March 5, 1935. O. N. WISWELL 1,993,639

DEVICE FOR RELEASING FLUID FROM A CONTAINER

Original Filed Jan. 17, 1931

Fig. 1

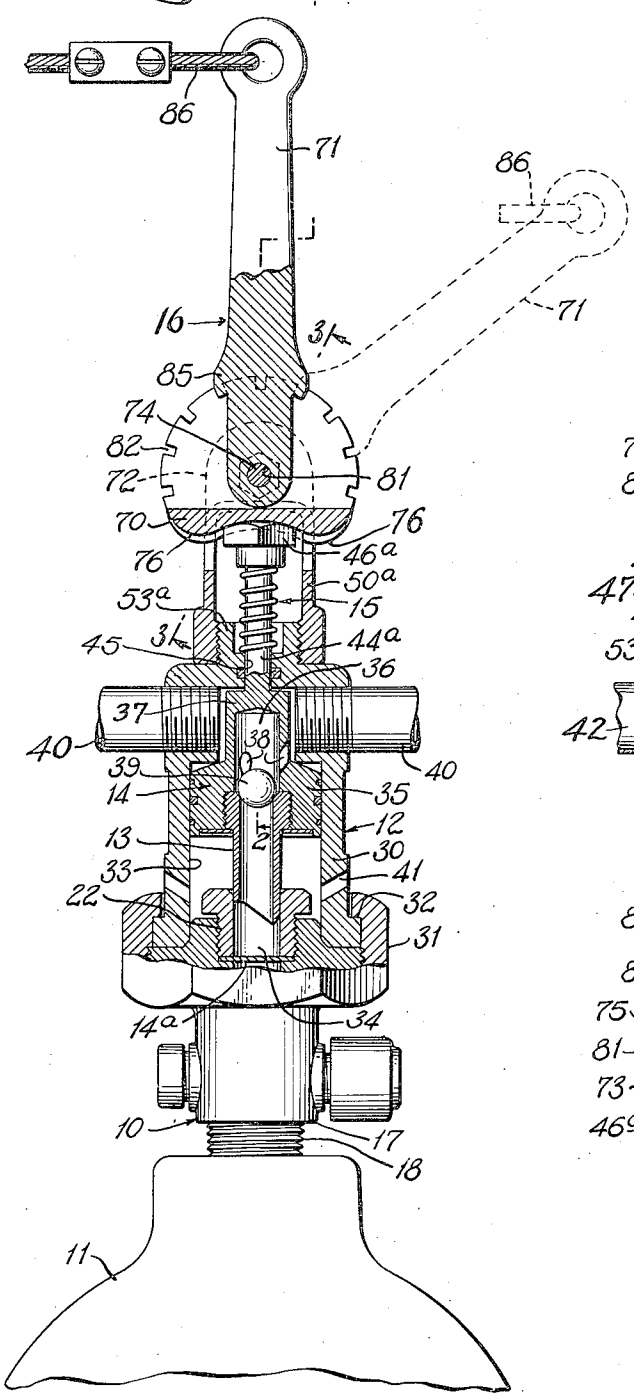


Fig. 2

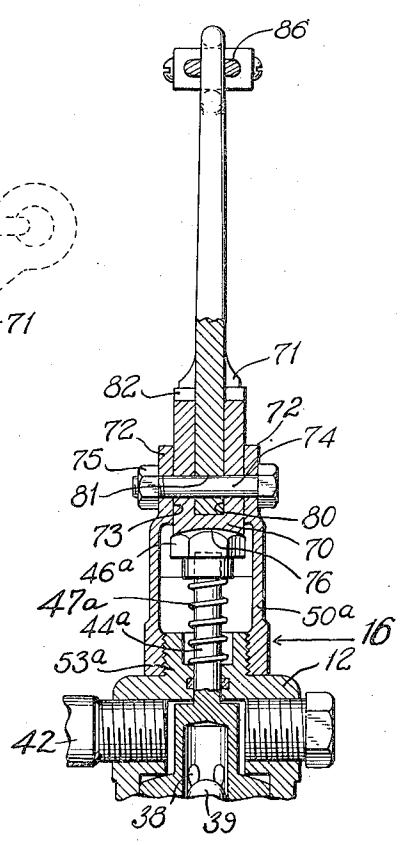
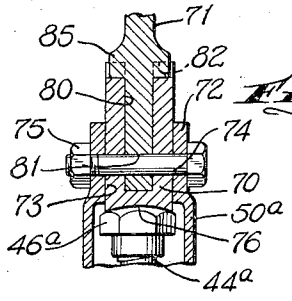


Fig. 3



INVENTOR.
OZRO N. WISWELL
BY Frederick S. Duncan
ATTORNEY.

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DEVICE FOR RELEASING FLUID FROM A CONTAINER

Ozro N. Wiswell, Los Angeles, Calif., assignor to C-O-Two Fire Equipment Company, Newark, N. J., a corporation of Delaware

Original application January 17, 1931, Serial No. 509,453. Divided and this application August 30, 1933, Serial No. 687,480

8 Claims. (Cl. 74—107)

The present application is a division of my co-pending application Ser. No. 509,453 filed January 17, 1931.

The 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, Ser. No. 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 penetrable 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 as described in the above mentioned copending application Ser. No. 349,150 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 positioned to project from the cam in any desired direction.

Other objects and features of the invention will appear in the following description of an embodiment thereof and thereafter the novelty and scope of the invention will be pointed out in the claims.

In the accompanying drawing,

Fig. 1 is a view, largely in vertical section, of a cylinder valve mounted on a typical fluid containing cylinder with my improved device for puncturing a closure disk mounted thereon;

Fig. 2 is a view in vertical section, taken substantially on the line 2—2 of Fig. 1; and

Fig. 3 is a detail view in section taken on the line 3—3 of Fig. 1.

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 or mechanism illustrated in Figs. 1 to 3 of the drawing includes, generally, a cylinder valve or fitting 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 cylinders 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 to actuate the manual means 15 of the head.

The cylinder valve 10 is shown as mounted on a typical container or cylinder 11 which carries a fluid under pressure. The fitting 10 comprises a vertically disposed body 17 having a threaded stem which is screwed into the neck of the container 11. The fitting has a longitudinal bore therein for the discharge of the fluid. However, the upper end of this bore is normally closed by a disk 14*a* which is retained in position by a tubular nut 22 threaded into the upper end of the fitting.

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 drawing, 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 a sharpened cutting edge 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 ball check valve 39 is arranged in the opening 36 to co-operate with a seat formed around the upper end of the passage 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 Fig. 2, 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, Ser. No. 448,673. 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. 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*a* projecting upwardly from the reduced upper end part 37 of the piston. The stem 44*a* 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*a* is mounted on the upper end of the stem 44*a*. The operating knob 46*a* may have a rounded upper end and flattened sides. A helical spring 47*a* is arranged under compression between the upper end of the body 30 and the knob

46a to normally yieldingly retain the stem 44a, 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 12a 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 44a to actuate the cutter 13 and release the fluid from the container 11. The attachment comprises a body or bracket 50a, a cam 70 journalled in the bracket and operable to depress the stem 44a, and an operating handle or lever 71 for the cam.

The lower portion of the bracket or body 50a is preferably tubular and is screw-threaded upon the annular projection 53a at the upper end of the head 12. Spaced yoke parts 72 are provided upon the upper end of the body 50a. The opening 73 between the parts 72 extends downwardly into the tubular portion of the bracket 50a.

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 46a. 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.

To fix the lever 71 in the desired angular position with respect to the cam 70, 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 12a 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.

With the arm or lever 71 in the full line position shown in Fig. 1, the cable 86 may extend in either direction therefrom, because a force exerted horizontally in either direction on the arm 71 will actuate the device to puncture the disc 14a by reason of the two cam faces 76. If there is insufficient head room the arm may be set at an angle to one side or other of the vertical, as shown in broken lines in Fig. 1. The device may then be actuated by a horizontal pull toward the vertical axis or even by a vertical pull. Obviously, if the device is to be operated by a vertical pull, it will be preferable to have the arm extend horizontally from the cam. Hence, I prefer to provide an angular range of adjustment of the arm on the cam of 180 degrees or 90 degrees each side of the vertical axis.

While I have described a specific embodiment of my invention, I wish it to be understood that this is to be taken as illustrative and not limitative, and that I reserve the right to make any changes in form, construction or arrangement of parts that fall within the spirit and scope of the following claims.

I claim:

1. An operating device for a container control head having an operating stem which includes a cam for operating the stem, an operating lever for the cam, and means whereby the lever may be connected with the cam to project in different directions therefrom, said means including a removable member arranged in openings in the cam and lever, and co-operating lugs and notches on the cam and lever.

2. An operating device for a container control head having an operating stem which includes a body adapted to be detachably mounted on the head, a cam for operating the stem, a lever for the cam, and means whereby the lever may be connected with the cam to project therefrom at any one of a plurality of spaced points including, a removable pin pivotally mounting the cam on the body and passing through an opening in the lever.

3. An operating device for a container control head having an operating stem which includes, a body adapted to be detachably mounted on the head, a cam for operating the stem, a lever for the cam, and means whereby the lever may be connected with the cam to project therefrom at any one of a plurality of spaced points including, a removable pin pivotally mounting the cam on the body and passing through an opening in the lever, and notches on the lever and cam.

4. An operating device for a container control head having an operating stem which includes a body adapted to be detachably mounted on the head, two members, one a cam for operating the stem, the other an operating lever for the cam, means for pivotally mounting the cam on the body, and means for connecting the lever with the cam to project in various directions therefrom including, a removable pin passing through the openings, a lug on one member to co-operate with any one of a plurality of spaced notches in the other member.

5. An operating device for a container control head having an operating stem, which includes a body adapted to be detachably mounted on a head, a cam journalled on the body and operable to actuate the stem upon being turned in either direction, an operating lever for the cam, and means for securing the lever to the cam in any one of a plurality of angularly spaced operating positions.

6. An operating device for a container control head having an operating stem, which includes

a body adapted to be detachably mounted on the head, a cam journalled on the body and operable to actuate the stem upon being turned in either direction, an operating arm for the cam, and means for securing the arm to the cam in either of two diametrically opposite positions whereby the cam may be operated from either side thereof.

7. An operating device for a container control head having an operating stem, which includes a body adapted to be detachably mounted on the head, a cam journalled on the body and operable to actuate the stem upon being turned in either direction, an operating arm for the cam and means for securing the arm in various angularly spaced positions ranging through an angle of approximately 180° and between and including two opposed horizontal positions, whereby the cam may be operated by the application of vertical forces on either side of the cam or the operation of horizontal forces from either side of the arm.

8. An operating device for a container control head having an operating stem, which includes a cam pivotally mounted in the head and operatively engaging the stem, a lever formed with an eye at one end, the cam mounting including a pivot member for the cam passing through the eye, the cam being formed with a plurality of recesses, and a lug fixed on the lever and adapted to enter a selected one of said recesses to secure the lever at a selected angle with respect to the cam.

OZRO N. WISWELL.