Aug. 10, 1943. H. C. GRANT, JR 2,326,138

CONTROL HEAD

Filed Aug. 20, 1941

Fig. 1

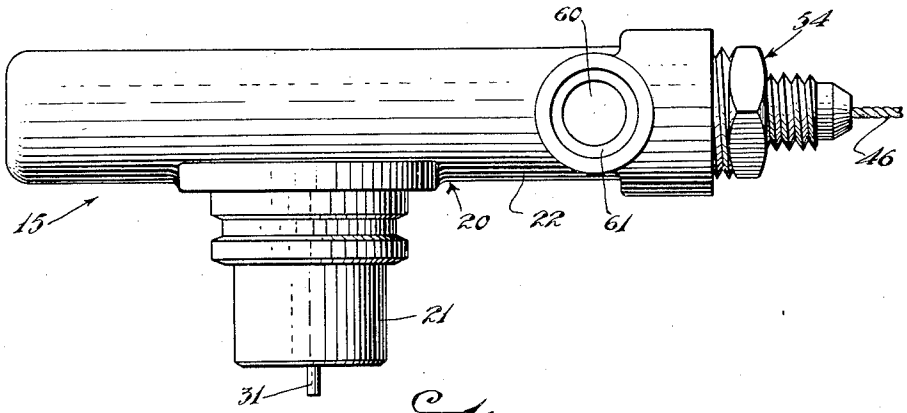


Fig. 2

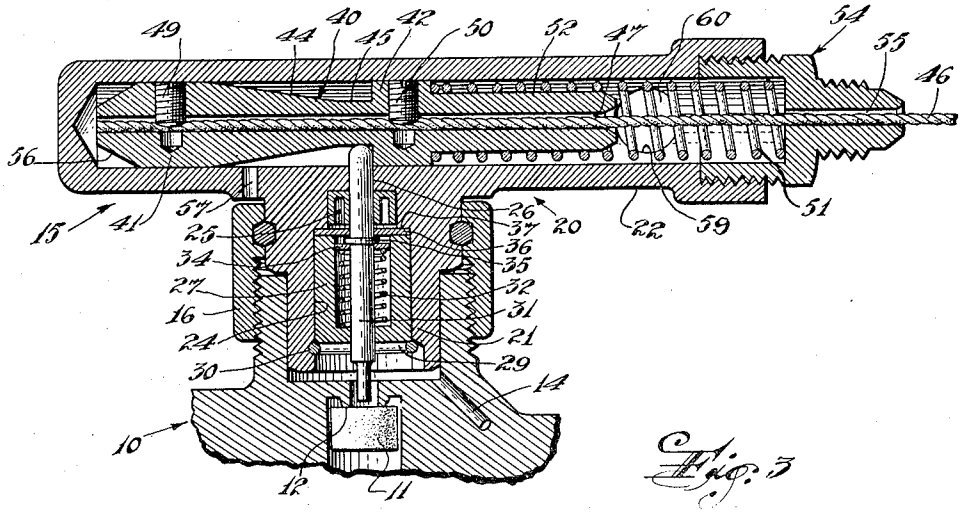
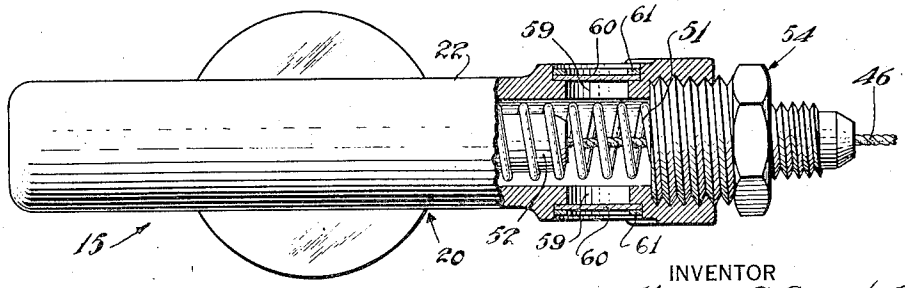


Fig. 3



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CONTROL HEAD

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7 Claims. (Cl. 74—110)

The present invention relates to control devices, and more particularly to a pull cable actuated control head adapted to be used in connection with controlling valves of systems for dispensing a high pressure fluid medium.

In systems for dispensing or releasing a fluid pressure medium such as carbon dioxide used for extinguishing fires or for other purposes, it is customary to provide the container or cylinder for storing the fluid medium with a valve or similar means for releasing the medium. 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 maintained in closed position by the operation of the pressure in the cylinder and which may be opened to bleed a portion of the pressure medium in back of the piston of the valve member. The device or control head of the present invention is primarily concerned with controlling the operation of the pilot valve or other means adapted to effect the opening of valves or the like.

An object of the invention is to provide a simple inexpensive control head of the foregoing character.

Another object is to provide a control head which is small, compact and light in weight and is therefore particularly adapted for installations where size and weight are of importance.

Another object is to provide a pull cable operated control head requiring a relatively light pull to effect operation.

Another object is to provide a control head which is positive in operation and contains no parts which can get out of position or jam, whereby the control head may fail to be operated.

Another object is to provide a control head having means for visibly indicating when the parts thereof are improperly positioned prior to operation of the head.

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 side elevational view of a control head, illustrating an embodiment of the invention.

Figure 2 is a longitudinal sectional view of the control head mounted on a valve.

Figure 3 is a top view partly in section, illustrating a detail of the control head.

Referring more particularly to the drawing, there is shown in Figure 2, 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 a portion of the pressure medium may be conducted to actuate the valve means. A control head 15, in accordance with the invention, for operating the pilot valve member 11, may be mounted on and attached to the upper end of the valve assembly 10 by a suitable coupling nut 16 or the like.

The control head comprises a substantially T-shaped body, casing or housing 20 having a downwardly depending tubular portion 21 providing the base of the T which extends into the valve assembly and carries a nut 16 for securing the head to the valve assembly. A tubular portion 22 extends transversely and perpendicularly across the casing portion 21 and preferably is integral therewith to provide the arms of the T.

The downwardly depending portion 21 has a cylindrical inner bore 24 which is provided with a portion of reduced diameter at the upper end for housing an annular packing or sealing gland 25 and which terminates in an aperture 26 leading to the interior of the transversely extending tubular portion 22. A substantially cup-shaped sleeve member 27 is positioned in the lower portion of the bore 24 and may be retained by a spring ring 28 forced into an annular groove 30 in the side wall of the bore. If desired the sleeve 27 may be screw threaded into the bore.

A pin or rod 31 is mounted in the sleeve 27 and has its lower end extending through an aperture in the base of the sleeve and is adapted to engage the pilot valve member 11 and unseat it upon downward movement of the pin. The upper portion of the pin 31 extends through the gland 25 and the aperture 26 and projects into the interior of the tubular portion 22. Preferably, the upper end of the pin is semi-spherical in shape to facilitate engagement by cam means in the tubular portion 22 for moving the pin downwardly, as about to be described. The pin preferably is normally maintained in its upper position by a cylindrical helical spring 32 telescoped about the pin and having its lower end seated on the end wall of the cup-shaped sleeve 27 and having its upper end abutting a disc or washer 34, through which the pin extends and which is engaged by a flange 35 on the pin. The spring 32 normally is slightly compressed to urge the washer 34 upwardly against the flange 35 which in turn causes the pin to be urged up-

wardly. The extent of upward movement of the pin may be limited by positioning a washer 36 in the bore 24, which acts as a stop for the flange 35 when the pin is urged upwardly. The washer 36 is secured in the bore by the inner end of the sleeve 27 which holds the washer against a shoulder 37 adjacent the gland 25.

The tubular portion 22 of the casing or body 20 of the control head preferably is cylindrical in shape and has a circular bore of substantially uniform diameter extending longitudinally therethrough. An operating member 40 provided with a cam surface for engaging the upper end of the pin 31 is slidably mounted in the bore of the casing portion 22.

This slidable member 40 has a substantially cylindrical portion 41 adjacent one end and a substantially cylindrical flange 42 spaced longitudinally from the portion 41, which serve as guide portions for slidably mounting the member 40 in the bore of the casing portion 22.

Intermediate the cylindrical portion 41 and the flange 42, a substantially frusto-conical cam portion 44 is provided which has a surface for engaging the pin 31. The surface of the cam portion 44 converges toward the flange 42 at a relatively small angle or slight taper to provide a relatively high mechanical advantage for wedging the pin downwardly, whereby only a small force is required to move the slidable member 40. The surface of the cam portion 44 may be inclined with respect to the longitudinal axis of the member 40 at an angle of between about 7.5 and 15°, but preferably, about 10°.

The cam portion is further provided with a relatively short cylindrical surface 45 at the converging end of the cam surface and adjacent the flange 42. The cylindrical surface is adapted to engage the pin when the slidable member 40 is in its normal or non-operated position.

The slidable member 40 is adapted to be operated by a pull cable 46 which extends through a longitudinal bore 47 in the member 40, which is secured to the member 40 by set screws 49 and 50 threaded into the cylindrical guide portion 41 and the flange 42, respectively. The slidable member 40 preferably is maintained in its normal position by a cylindrical helical spring 51 telescoped about a tubular end portion 52 of reduced diameter and having one end thereof engaging the flange 42. The other end of the spring engages the end wall of a cap member 54 threaded to the open end of the tubular portion 22. The cap member is provided with an aperture 55 through which the cable passes outwardly of the casing 20.

In order to facilitate inserting the operating member 40 into the tubular casing portion 22, the free end of the member 40 adjacent the cylindrical guide portion 41 is substantially frusto-conical in shape to provide a cam surface 56 for urging the pin 31 downwardly, during assembly, to permit the guide portion 41 to slide over the pin. An aperture or vent 57 is provided for relieving air pressure in the tubular casing portion which may be caused by the sliding movement of the member 40.

It is desirable to be able to readily determine the position of the slidable operating member 40 in the casing portion 22. To accomplish this, the casing portion 22 may be provided with sight holes adjacent the end at which the cap 54 is secured. Preferably a pair of diametrically opposite holes 59 (Figure 3) are provided which are closed each by a disc 60 of transparent material to exclude foreign substances from the bore of the tubular portion 22. The discs 60 may be held in place by suitable spring retaining rings 61 or the like. The end portion 52 of the slidable member is coated with a conspicuous color so that by observing the holes 59, it can be readily determined whether or not the slidable member 40 is in normal position or has been operated.

From the foregoing description it will be seen that the present invention provides an improved control head which is simple and inexpensive in construction. The control head is readily assembled and can be operated by exerting a slight force on the pull cable to insure quick and positive operation. When the cam surface 44 slides acorss the pin 31, the pin is moved downwardly to unseat the pilot valve member 11. When the pull cable is released the spring 51 returns the operating member to its normal position. In the event the operating member is not returned, the conspicuoulsy colored end 52 of the member 40 is visible through the transparent discs 60 and provides an indication that the member 40 is not in its proper position. The parts of the control head are compact and light in weight, but 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. A control head comprising a body; a casing on said body provided with a bore closed at one end and open at its other end; a cap attached to said casing at said open end; a member adapted to be operated having one end thereof extending into the bore of said casing; means for urging said member toward the bore; a plunger positioned in the bore of said casing for slidable movement therein, having a flange acting as a guide portion for said plunger and providing a pair of shoulders one of which is adapted to abut the end of said member extending into the bore of said casing, a second guide portion, and a cam portion intermediate said guide portions adapted to operate said member; and a spring having one end abutting the other shoulder of said flange and having its other end abutting said cap for urging the first shoulder of said flange against the end of said member extending into the bore of said casing.

2. A control head comprising a body; a casing on said body provided with a bore closed at one end and open at its other end; a cap attached to said casing at said open end; a member adapted to be operated having one end thereof extending into the bore of said casing; means for urging said member toward the bore; a plunger positioned in the bore of said casing for slidable movement therein, having a flange acting as a guide portion for said plunger and providing a pair of shoulders one of which is adapted to abut the end of said member extending into the bore of said casing, a second guide portion, a cam portion intermediate said guide portions adapted to operate said member, and a cam por-

tion at the end of said plunger adjacent said closed end of said casing for urging said member out of the bore to facilitate positioning of the plunger therein; and a spring having one end abutting the other shoulder of said flange and having its other end abutting said cap for urging the first shoulder of said flange against the end of said member extending into the bore of said casing.

3. A control head comprising a body; a casing on said body provided with a bore closed at one end and open at its other end; a cap attached to said casing at said open end; a member adapted to be operated having one end thereof extending into the bore of said casing; means for urging said member toward the bore; a plunger positioned in the bore of said casing for slidable movement therein, having a flange acting as a guide portion for said plunger and providing a pair of shoulders one of which is adapted to abut the end of said member extending into the bore of said casing, a second guide portion, and a cam portion intermediate said guide portions adapted to operate said member; a spring having one end abutting the other shoulder of said flange and having its other end abutting said cap for urging the first shoulder of said flange against the end of said member extending into the bore of said casing; and means for indicating when said plunger has been moved to operate said member, including an aperture in said casing adjacent said open end and a conspicuously colored portion on said plunger at the end adjacent said open end of the casing.

4. A control head comprising a body; a casing on said body provided with a bore closed at one end and open at its other end; a cap attached to said casing at said open end and having an aperture therein; a member adapted to be operated having one end thereof extending into the bore of said casing; means for urging said member toward the bore; a plunger positioned in the bore of said casing for slidable movement therein, having a flange acting as a guide portion for said plunger and providing a pair of shoulders one of which is adapted to abut the end of said member extending into the bore of said casing, a second guide portion, and a cam portion intermediate said guide portions adapted to operate said member; a spring having one end abutting the other shoulder of said flange and having its other end abutting said cap for urging the first shoulder of said flange against the end of said member extending into the bore of said casing; and a pull cable secured to said plunger and extending through the aperture in said cap.

5. A control head comprising a body; a casing on said body provided with a bore closed at one end and open at its other end; a cap attached to said casing at said open end and having an aperture therein; a member adapted to be operated having one end thereof extending into the bore of said casing; means for urging said member toward the bore; a plunger positioned in the bore of said casing for slidable movement therein, having a flange acting as a guide portion for said plunger and providing a pair of shoulders one of which is adapted to abut the end of said member extending into the bore of said casing, a second guide portion, a cam portion intermediate said guide portions adapted to operate said member, and a cam portion at the end of said plunger adjacent said closed end of said casing for urging said member out of the bore to facilitate positioning of the plunger therein; a spring having one end abutting the other shoulder of said flange and having its other end abutting said cap for urging the first shoulder of said flange against the end of said member extending into the bore of said casing; and a pull cable secured to said plunger and extending through the aperture in said cap.

6. A control head comprising a body; a casing on said body provided with a bore closed at one end and open at its other end; a cap attached to said casing at said open end and having an aperture therein; a member adapted to be operated having one end thereof extending into the bore of said casing; means for urging said member toward the bore; a plunger positioned in the bore of said casing for slidable movement therein, having a flange acting as a guide portion for said plunger and providing a pair of shoulders one of which is adapted to abut the end of said member extending into the bore of said casing, a second guide portion, a cam portion intermediate said guide portions adapted to operate said member, and a cam portion at the end of said plunger adjacent said closed end of said casing for urging said member out of the bore to facilitate positioning of the plunger therein; a spring having one end abutting the other shoulder of said flange and having its other end abutting said cap for urging the first shoulder of said flange against the end of said member extending into the bore of said casing; a pull cable secured to said plunger and extending through the aperture in said cap; and means for indicating when said plunger has been moved to operate said member.

7. A control head comprising a body; a casing on said body provided with a bore closed at one end and open at its other end; a cap attached to said casing at said open end and having an aperture therein; a member adapted to be operated having one end thereof extending into the bore of said casing; resilient means for urging said member toward the bore; a plunger positioned in the bore of said casing for slidable movement therein, having a flange acting as a guide portion for said plunger and providing a pair of shoulders one of which is adapted to abut the end of said member extending into the bore of said casing, a second guide portion, a cam portion intermediate said guide portions adapted to operate said member, and a cam portion at the end of said plunger adjacent said closed end of said casing for urging said member out of the bore to facilitate positioning of the plunger therein; a spring having one end abutting the other shoulder of said flange and having its other end abutting said cap for urging the first shoulder of said flange against the end of said member extending into the bore of said casing; a pull cable secured to said plunger and extending through the aperture in said cap; and means for indicating when said plunger had been moved to operate said member, including an aperture in said casing adjacent said open end and a conspicuously colored portion on said plunger at the end adjacent said open end of the casing.

HARRY C. GRANT, JR.