

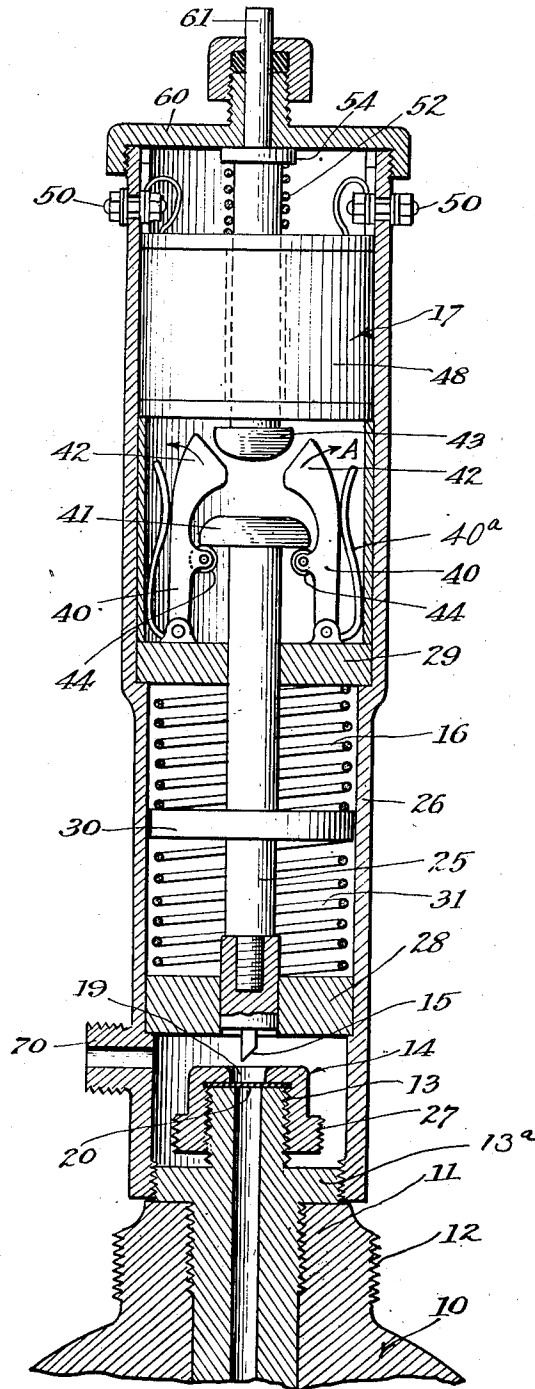
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FLUID CONTROL DEVICE

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UNITED STATES PATENT OFFICE.

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FLUID-CONTROL DEVICE.

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This invention relates to a control device, and has particular reference to an electro magnetic fluid control. The device provided by this invention is useful in various apparatus and for handling various fluids. It is particularly useful as applied to fluid containers or tanks, for instance, to gas containers. I will proceed to set forth a typical form of the invention applied to a container of gas, for instance, carbon dioxide gas, for allowing gas to escape from the container upon closing of the control circuit. It is to be understood that this particular example is not to be construed as limiting the invention either in its structural details or its application.

It is an object of my invention to provide a control device of the character set forth, which is simple, effective and reliable in operation.

Another object of my invention is to provide a control device of the character mentioned particularly suited for use in apparatus handling gas as a means of extinguishing fires.

The various objects and features of my invention will be best and more fully understood from the following detailed description of a typical preferred form of the invention, throughout which description reference is had to the accompanying drawings, in which the figure is a vertical or longitudinal detailed sectional view of the construction embodying this invention showing it in operating position on the container.

In the drawings numeral 10 designates, generally, a gas container such as is commonly used to handle various gases, for instance, carbon dioxide gas. In the drawings, I have shown the neck 11 of the container, through which the gas is passed into and out of the container, provided at its base or inner end with a threaded part 12 of large diameter. The neck is provided with a fitting which screw threads into the container and has a threaded end part 13 of small diameter and a threaded flange part 13^a. The threaded part 13 of the container is usually employed to receive pipes, valves, or fittings which handle the gas, while the part 12 is usually employed to receive a cap applied to the container during storage or transportation.

My invention provides, generally, a cap 14

which normally tightly seals or closes the container, a punch 15 operable to open the cap, a spring 16 for actuating the punch and electro magnetic control means 17. The construction provided by my invention may be applied to suitable parts or fittings which in turn are applied to the container 10, or it may be applied directly to the container as I have shown in the drawings.

The cap 14 is preferably applied directly to the neck of the container and may be in the form of an ordinary cap internally screw threaded to fit the threaded part 13 of the container. The end of the cap is provided with an opening 19 to register with the opening in the container. This opening in the cap is closed by a metal plate 20 which is arranged in the cap to be clamped tightly between the end of the cap and the end of the part 13. The metal plate 20 is formed of comparatively soft metal and is comparatively thin, so that it can be easily penetrated by the punch hereinafter described. Further, in practice the plate 20 may be made of such material and proportions as to act as a safety device to fail and allow the gas to escape from the container in the event that excessive pressure develops in the container.

The punch 15 is adapted to operate through the opening 19 in the cap to penetrate the plate 20 and thereby open the container to allow gas to escape therefrom. The punch is preferably pointed or shaped to readily penetrate the plate. For instance, as I have shown in the drawings, it is in the form of a round metal part having its outer end truncated at an angle to form a point. The punch may be mounted in various manners in proper co-operative relation with the cap. For instance, it may be mounted on a stem 25 suitably supported in a body 26. In the preferred form of construction the body is adapted to be attached to the neck of the container to extend upwardly therefrom to carry the stem in proper alignment with the opening in the cap. The body may be connected to the neck of the container in various ways. It may be designed to be applied to the screw threaded part 12, or it may be applied to the screw threaded part 13^a as I have shown in the drawings. The stem 25 is slidably carried in spaced parts or partitions 28 and 29 in the body. The stem is carried by the par-

titions so that the punch 15 at its lower end is in proper alignment with the opening 19 in the cap.

The operating spring 16 is a compression spring arranged to operate the stem 25. In the preferred arrangement the spring is a helical spring arranged in the body 26 around the stem 25 and between the partition 29 and a flange 30 on the stem. The parts are proportioned so that the spring normally tends to move the stem downwardly with the desired pressure. In practice I may provide means for cushioning the operation caused by the spring 16, and for this purpose I may provide a compression spring 31 in the body between the flange 30 and lower partition 28. This spring 31 is proportioned to stop or cushion the action of the spring 16 after the stem has been moved to completely actuate the punch.

The control means 17 includes, generally, a releasable catch device operable to releasably hold the stem 25 in an up position with the spring 16 under compression and an electromagnetic means for releasing the catch device. The catch device may include two pivoted arms 40 adapted to engage under a head 41 on the upper end of the stem. The arms may be carried by the partition 29 to extend upwardly and inwardly to engage under the head 41. The outer or upper ends 42 of the arms extend above the head to be engaged by the core 43 of the electromagnetic device. Each arm 40 preferably carries a roller 44 that engages under the head 41 to reduce the resistance to operation. The arms may be arranged at diametrically opposite points with reference to the head 41, and are urged inwardly by springs 40^a.

The electromagnetic device for releasing the levers includes the core 43 and a winding 48 which surrounds the core. The winding is carried in the upper part of the body 26 and the necessary electrical connections are made with the winding through binding posts 50 in the body at points immediately above the winding. The core 43 is normally yieldingly held in the upper position shown in the drawings, by a spring 52 arranged between the upper end of the winding and a head 54 on the core. The spring 52 is comparatively light so that the core is readily moved downward when current is passed through the winding. The upper end of the body is closed by a cap 60 and in practice an extension 61 is provided on the upper end of the core to extend upwardly through the cap to project above the cap so that the core can be depressed or moved downwardly, manually when desired.

In operation the device is applied to a container 10 in the manner shown in the drawings, and is normally set ready for operation with the arms 40 engaged under the head 41 so that the stem 25 is held in an up

position with the spring 16 under compression. When the necessary current is passed through the winding 48 by a suitable electric control; for instance a remote relay thermostat or the like, the core 43 is moved downward so that it engages the ends of the arms 42 causing them to swing in the direction indicated by the arrows A in the drawings. This releases the head 41 allowing the stem 25 to be moved downward and thereby move the punch 15 into engagement with the plate 20 so that the plate is penetrated allowing the fluid to escape from the container. The fluid may be conducted from the device in any suitable manner. For instance a suitable connection 70 may be provided in the lower part of the body as I have shown in the drawings.

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 with a container or tank for fluid under pressure having an outlet closed by a sealing plate, of a punch adapted to perforate said sealing plate, a guide for the punch attached to the container and positioning the punch in alignment with the sealing plate, means constantly acting to move the punch to perforate the sealing plate, means normally restraining such movement of the punch, and a solenoid adapted when energized to render the said restraining means inoperative, the core of the solenoid being manually movable to render said restraining means inoperative independently of the solenoid being energized.
2. The combination with a container or tank for fluid under pressure having an outlet closed by a sealing plate, of a punch adapted to perforate said sealing plate, a guide for the punch attached to the container and positioning the punch in alignment with the sealing plate, means constantly acting to move the punch to perforate the sealing plate, means normally restraining such movement of the punch, and a solenoid, the core of which is adapted to render said restraining means inoperative when the solenoid is energized, said core normally projecting from the body of the solenoid at one end, whereby it may be manually moved to render the punch restraining means inoperative when the magnet is de-energized.
3. The combination with a container or tank for fluid under pressure having an outlet closed by a sealing plate, of a casing secured to the container, a punch adapted to perforate the outlet closure plate arranged within said casing, a spring in the casing acting to force the punch through the sealing

plate, means in the casing for restraining movement of the punch by the spring, and a solenoid in the casing adapted to render said restraining means inoperative when the solenoid is energized, the core of the solenoid being manually movable to render said restraining means inoperative when the solenoid is de-energized.

4. The combination with a container or tank for fluid under pressure having an outlet closed by a sealing plate, of a punch adapted to perforate the outlet closure plate, means attached to the container for guiding movement of the punch, a spring acting to move the punch to perforate the sealing plate, a latch normally engaging the stem of the punch to prevent movement thereof by the spring and adapted to be manually moved to inoperative position, and a solenoid having a core which when the solenoid is energized will effect movement of the latch to inoperative position.

5. The herein described attachment for a container or tank for fluid under pressure having an outlet closed by a sealing plate, comprising a casing adapted to be attached to such a container in communication with the outlet thereof, said casing having an outlet, a punch supported within the casing and adapted to perforate the outlet closure plate of the container to which the casing is applied, a spring within the casing acting to move the punch to perforate said sealing plate, a pivotally mounted latch within the casing normally engaging a shoulder on the stem of the punch and preventing movement thereof by the spring, a solenoid within the casing and having a member connected with its core whereby when the solenoid is energized the latch will be rendered inoperative to restrain movement of the punch by the spring, and means for manually moving said latch to inoperative position.

6. The herein described attachment for a container or tank for fluid under pressure having an outlet closed by a sealing plate, comprising a casing adapted to be attached to such a container in communication with the outlet thereof, said casing having an outlet, a punch within the casing adapted to perforate the container outlet closure plate and having an elongated stem, a spring within the casing acting to move the punch to perforate said sealing plate, a latch pivotally mounted within the casing and normally engaging the stem of the punch to prevent movement of the punch by the spring, a solenoid within the casing having its core provided with a member adapted to move the latch to inoperative position when the solenoid is energized, and means extending to the outside of the casing for moving the solenoid core to render the latch inoperative when the solenoid is de-energized.

7. The herein described attachment for a

container or tank for fluid under pressure having an outlet closed by a sealing plate, comprising a casing adapted to be attached to such a container in communication with the outlet thereof, said casing having an outlet, a punch within the casing adapted to perforate the container outlet closure plate and having an elongated stem, a spring within the casing acting to move the punch to perforate said sealing plate, a latch pivotally mounted within the casing and normally engaging the stem of the punch to prevent movement of the punch by the spring, means adapted to be actuated from points relatively remote from the casing to move the latch to inoperative position, and manually operable means projecting from the casing for moving said latch to inoperative position.

8. The combination of a container for fluid under pressure comprising a body having an internally threaded neck, a tubular fitting having a stem engaged with the thread in said neck and provided outside of the container body with an enlarged, peripherally threaded, section and a smaller, externally threaded, terminal section, a closure cap engaged with the threaded outer terminal section of the fitting and provided with an opening in alignment with the bore in said fitting, a sealing disk within the cap extending across said opening, a casing engaged with the peripheral thread of the enlarged section of the fitting and provided with a fluid outlet, a punch positioned within said casing in alignment with the opening in the cap closure of the container fitting, means within the casing acting to move the punch to perforate the sealing disk, restraining devices in the casing normally retaining the punch in retracted position, means for rendering said restraining devices inoperative, and means for resiliently checking movement of the punch toward the container.

9. The combination of a container for fluid under pressure having an externally threaded outlet projecting from its body, a cap closure engaged with the thread on said outlet and having an opening in alignment with the outlet bore, a sealing disk within the cap and extending across said opening therein, a support attached to the container and surrounding said outlet, a punch guided by means on said support and positioned in alignment with the opening in the cap, a spring surrounding the stem of the punch and acting to impel it toward the sealing disk, restraining means for holding the punch in opposition to said spring, means for releasing said restraining devices, and a second spring adapted to resiliently check movement of the punch toward the sealing disk.

In witness that I claim the foregoing I have hereunto subscribed my name this 1st day of December 1925.

CHARLES S. JOHANN.