

March 25, 1930.

D. MAPES

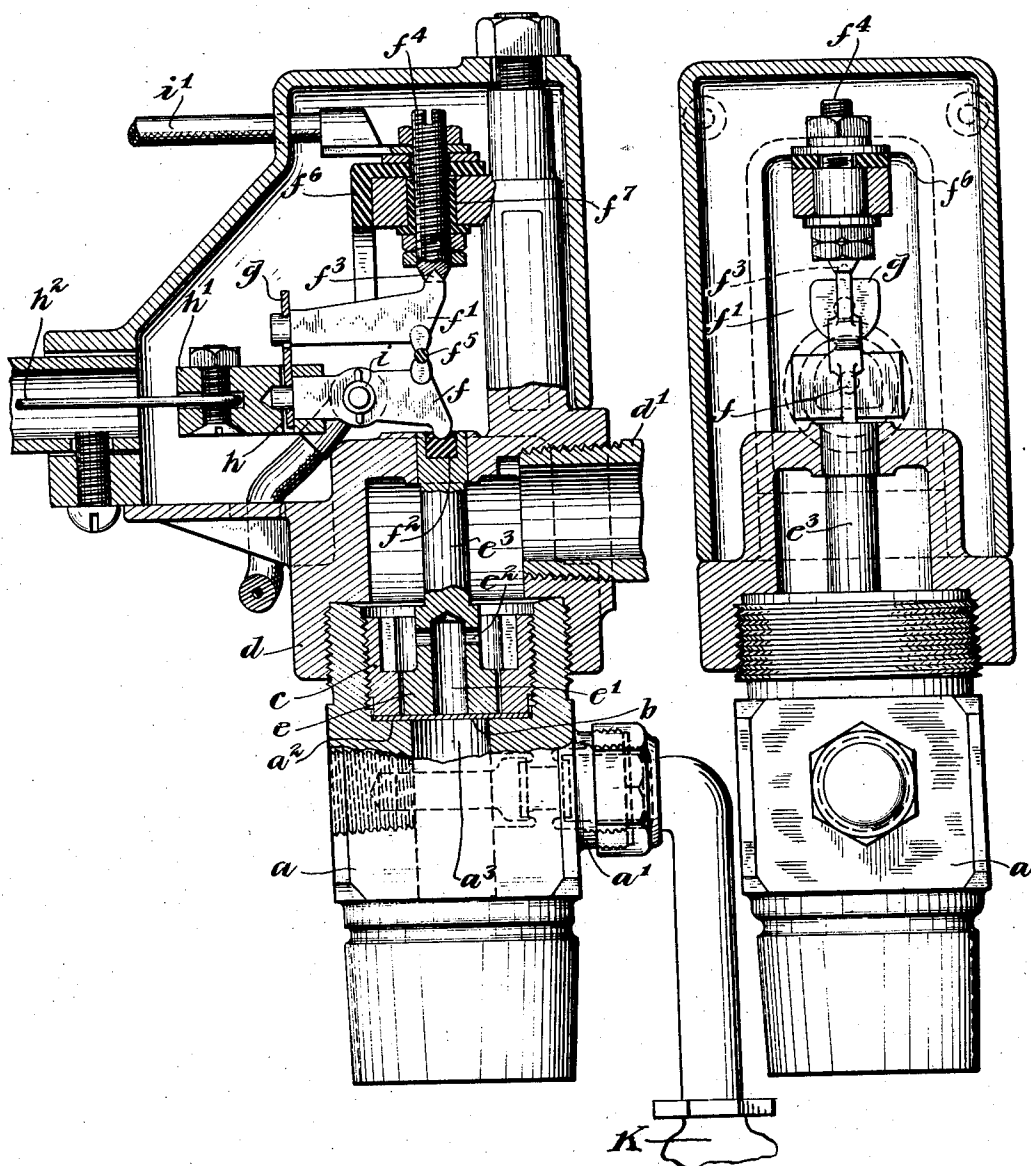
1,751,705

RELEASE DEVICE FOR FLUIDS UNDER PRESSURE

Filed March 24, 1927

Fig. 1.

Fig. 2.



INVENTOR

Daniel Mapes
Redding, Greeley, ^{BX 17} Shea & Campbell
ATTORNEYS

UNITED STATES PATENT OFFICE

DANIEL MAPES, OF MAMARONECK, NEW YORK, ASSIGNOR TO WALTER KIDDE & COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

RELEASE DEVICE FOR FLUIDS UNDER PRESSURE

Application filed March 24, 1927. Serial No. 178,118.

This invention has been developed with particular reference to the release of a fire extinguishing medium, such as carbon dioxide, which is usually stored in containers under high pressure, but it will be apparent that the invention is capable of use for other specific uses, where the conditions approach or resemble more or less those which are found in the particular use mentioned and therefore is not limited to the particular use which has been chosen for illustration and explanation of the nature of the invention. The requirements of the particular use mentioned include the sealing of the container against leakage, the release of the contents of the container if the internal pressure rises above a predetermined degree, and the quick release of the contents of the container when such release is necessary. By the present invention all of these requirements are met. The container is sealed against leakage by a seal which preferably takes the form of a diaphragm which can be so held against the outlet of the container as effectually to prevent leakage under normal conditions. It is so supported from the outside that it will give way and permit the release of the contents of the container if the internal pressure rises above a predetermined degree and the support for the seal is held in place by means which can be released in any convenient manner, as by an increase in temperature or manually, or otherwise, and, being released, will permit the support to move away and leave the seal subject to the normal pressure within the container under which it will give way and permit the contents of the container to escape. Preferably the seal is unsupported normally over a relatively small area such that the seal will not give way under the normal internal pressure, but will give way to an abnormal internal pressure, while the release of the support permits the seal to be subject to the action of the internal pressure over a larger area so that, when the support is released, the seal will give way to the normal internal pressure and permit the contents of the container to escape rapidly.

The invention will be explained more fully hereinafter with reference to the accom-

panying drawing in which it is illustrated and in which:

Figure 1 is a view in vertical sectional elevation of a structure which embodies the invention.

Figure 2 is a view in vertical sectional elevation in a plane at right angles to that of Figure 1.

In the embodiment of the invention illustrated in the drawing, the base or body *a*, suitably chambered, is formed at *a'* for connection to the outlet of a container *k*. At *a''* it is formed with a seat to receive the seal *b* and is threaded internally to receive a bushing *c* by which the seal, shown as a relatively thin plate or diaphragm of suitable material selected with a view to its giving way to internal pressure under certain conditions, is pressed tightly against the seat *a''*. The base or body is also threaded externally to receive the housing which supports the parts to be mentioned and has the discharge pipe *d'* connected to it. The seal is supported against the internal pressure of the container by a support *e* which may take the form of a plunger with a free working fit within the bushing *c*. As shown, the bore of the bushing *c* is larger than the opening *a''* into the chamber of the base or body and the support *e* supports the seal *b* externally over an area such that the seal will not give way when subject to the normal internal pressure in the container. The support, however, is bored at *e'* with a bore considerably less in area than the outlet *a''*, the bore communicating, as at *e''*, with the chamber of the housing *d* and the discharge pipe *d'*. The area of the seal which is thus left unsupported normally is relatively small, so that the seal will not give way when subject to the normal internal pressure, but will give way if the internal pressure rises above a predetermined degree. If, however, the seal is left unsupported for the entire area of the outlet *a''* it will give way to the normal internal pressure and permit the contents of the container to escape. It will be observed that in the construction shown the seat or shoulder *a''* forms a stop associated with the supporting means *e* to limit movement of the supporting means and so pre-

vent the rupture of the seal under the pressure of the supporting means.

Various means may be provided for retaining the support *e* in operative position and for releasing the support so as to permit the seal to be subject to internal pressure over the larger area, that is to say, the full area of the outlet *a*³, and to give way and permit the contents of the container to escape freely through the bore of the bushing and the discharge pipe. In the embodiment of the invention illustrated in the drawing, the releasable device to retain in operative relation under normal conditions the seal supporting means is shown as of such a character as to be released through a change in temperature conditions, as by the fusing of a retaining link or detent by a controlling current of electricity, and by mechanical operation, as the disengagement of the controlling detent. The construction shown comprises two levers *f* and *f'*, one of them bearing against the end of the stem *e*³ of the support *e*, preferably through an insulating block *f*², while the other bears, as at *f*³, against an adjusting screw *f*⁴. The two levers *f* and *f'*, shown as roughly L-shaped, bear against each other at their heels, preferably through a block of insulation *f*⁵, the point of bearing of the two levers upon each other being at one side of the line of the two bearings *f*² and *f*³, so that the tendency of pressure against the toe of the lever *f* is to cause the long arms of the two levers to separate. To prevent such separation of the long arms of the two levers under normal conditions, with the consequent release of the seal supporting means *e*, the long arms of the two levers are connected by a detent link *g* which is fusible, as by the action of a current of electricity, and is also displaceable by mechanical means, for the purpose of releasing the seal supporting means. As shown, the link *g* engages loosely the ends of the long arm of the levers *f*, *f'*, being passed through a slot *h* in a block *h'*, to which is secured the end of a rod or cable *h*², so that by a pull on the rod or cable the link *g* will be disengaged from the lever *f* to permit the separation of the two levers. The link may also be fused to permit the separation of the levers and for this purpose one of the terminals *i* of an electric circuit may be connected to the lever *f*, while the other terminal *i'* may be connected to the adjusting screw *f*⁴ which, as shown, is insulated from the supporting means as by the insulation *f*⁶ and the insulating bushing *f*⁷. Whether the releasable supporting device be released for movement by mechanical disengagement of the link *g* from one or both of the levers *f*, *f'*, as by a pull on the rod or cable *h*², or by rupture of the link, as by fusion by a current of electricity, the effect is to release the seal supporting or retaining means and the giving way of the seal under the in-

fluence of the internal pressure in the container, thereby permitting the free discharge of the contents of the container. It will be understood that the giving way of the seal when it is released through the operation of any external causes is due to the large area of the seal which then becomes subject to the internal pressure, the area of the seal which is subject to the internal pressure under normal conditions not being sufficient to permit the seal to give way unless the internal pressure rises to the predetermined degree at which it is desired, for reasons of safety, that the discharge of the contents of the container shall be permitted to take place.

While the construction hereinbefore described is satisfactory for the conditions under which it was designed to operate, it will be understood that the details of construction and arrangement may be varied to suit different conditions of use and that, except as pointed out in the accompanying claims, the invention is not restricted to the particular construction shown and described herein.

I claim as my invention:

1. In a device of the character described, a container, a seal secured to the container and adapted to rupture under influence of a normal pressure within the container, a seal supporting means mounted to prevent the rupture of the seal under the normal pressure, said supporting means being apertured so as to leave a portion of said seal unsupported whereby it will be ruptured by a predetermined excess pressure within said container, means releasably holding said seal-supporting means in supporting relation to said seal, and an outlet in the supporting means communicating with the aperture.

2. In a device of the character described, a container, a seal secured to the container and adapted to rupture under influence of a normal pressure within the container, a seal supporting means normally engaging the seal to prevent its rupture under the normal pressure, a stop associated with the supporting means to limit movement of the said supporting means, said supporting means being apertured so as to leave a portion of said seal unsupported whereby it will be ruptured by predetermined excess pressure within the container, means releasably holding said seal-supporting means in supporting relation to said seal, and an outlet on the supporting means communicating with the aperture.

3. In a device of the character described, a valve body, a shoulder formed therein, a bushing secured within the valve body and forming a seat, a seal secured between the body and bushing and adapted to rupture under influence of a normal pressure below the valve body, a plunger movable within the bushing and normally preventing the rupture of the seal by pressing it against the shoulder, said supporting means being apertured

so as to leave a portion of said seal unsupported whereby it will be ruptured by a predetermined excess pressure within said container, and means in the plunger to carry off the fluid escaping due to the rupturing of the disc under the excess pressure.

4. In a device of the character described, a container, a seal, seal-securing means holding the seal to the container over a circumferential portion of its area so as to permit it to rupture under the influence of a normal pressure within the container, a releasable seal-supporting means independent of the seal securing means normally engaging the seal to prevent its rupture under the normal pressure, and a shoulder on the container on the opposite side of the seal from the releasable seal supporting means against which the seal and the releasable seal supporting means are seated to prevent the rupture of the seal under the pressure of the releasable seal supporting means.

This specification signed this 18th day of March, A. D. 1927.

DANIEL MAPES.