

March 5, 1935.

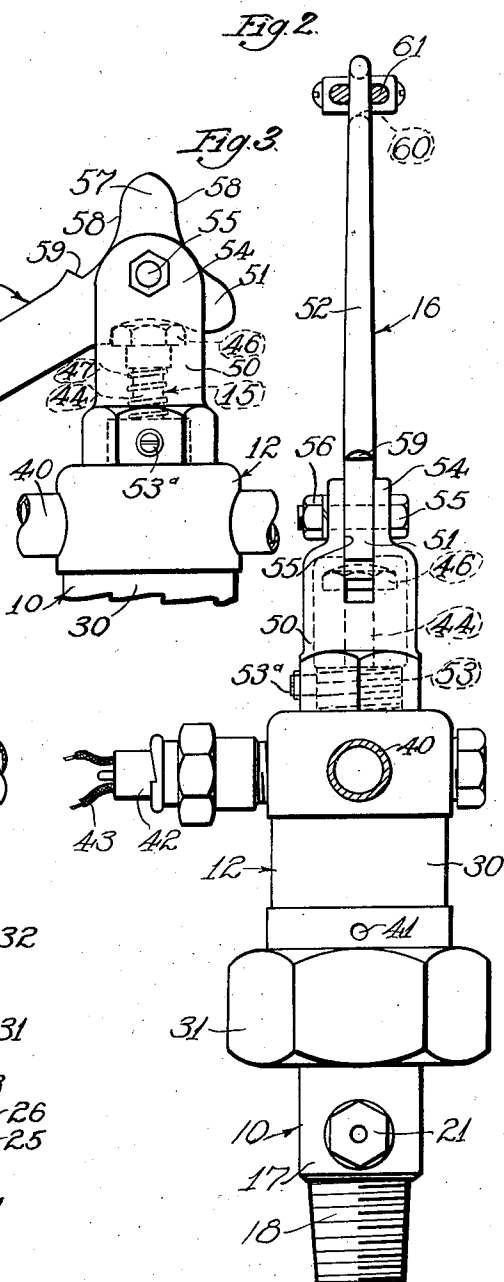
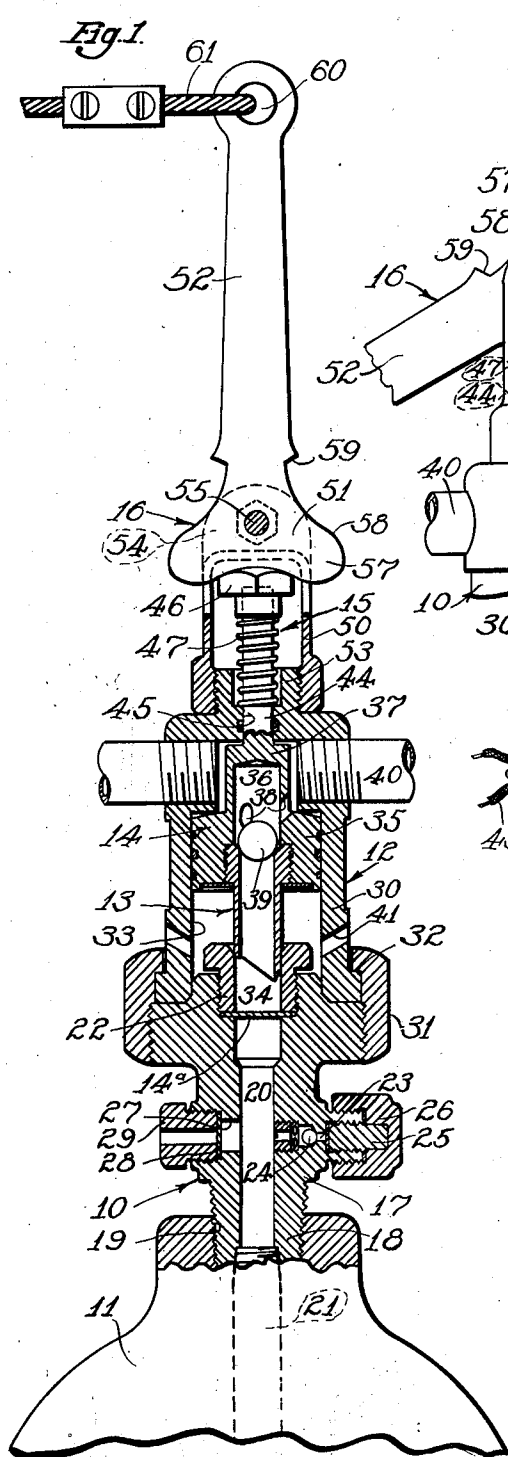
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DEVICE FOR RELEASING FLUID FROM A CONTAINER

Filed Jan. 17, 1931

2 Sheets-Sheet 1



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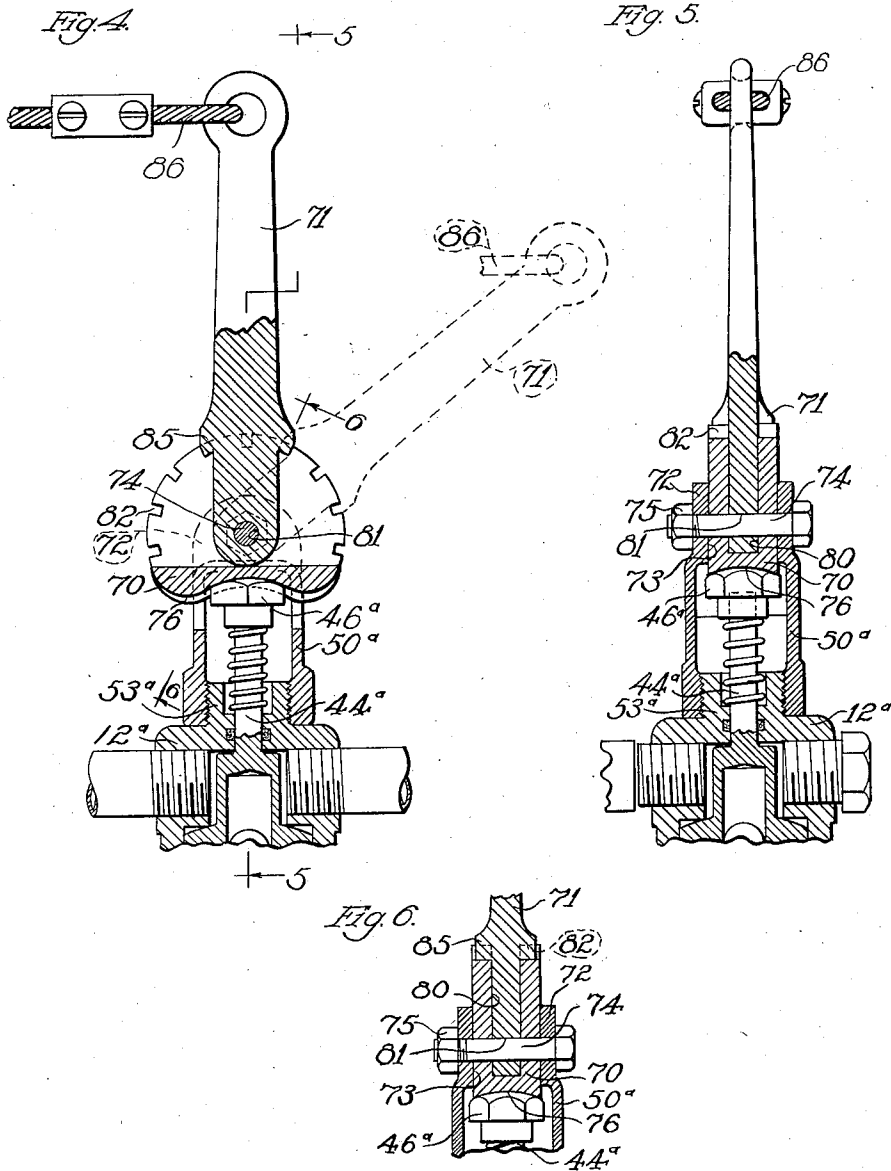
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UNITED STATES PATENT OFFICE

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DEVICE FOR RELEASING FLUID FROM A CONTAINER

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3 Claims. (Cl. 74-107)

This invention relates to a device for releasing fluid from a container, and relates more particularly to a device for puncturing a penetrable closure disc of a container carrying fluid under pressure.

It is a general object of the invention to provide a device for puncturing a closure disc that embodies a simple, effective, and convenient operating means.

The present invention is concerned primarily with a means for operating a head or device for puncturing a frangible closure disc. The invention is capable of embodiment in forms for use on or in connection with various types of devices or fixtures for puncturing closure discs. Throughout the following detailed disclosure, the invention will be described in combination with a closure disc puncturing device of the general character fully described and claimed in the co-pending application of Scott E. Allen and Ozro N. Wiswell, Serial Number 349,150, filed March 22, 1929, entitled Non-stalling self-energizing head for puncturing closure discs.

Carbon dioxide and other fire extinguishing mediums are commonly contained under pressure in flasks or cylinders. In fire extinguishing systems involving the use of carbon dioxide, the fluid containing cylinders are provided with penetrable closure discs and heads for puncturing the discs to release the gas or fluid from the cylinders. The closure discs are arranged in openings in the upper ends of the cylinders and the heads for puncturing the discs are mounted on the upper ends of the cylinders. Closure disc puncturing devices of the general character described in the co-pending application referred to above embody operating stems adapted to be manually or mechanically depressed to cause puncturing of the discs and the release of the fire extinguishing fluid. The fluid containing cylinders are arranged or placed in suitable locations in the compartments or rooms to be protected against fire. In ships and like situations where space is limited, it is particularly advantageous to place the cylinders in positions where they do not occupy storage space or obstruct passages, etc. It sometimes occurs that the fluid containing cylinders are located in confined and inconvenient places where it is extremely difficult to manually depress the operating stems or to provide for the mechanical depression of the operating stems to release the fire extinguishing medium.

It is an object of the present invention to provide a device or head for puncturing the pene-

trable closure disc of a fluid containing cylinder that is particularly easy and convenient to operate and that may be adjusted or set to be operable by either vertical or horizontal pressure.

It is another object of the invention to provide a head for puncturing a frangible closure disc of a fluid containing cylinder that involves a combination of elements whereby the closure disc may be punctured by fluid pressure means, by electrically actuated means, or by a means operable mechanically or manually by horizontal or vertical actuation.

It is another object of the invention to provide an attachment for a closure disc puncturing head of the general character described in the co-pending application identified above that embodies an operating lever or handle that may be mounted or set to be operated by a horizontal pressure in either direction, or that may be set in positions at either side of the head to be operated by vertical pressure.

It is another object of the invention to provide an attachment of the character mentioned in which the operating handle or lever may be operated manually or operated from a remote point by means of an operating cable, or the like.

It is another object of the invention to provide an attachment of the character mentioned for use on a head for releasing fluid from a cylinder that may be easily and quickly mounted directly on heads of the general character referred to without modifications or additional parts.

It is another object of the invention to provide an attachment of the character mentioned for operating a closure disc puncturing device that is particularly simple and inexpensive to manufacture, and that is dependable and positive in operation.

It is another object of the invention to provide a fixture or attachment for operating a head for puncturing a closure disc in which the operating handle or lever may be readily set in substantially horizontal positions on either side of the head for vertical movement or actuation to operate the head, or may be set in a vertical position for horizontal operation in either direction. The operating handle or lever may be set in the desired position by the removal and replacing of a single pin or bolt.

It is a further object of the invention to provide an attachment for operating a closure puncturing head that includes a cam operable upon partial rotation to depress the stem of the head and a handle or lever that may be set or posi-

tioned to project from the cam in any desired direction.

The various other objects and features of the invention will be best and more fully understood from the following detailed description of typical forms and applications of the invention, throughout which description reference will be had to the accompanying drawings, in which:

Fig. 1 is a vertical detailed sectional view of a cylinder valve mounted on a typical fluid containing cylinder, a head mounted on the valve for puncturing a closure disc, and one form of attachment mounted on the head. Fig. 2 is a side elevation of the parts illustrated in Fig. 1. Fig. 3 is an elevation of the upper portion of the mechanism, showing the operating handle in a position where it projects laterally from the head. Fig. 4 is a vertical detailed sectional view of another form of the present invention, illustrating it mounted on the upper end of a head. Fig. 5 is a vertical detailed sectional view taken substantially as indicating by line 5—5 on Fig. 4. Fig. 6 is a sectional view taken as indicated by line 6—6 on Fig. 4.

The appliances or attachments provided by this invention are intended for use on heads for puncturing the closure discs of cylinders or flasks carrying fluid under pressure and, more particularly, on heads involving operating stems adapted to be depressed to cause puncturing of the closure discs. It is to be understood that the invention is capable of embodiment in forms for use on fixtures and heads varying somewhat in character, and that the invention is not to be considered as restricted to the particular forms and applications about to be described.

The apparatus of mechanism illustrated in Figs. 1 to 3 of the drawings includes, generally, what is known in the art as a cylinder valve 10 mounted on a typical flask or cylinder 11 for carrying fluid under pressure; a head 12 mounted on the fitting or valve 10 and including a cutter 13 for puncturing a closure disc 14^a to release fluid from the cylinder 11, means 14 operable by fluid under pressure to actuate the cutter 13, and manual means 15 for actuating the cutter 13; and an attachment 16 mounted on the head 12 and operable mechanically or manually by vertical or horizontal pressure to actuate the manual means 15 of the head.

The cylinder valve or fitting 10 is shown mounted on a typical container or cylinder 11 for carrying a fluid under pressure. The fitting 10 includes a vertically disposed body 17 having a pin 18 at its lower end and threaded into an opening 19 in the upper end of the container 11. A central longitudinal passage 20 extends vertically through the body 17 from one end to the other. A syphon tube 21 is threaded into the lower end of the passage 20 and projects downwardly into the cylinder 11. The upper end of the passage 20 is closed by the frangible and penetrable closure disc 14^a. The disc 14^a is retained in position by a tubular nut 22 threaded into the upper end of the discharge passage 20.

A lateral filling opening 23 is provided in the body 17 and communicates with the passage 20. A suitable check valve 24 is provided in the filling opening 23 to prevent the discharge of fluid outwardly through the opening. The outer end of the filling opening 23 may be normally closed by a screw-threaded plug 25 and a cap 26. A side or lateral safety opening 27 is provided in the valve body 17. The opening 27 is normally closed by a frangible closure disc 28 designed to fail

or burst under a predetermined dangerous or high pressure. The disc 28 may be retained in position by a tubular nut 29. The upper end portion of the valve body 17 is of enlarged diameter and is externally screw-threaded to receive the head 12.

The head 12 is mounted on the upper end of the fitting or valve 10 and is in the nature of a device for puncturing the disc 14^a to release the fire extinguishing medium from the container 11. The head 12 includes a body 30 seated on the upper end of the fitting body 17. The body 30 of the head is an elongated vertically disposed member and is attached to the valve body 17 by means of a union or coupling member 31 threaded on the enlarged upper end of the body 17. The member 31 has a reduced upper end to co-operate with a shoulder 32 on the body 30 to clamp the body of the head onto the fitting 10. A chamber 33 extends upwardly in the body 30 from its lower end.

The cutter 13 is operable by the means 14 or the means 15 to perforate the disc 14^a to release the fluid from the container 11. The cutter 13 is carried by the fluid pressure actuated means 14, as will be hereinafter described. In the particular type of head illustrated in the drawings, the cutter 13 is an elongated tubular member and is vertically disposed within the chamber 33. The lower end part of the cutter 13 may extend into the opening 34 in the nut 22. The cutter 13 slidably fits the opening 34 and its lower end is normally disposed some distance above the disc 14^a. The lower end of the cutter 13 is inclined and formed with sharpened cutting edges to effectively perforate the disc 14^a.

The fluid pressure actuated means 14 for operating the cutter 13 is in the nature of a cylinder and piston means and includes a piston 35, slidable in the cylinder opening of the chamber 33. The piston 35 carries the cutter 13. The cutter 13 may be provided at its upper end with an enlarged portion screw-threaded into the lower end of an opening 36 in the piston. The piston 35 is provided with a reduced upper end part 37 and the opening 36 extends upwardly through the piston and terminates within the reduced part 37. Lateral ports 38 extend outwardly from the opening 36 to discharge into the upper end of the cylinder opening 33. A suitable check valve is provided in the passage 36 to prevent the discharge of fluid downwardly through the passage and the tubular cutter 13. A ball 39 is arranged in the opening 36 to co-operate with a seat formed around the upper end of the opening in the cutter 13 to prevent the downward passage of fluid through the cutter.

Two or more conduits 40 may communicate with or discharge into the upper end portion of the cylinder opening 33. One of the conduits 40 may be considered as discharging into a manifold for carrying the fire extinguishing medium to the point of discharge, while the other conduit 40 may be considered as being connected with the chamber of a head arranged on a fluid containing cylinder or as extending to any other suitable source of fluid pressure supply. It is to be understood that the head 12 may be connected with a discharge manifold and/or with other discharge heads in any suitable manner. Fluid pressure discharged into the upper end of the cylinder opening 33 is operable to depress the piston 35 and force the cutter through the disc 14^a. Vent openings 41 are provided in the body 30 to communicate with the lower end part of the

chamber 33 to permit the discharge of fluid trapped in the chamber during downward movement of the piston.

In the drawings, I have illustrated an electrically actuated device 42 operable to generate fluid under pressure within the upper portion of the chamber 33 to actuate the cutter 13. The device 42 may be an electrically actuated device of the character set forth and claimed in the co-pending application, Serial No. 443,673. The plug or device 42 may be threaded into an opening in the upper end of the body 30 to discharge into the upper end of the cylinder opening 33. The device 42 contains a highly inflammable or explosive material adapted to be ignited upon the energization of an electric circuit carried by conductors 43. Upon igniting of the explosive in the device 42, a high pressure is developed within the upper end of the cylinder 33 which actuates the piston 35 downwardly.

The manual means 15 for actuating the cutter 13 includes a stem 44 projecting upwardly from the reduced upper end part 37 of the piston. The stem 44 extends through an opening 45 in the upper end of the body 30 to project upwardly from the upper end of the head 12. A suitable knob 46 is mounted on the upper end of the stem 44. The operating knob 46 may have a rounded upper end and flattened sides. A helical spring 47 is arranged under compression between the upper end of the body 30 and the knob 46 to normally yieldingly retain the stem 44, the piston 35, and the cutter 13 in the up or unactuated position.

The attachment 16 is adapted to be mounted on the upper end of the head 12 and is provided primarily to permit the ready actuation of the stem 44 by manual or mechanical means. The attachment 16 is in the nature of a cam means for depressing the stem 44 to actuate the cutter 13 and release the fluid from the container 11. In the form of the invention illustrated in Figs. 1 to 3 of the drawings, the attachment includes, generally, a bracket or body 50, a cam 51, and a lever or handle 52 for the cam.

The bracket 50 of the attachment may be mounted on the upper end of the body 20 and in any suitable manner. In the case illustrated, the lower portion of the body 50 is tubular and is screw-threaded onto a pin 53 on the upper end of the body 30. The lower end part of the body 50 may be polygonal or provided with flattened sides to receive a wrench, or the like. The bracket 50 may be turned or threaded on the pin 53 to any desired rotative position and may be releasably set in that position by a set screw 53^a.

The bracket body 50 surrounds or encases the projecting portion of the stem 44 and the knob 46. Upwardly projecting yoke parts 54 are provided on the upper end of the body 50. The opening or slot 55 between the spaced parts 54 extends some distance downwardly into the tubular main part of the bracket.

The cam 51 is pivotally mounted between the spaced parts 54 and engages the knob 46. The cam 51 is mounted on a removable bolt 55 carried in transverse openings through the spaced parts 54. A nut 56 may be threaded on one end of the bolt to hold it against displacement. The cam 51 is provided with two like cam projections 57 for depressing the knob 46. The projections 57 project radially outward relative to the pivotal axis of the cam and are circumferentially spaced relative to the axis of the movement of the cam, as clearly illustrated in Figs. 1 and 3 of the draw-

ings. In practice, the longitudinal center lines of the two cam projections 57 may be approximately 120° apart. A curved cam face 58 is provided on each of the opposite edges of each of the projections 57. The faces 58 are curved to effectively co-operate with the rounded upper end of the knob 46. The cam faces 58 on the inner edges of the projections 57 join at a point midway between the projections. The cam faces 58 at the outer edges of the projections terminate in shoulders 59. The shoulders 59 are provided to engage the flattened sides of the knob 46 when the handle 52 is in either one of its lateral positions, as will be hereafter described.

The handle or lever 52 constitutes the means for actuating the cam 51 and may be operated manually or by suitable mechanical or gravity means. The handle 52 may be integral with the cam 51 and may be of any suitable length. In accordance with this form of the invention, the lever or handle 52 projects radially outward from the cam 51 at a point substantially 120° from the two cam projections 57. A transverse opening 60 may be provided in the outer end of the handle 52 to pass or receive an operating cable or wire 61.

Normally, the various parts of the head 12 are in the positions illustrated in Fig. 1 of the drawings. The cutter 13 may be operated to perforate the disc 14^a by passing fluid under pressure into the upper end of the chamber 33 through a conduit 40, or by actuating the pressure generating device 42. Upon perforation of the disc 14^a by the cutter 13, the fluid is released from the container 11 and discharges upwardly through the cutter and opening 36 to pass through the conduits 40. When it is desired to manually actuate the head 12, the handle 52 is swung or turned to bring one of the cam projections into camming engagement with the knob 46 to depress the stem 44. It is a feature of the present invention that the arm or handle 52 may be set or positioned for operation vertically or horizontally to actuate the head 12. The handle 52 may be positioned vertically as illustrated in Fig. 1 of the drawings or positioned to project laterally from either side of the head. Fig. 3 of the drawings illustrates one of the lateral positions of the handle 52, it being apparent how the handle may be set to project from the opposite side of the head.

To arrange the lever or handle in the desired position, the bolt 55 is removed and the handle arranged as desired. The bolt 55 may then be replaced to mount the cam and the handle on the bracket. It is preferred to set the cam and handle 52 in the desired position before applying the attachment 16 to the head 12. When the handle 52 is in the vertical position illustrated in Fig. 1 of the drawings, it may be operated or swung horizontally in either direction to actuate the head 12. When the handle is set in a lateral position such as is illustrated in Fig. 3 of the drawings, it may be swung or operated upwardly to depress the stem 44.

The embodiment of the invention illustrated in Figs. 4 and 5 of the drawings may be employed in connection with heads of the same general character as the head 12 described above. The attachment is illustrated arranged in position on a head 12^a similar to the head 12. This form of the invention includes, generally, a body or bracket 50^a, a cam 70 carried by the bracket and operable to depress the stem 44^a of the head, and an operating handle or lever 71.

The body 50^a of the appliance may be similar generally to the body 50 described above. The

lower portion of the bracket or body 50^a may be tubular and may be screw-threaded onto a pin 53^a on the upper end of the head 12^a. Spaced yoke parts 72 are provided on the upper end of the body 50^a. The opening 73 between the parts 72 extends downwardly into the tubular portion of the bracket 50^a.

The cam 70 is pivotally mounted between the parts 72 on a removable bolt 74 extending transversely between the yoke parts. The bolt 74 may be retained in position by a nut 75. The lower end of the cam 70 is provided with two curved cam faces 76 for engaging the upper end of the knob 46^a. The cam faces 76 are curved downwardly and outwardly in opposite directions from a point below the axis of movement of the cam. The curvature of the two faces 76 may be alike. The upper portion of the cam 70 is segmental, as the cam has an upper edge curved continuously between the outer ends of the two cam faces 76. The upper edge of the cam 70 is curved about the pivotal axis of the cam. The cam 70 may be bifurcated, being provided with a central vertical opening or slot 80.

The operating means or handle 71 is adapted to be connected with the cam 70 to project outwardly therefrom at any one of a plurality of circumferentially spaced points. The inner end of the handle 71 extends into the opening 80 and the bolt 74 passes through an opening 81 in the handle. This form of the invention provides means for the locating or setting of the handle 71 in any one of a plurality of different positions. The means for setting the handle 71 in various rotative positions relative to the cam 70 includes a plurality of circumferentially spaced notches 82 in the curved upper edge of the cam 70. There may be any suitable number of notches 82 and the notches may be equally spaced apart. Inwardly projecting lugs 85 are provided at the opposite side edges of the handle 71. The lugs 85 are adapted to extend into or co-operate with two of the spaced notches 82. The lever or handle 71 may be of any suitable length and may be provided at its outer end with an opening for receiving an operating cable 86.

In employing the form of the invention illustrated in Figs. 4 and 5 of the drawings, the lever 71 may be swung or operated to cause a cam face 76 to co-operate with the knob 46^a to depress the stem 44^a. In accordance with this form of the invention, the handle or lever 71 may be set or positioned in any one of a plurality of rotative positions on the cam 70. To position the lever 71, the bolt 74 is removed and the handle moved to the desired position where its two lugs 85 extend into two of the notches 82. The bolt 74 may then

be replaced to connect the lever with the cam. It will be apparent that the handle or lever 71 may be set to project in any desired direction from the upper end of the head 12^a and may be easily and quickly operated to actuate the head. The cable 86 may extend to any remote point and may be operated in any manner to actuate the head.

Having described only typical preferred forms of my invention, I do not wish to limit myself to the specific details set forth, but wish to reserve to myself any changes or variations that may appear to those skilled in the art or fall within the scope of the following claims:

Having described my invention, I claim:

1. An operating device for a container control head having an operating stem, which device comprises a pivotally movable cam carried by the head and adapted to operate the stem, an operating lever in permanent fixed relation to the cam, said cam having two lobes radially disposed with respect to the pivot of the cam and symmetrically disposed with respect to the lever, and means whereby the lever may be set to occupy a vertical idle position for operation of the stem by force applied horizontally to the lever or may be set in a transverse idle position for operation of the stem by force applied vertically to the lever.
2. An operating device for a container control head having an operating stem, which device comprises a pivotally movable cam carried by the head and adapted to operate the stem, an operating lever in permanent fixed relation to the cam, said cam having two lobes radially disposed with respect to the pivot of the cam and symmetrically disposed with respect to the lever, and means whereby the lever may be set to occupy a vertical idle position for operation of the stem by force applied horizontally to the lever in either direction or may be set in either of two opposed transverse idle positions for operation of the stem by force applied vertically to the lever.
3. An operating device for a container control head having an operating stem, which device comprises a body on the control head, a pivotally movable cam carried by the head and adapted to operate the stem, an operating lever in permanent fixed relation to the cam, said cam having two radially disposed lobes at angles of 60° to each other and to the lever, means whereby the lever may be positioned for operation of the stem by force applied horizontally to the lever or by force applied vertically to the lever, and stops formed on the lever to limit downward movement of the lever when set for operation by force applied vertically thereto.

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