicularly with respect to the stem 24 so that, upon rotation of the cam 36, the cam is adapted to move the stem 24 downwardly. The shaft 37 is slidably disposed in the bore 39 by slidably and rotatably mounting one end, 40, in a journal or bearing aperture 41 and having the other end 42 extend slidably and rotatably through the aperture of a plug or bushing 44 threaded into the bore 39. This plug 44 may house a packing or sealing gland 45 extending about the shaft 37 to hermetically seal the bore 39. The end 40 of the shaft is normally urged into the journal aperture 41, so that the side wall of the cam abuts the inner side wall of the housing adjacent the aperture 41, by a resilient member such as a cylindrical helical spring 46 telescoped over the shaft 37 having one end engaging an apertured disc 47 facing the plug 44 and having its other end engaging a cup-shaped cap or shell 49 urged against a shoulder 48 on the shaft 37.

The shaft 37 is adapted to be rotated or pulled outwardly in opposition to the spring 46 by providing the end 42 of the shaft which extends outwardly from the plug 44 with a manually engageable member such as a handwheel 50 suitably keyed or arbored to the end of the shaft. Preferably, the handwheel has a cylindrical skirt or flange 51 which is milled or knurled on the exterior to facilitate manual engagement (Figure 1) and which is partially telescoped over the free end of the housing.

In order to prevent accidental or unintentional rotation of the handwheel, shaft and cam, the free end of the skirt is provided with a recess or groove 52 circumferentially positioned with respect to the cam to receive a lug, tongue, or projection 54 on the housing when the cam is in a position to enable the spring 34 to urge the stem upwardly. However, the handwheel may be rotated by pulling it outwardly to clear the tongue 54. As will be seen in Figure 2, the cam 36 is of a width which maintains the surface thereof in engagement with the upper end of the stem, whereby rotation of the handwheel in either direction will rotate the cam to move the stem downwardly. After the handwheel has been pulled outwardly and is being rotated, the free edge of the flange or skirt 51 abuts the tongue 54 to hold the handwheel in its outward position.

When the handwheel has been rotated into a position so that the cam 36 presses the stem downwardly to its maximum extent, it is desirable to maintain the stem in this position, whereby the pilot valve member 11 is held in unseated position. This may be accomplished by providing a groove or slot 55 (Figure 2) circumferentially located in the skirt of the handwheel which is adapted to receive the tongue or projection 54 when the parts are in the foregoing relation. Preferably, the location of the groove 55 depends upon the contour of the cam and, for example, where the high and low contact points of the cam are diametrically opposite (Figure 4) the groove 55 is also opposite the groove 52. When the tongue 54 and groove 55 are in alignment, the spring 46 is effective to pull the shaft and handwheel inwardly whereby the tongue enters the groove and locks the handwheel in position. It will be understood that, instead of providing a tongue on the housing and grooves in the handwheel, the housing could be provided with a lug having a groove for receiving projecting portions on the handwheel to attain the desired locking action.

It may also be desirable to lock the handwheel against unauthorized operation by securing the handwheel to the housing by means of a breakable seal wire 56 passing through an aperture 57 in the projection or tongue 54 and through an aperture 58 in the handwheel. The seal wire minimizes temptation to tinker or hamper with the handwheel and also serves to indicate when the handwheel has been operated. In operation, the seal wire is adapted to be broken when the handwheel is pulled outwardly or is rotated.

From the foregoing description it will be seen that the present invention provides an improved control device adapted to be used in connection with high pressure medium dispensing systems. The device is compact and is constructed of a minimum number of parts which are readily made and assembled. The device is positive in operation, insures proper release of the fluid pressure medium, and is protected against unauthorized tampering. The parts of the device are rugged in construction and can readily withstand any rough usage to which they may be subjected.

While my invention resides in certain principles of construction and operation which have been illustrated and described in connection with the accompanying drawing, it will be apparent to those skilled in the art that the invention may be embodied in other forms of construction without departing in any manner from the spirit and scope of the invention, and I therefore do not wish to be strictly limited to the disclosure, but rather to the scope of the appended claims.

I claim:

1. In a device for controlling the operation of a valve member, the combination of a housing, a member slidably disposed in said housing adapted to operate the valve member, a shaft extending transversely with respect to said member and being slidably and rotatably disposed in said housing and having one end projecting outwardly therefrom, a cam on said shaft adapted to engage said member for effecting movement thereof, manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft, tongue and groove means associated with said manually engageable means and said housing for locking said manually engageable means against unintentional rotation including a tongue on said housing and a groove formed in said manually engageable means, said manually engageable means having a second groove formed therein adapted to cooperate with said tongue for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said slidable member in operating position, resilient means associated with said shaft and said housing for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said member when said shaft is pulled outwardly whereby said cam is adapted to operate said member when said shaft is in its outward position, and breakable means attached to said manually engageable means and said housing for indicating when said manually engageable means have been operated.

2. In a device of the class described, the combination of a housing; a member slidably disposed in said housing; a shaft extending transversely with respect to said member and being

slidably and rotatably disposed in said housing and having one end projecting outwardly therefrom; a cam on said shaft adapted to engage said member for effecting movement thereof; manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft; tongue and groove means associated with said manually engageable means and said housing for locking said manually engageable means against unintentional rotation, including a tongue on said housing and a groove formed in said manually engageable means, said manually engageable means having a second groove formed therein adapted to cooperate with said tongue for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said slidable member in operating position; and resilient means associated with said shaft and said housing for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said member when said shaft is pulled outwardly whereby said cam is adapted to operate said member when said shaft is in its outward position.

3. In a device of the class described, the combination of a housing; a member slidably disposed in said housing; a shaft extending transversely with respect to said member and being slidably and rotatably disposed in said housing and having one end projecting outwardly therefrom; a cam on said shaft adapted to engage said member for effecting movement thereof; manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft; means associated with said manually engageable means and said housing for locking said manually engageable means against unintentional rotation while in non-operating position, and for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said slidable member in operating position; and resilient means associated with said shaft and said housing for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said member when said shaft is pulled outwardly whereby said cam is adapted to operate said member when said shaft is in its outward position.

4. In a device of the class described, the combination of a housing; a member slidably disposed in said housing; a shaft extending transversely with respect to said member and being slidably and rotatably disposed in said housing and having one end projecting outwardly therefrom; a cam on said shaft adapted to engage said member for effecting movement thereof; resilient means for urging said member toward said cam; manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft; means associated with said manually engageable means and said housing for locking said manually engageable means against unintentional rotation while in non-operating position, and for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said slidable member in operating position; and resilient means associated with said shaft and said housing for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said member when said shaft is pulled outwardly whereby said cam is adapted to operate said member when said shaft is in its outward position.

5. In a device of the class described, the combination of housing means; a stem slidably disposed in said housing means; a shaft extending traversely with respect to said stem and being slidably and rotatably disposed in said housing means and having one end projecting outwardly therefrom; a cam on said shaft adapted to engage said stem for effecting movement thereof; manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft; tongue and groove means associated with said manually engageable means and said housing means for locking said manually engageable means against unintentional rotation, including a tongue on one of said means and a groove formed in said other means, and a second groove formed in one of said means adapted to cooperate with said tongue for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said stem in operating position; and resilient means associated with said shaft and said housing means for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said stem when said shaft is pulled outwardly whereby said cam is adapted to operate said stem when said shaft is in its outward position.

6. In a device of the class described, the combination of a housing; a member slidably disposed in said housing; a shaft extending transversely with respect to said member and being slidably and rotatably disposed in said housing and having one end projecting outwardly therefrom; a cam on said shaft adapted to engage said member for effecting movement thereof; manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft; means associated with said manually engageable means and said housing for locking said manually engageable means against unintentional rotation while in non-operating position, and for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said slidable member in operating position; resilient means associated with said shaft and said housing for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said member when said shaft is pulled outwardly whereby said cam is adapted to operate said member when said shaft is in its outward position; and breakable means attached to said manually engageable means and said housing for indicating when said manually engageable means have been operated.

7. In a device of the class described, the combination of a housing; a member having a piston thereon slidably disposed in said housing; a shaft extending transversely with respect to said member and being slidably and rotatably disposed in said housing and having one end projecting outwardly therefrom; a cam on said shaft adapted to engage said member for effecting movement thereof; manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft; means associated with said manually engageable

means and said housing for locking said manually engageable means against unintentional rotation while in non-operating position, and for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said slidable member in operating position; resilient means associated with said shaft and said housing for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said member when said shaft is pulled outwardly whereby said cam is adapted to operate said member when said shaft is in its outward position; and means on said housing for introducing a fluid medium under pressure acting on said piston to move said slidable member independently of said cam, said shaft and said manually engageable means.

8. In a device of the class described, the combination of a housing; a member having a piston thereon slidably disposed in said housing; a shaft extending transversely with respect to said member and being slidably and rotatably disposed in said housing and having one end projecting outwardly therefrom; a cam on said shaft adapted to engage said member for effecting movement thereof; manually engageable means on the outwardly projecting end of said shaft for pulling said shaft outwardly and for rotating said shaft; means associated with said manually engageable means and said housing for locking said manually engageable means against unintentional rotation while in non-operating position, and for locking said manually engageable means, said shaft and said cam in a position whereby said cam holds said slidable member in operating position; resilient means associated with said shaft and said housing for opposing sliding movement of said shaft and adapted to return said shaft to its initial position, said cam being of a width to remain in contact with said member when said shaft is pulled outwardly whereby said cam is adapted to operate said member when said shaft is in its outward position; breakable means attached to said manually engageable means and said housing for indicating when said manually engageable means have been operated; and means on said housing for introducing a fluid medium under pressure acting on said piston to move said slidable member independently of said cam, said shaft, said manually engageable means, and said breakable means.

HARRY C. GRANT, JR.