May 29, 1928. 1,671,368

C. S. JOHANN

ELECTROMAGNETIC CONTROL FOR FLUID CONTAINERS

Filed Jan. 18, 1926

Fig. 1.

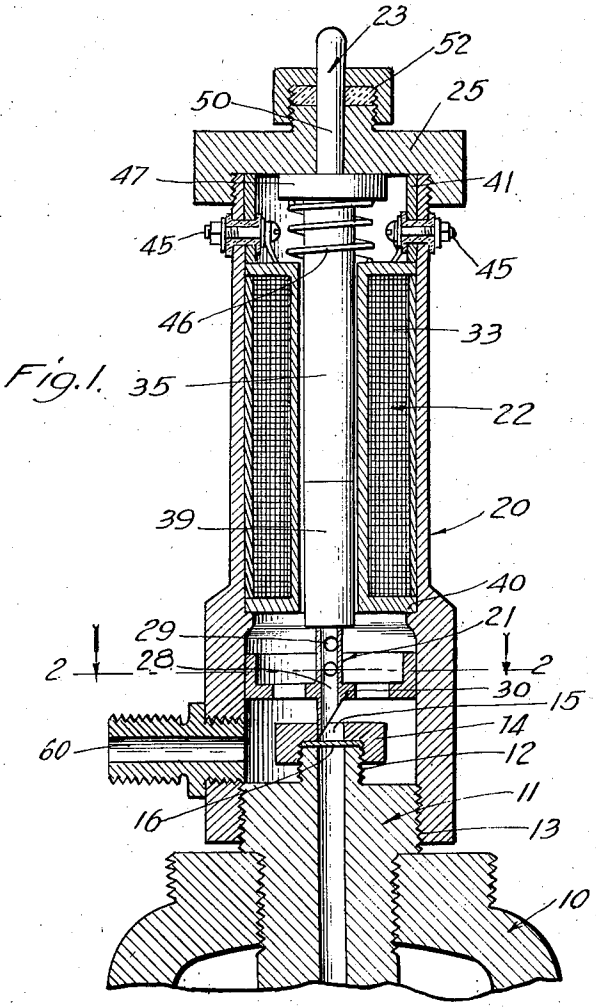
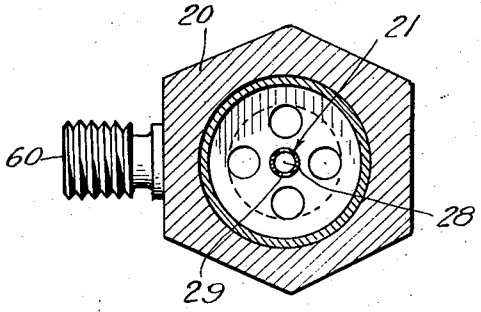


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTROMAGNETIC CONTROL FOR FLUID CONTAINERS.

Application filed January 18, 1926. Serial No. 81,971.

This invention relates to an electromagnetic control for fluid containers and it is a general object of the invention to provide an effective and improved device of this general character.

My present invention relates to a control suitable for gas containers and the like operable to open the containers to allow the contents thereof to escape.

I will, in describing my invention, make particular reference to only one form of the invention and will describe this form of the invention as applied to a gas container, it being understood that the broader principles of the invention are not to be construed as limited to application to a container of any particular type or construction nor to a container for handling any particular fluid.

The device to which this application is directed is of the same general character and for the same general purposes as the device which is the subject of my co-pending application entitled Fluid control device, filed December 22, 1925, Serial No. 77,164.

An object of my invention is to provide a control device of the character mentioned which is particularly simple and inexpensive of construction and which does not involve mechanical means such as catches, or the like, liable to fail or become inoperative.

The various objects and features of my present invention will be best and more fully understood from the following detailed description of a typical preferred form of the invention, in which:

Fig. 1 is a vertical detailed sectional view of the construction provided by this invention showing it applied to a typical gas container; and

Fig. 2 is a detailed transverse sectional view taken as indicated by line 2—2 on Fig. 1.

The device provided by this invention may be used on or in connection with, containers of various styles and constructions and may be used on containers carrying various fluids. I have herein shown the device applied to a typical gas container 10 provided with a neck fitting 11 having a threaded part 12 of small diameter and a threaded part 13 of large diameter. The container 10 is normally closed by a cap 14 applied to the part 12 of the fitting 11. The cap 14 is provided in its end with an opening 15 closed by a plate 16 adapted to fail under a predetermined pressure in the container or to be broken or penetrated as by means of a cutter or punch.

The device provided by this invention includes, generally, a body 20 to be connected with the container 10, a punch or cutter 21 for penetrating the plate 16, electromagnetic means 22 for actuating the cutter, and means 23 for manually actuating the cutter.

The body 20 may be connected with or to, the container 10 in various manners, it being preferred in practice to connect the body directly with the container. In the particular form of the invention shown in the drawings the body is in the form of a tube closed at its upper end by a cap 25 and internally screw threaded at its lower end to fit the threaded part 13 of the fitting 11.

The cutter 21 is an elongate member preferably round in cross section, angularly truncated at its lower end to form a pointed end which will effectively penetrate the plate 16. The cutter has a central longitudinal opening 28 communicating with lateral openings or ports 29 in the upper end portion of the cutter. The opening 28 and ports 29 are provided to allow free escape of fluid from the container when the cutter is in an actuated position as will be hereinafter described. The pointed end of the cutter is adapted to enter the opening 15 in the cap to penetrate the plate 16. I preferably provide a shoulder 30 on the cutter to engage the top of the cap and limit the extent the cutter enters the cap.

The electromagnetic means 22 provided for actuating the cutter includes a winding 33 mounted stationary in the upper portion of the body, and a core of iron 35 operable vertically in the winding. The means 22 can be operated by either alternating or direct current. The cutter 21 is operatively connected with the core 35, it being preferred that it be rigidly connected with the lower end of the core. The core is carried in the winding so that it is in alignment with the opening in the cap, and the cutter 21 is connected to the lower end of the core to be in position to operate through the opening in the cap. In the drawings I have shown the cutter connected to the core 35 by a connecting member 39 of brass or other non-magnetic material so that the core 35 is in the most advantageous position in the

winding, while the cutter is spaced below the winding in position to act on the plate 16. The winding 33 may be held tightly in the body between a shoulder 40 and a retaining sleeve 41. Suitable electrical connections may be made with the winding from the exterior of the body through binding posts 45. The core 35 is normally yieldingly held in an up or unactuated position by means of a spring 46 arranged between the upper end of the winding and a head 47 on the upper end of the core. The spring 46 is in practice just sufficiently strong to normally maintain the core in the up or unactuated position.

The means 23 provided for manually operating the device may include a rod 50 extending upwardly through the cap 25 so that its upper end projects above the cap while its lower end engages the head 47. Suitable packing means in the form of a packing gland 52 or the like, may be provided around the rod to prevent escape of fluid.

The body 20 may be provided at suitable points, for instance near its lower end portion, with openings to allow fluid to escape from it, or it may be provided with a single opening 60 through which the fluid may be conducted by means of a suitable conduit to any suitable point.

In using the term "cutter" I mean to include any device or means which may be used in the construction provided by my invention for penetrating or fracturing the plate which seals the container, and I do not mean to specifically limit myself to a part or device having specifically a cutting action.

In operation the body 20 is applied or connected to the container 10 in the manner shown in the drawings and when the electromagnetic means is de-energized the various parts are in the position shown in Fig. 1 of the drawings. Upon energizing of the winding 33, effected through any sort of a control, for instance through a remote control such as a switch or thermostat or the like, the core 35 is moved downwardly with force sufficient to cause the cutter to penetrate the plate 16 thereby opening the container allowing the fluid to escape therefrom. In practice the parts may be proportioned so that the cutter when unactuated is spaced above the plate 16 and therefore strikes the plate when the device is actuated, or they may be proportioned so that the cutter engages the plate when the device is unactuated and is therefore forced through the plate by pressure alone when the device is actuated. If the winding is only temporarily energized the combined action of the fluid escaping from the container and the spring 46 may return the parts to their normal unactuated position, and if the cutter is held in position in the opening 15 due to continued energizing of the winding, the fluid is free to escape through the opening 28 and ports 29 in the cutter. It is to be noted that my invention provides a particularly simple, inexpensive construction, and that it involves no complicated catch device or the like such as are liable to fail or become in-operative.

Having described only a typical preferred form 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. The combination of a container for fluid under pressure comprising a body having a discharge member projecting therefrom, a closure for said discharge member including a sealing disk extending across the bore thereof, a casing connected with the container and forming a chamber about said discharge member having a fluid outlet, an electro-magnet supported in said casing, and having a core movable toward and from the container, and a cutter connected to one end of said magnet core and adapted to be forced through said sealing disk when the magnet is energized.

2. The combination of a container for fluid under pressure comprising a body having a discharge member projecting therefrom, a closure for said discharge member including a sealing disk extending across the bore thereof, a casing connected with the container and forming a chamber about said discharge member having a fluid outlet, an electro-magnet supported in said casing, and having a core movable toward and from the container, a cutter secured to the inner end of the magnet core whereby it will be forced through the said sealing disk when the magnet is energized, and a spring acting to restore the magnet core to normal position.

3. The combination of a container for fluid under pressure comprising a body having a discharge member projecting therefrom, a closure for said discharge member including a sealing disk extending across the bore thereof, a casing connected with the container and forming a chamber about said discharge member having a fluid outlet, an electro-magnet supported in said casing and having a core movable toward and from the container, a cutter secured to the inner end of the magnet core whereby it will be forced through the sealing disk when the magnet is energized, and a spring cooperating with an abutment on the magnet core and the outer end of the body of the magnet to restore the core to normal position.

4. The combination of a container for fluid under pressure comprising a body having a discharge member projecting there-

from, a closure for said discharge member including a sealing disk extending across the bore thereof, a casing connected with the container and forming a chamber about said discharge member having a fluid outlet, a cutter within the casing having its inner end adjacent said sealing disk, the cutter having a bore extending through its inner end and provided with a lateral opening within the casing beyond the outer end of the discharge member of the container, means on the cutter stem adapted to cooperate with means on the discharge member to limit movement of the cutter toward the container, means within the casing for positively forcing the cutter through the sealing disk, and means for normally holding said cutter impelling means in normal position.

5. The combination of a container for fluid under pressure comprising a body having a discharge member projecting therefrom, a closure for said discharge member including a sealing disk extending across the bore thereof, a casing connected with the container and forming a chamber about said discharge member having a fluid outlet, a cutter within the casing having its inner end adjacent said sealing disk, the cutter having a bore extending through its inner end and provided with a lateral opening within the casing beyond the outer end of the discharge member of the container, means on the cutter stem adapted to cooperate with means on the discharge member to limit movement of the cutter toward the container, an electro-magnet within the casing having a movable core connected at its inner end to the cutter, whereby when the magnet is energized the cutter will be forced through the sealing disk, and means for holding the magnet core in its outermost position when the magnet is deenergized.

6. The combination of a container for fluid under pressure comprising a body having a discharge member projecting therefrom, a closure for said discharge member including a sealing disk extending across the bore thereof, a casing connected with the container and forming a chamber about said discharge member having a fluid outlet, a cutter within the casing having its inner end adjacent said sealing disk, the cutter having a bore extending through its inner end and provided with a lateral opening within the casing beyond the outer end of the discharge member of the container, means on the cutter stem between the inner end thereof and the lateral opening from the bore for cooperating with means on the discharge member of the container to limit inward movement of the cutter, means within the casing beyond the cutter adapted to force the cutter through the sealing disk, and means for normally holding said cutter impelling means in normal position.

In witness that I claim the foregoing I have hereunto subscribed my name this 8th day of Jan., 1926.

CHARLES S. JOHANN.