W. L. HARRISON.

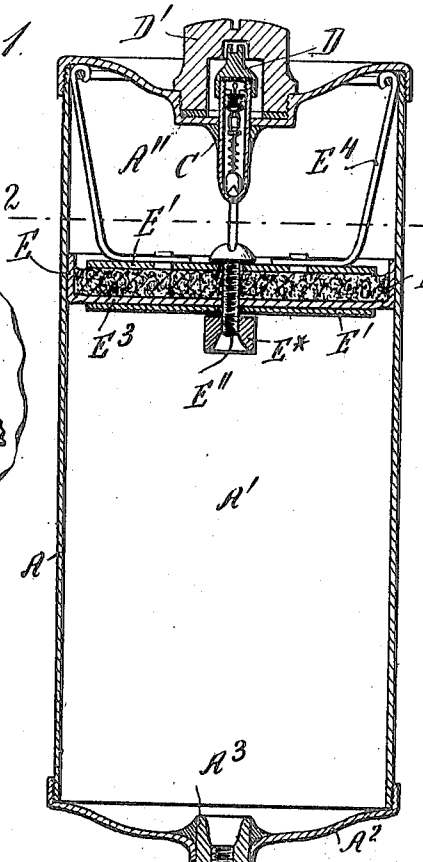
FIRE EXTINGUISHER.

APPLICATION FILED MAR. 23, 1915.

1,207,752.

Patented Dec. 12, 1916.

Fig. 1.



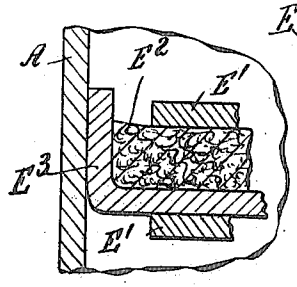


Fig. 3

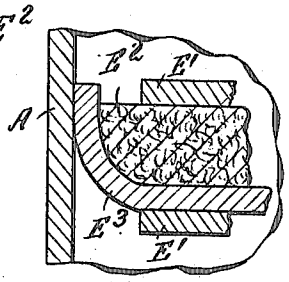


Fig. 4.

Fig. 5

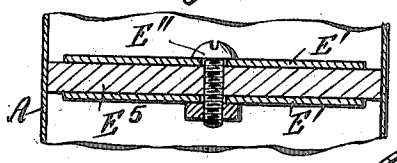
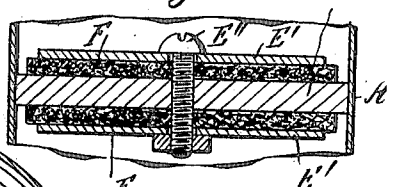


Fig. 6



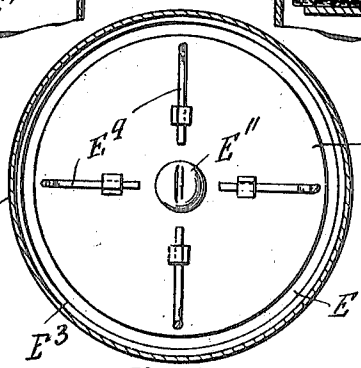


Fig. 2.

WITNESS:

Charles A. Mathé.

INVENTOR

William L. Harrison

BY John Lowa

ATTORNEY

THE ROBERTS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM L. HARRISON, OF BRANFORD, CONNECTICUT.

FIRE-EXTINGUISHER.

1,207,752. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed March 23, 1915. Serial No. 16,327.

To all whom it may concern:

Be it known that I, WILLIAM L. HARRISON, a citizen of the United States, and resident of Branford, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Fire-Extinguishers, of which the following is a specification.

My present invention relates to fire-extinguishers of the type which comprises a container divided by a so-called "floating" piston into two compartments one of which is filled with the fire-extinguishing fluid, while the other compartment holds a charge of compressed gaseous medium acting to expel the said fluid as soon as the outlet is opened. In apparatus of this class, difficulty is often experienced in obtaining a proper fit of the piston, and the object of my present invention is to overcome this drawback. For this purpose, I have devised the improved novel construction described and claimed hereinafter, whereby I secure automatically, a varying tightness of the joint between the piston and the wall of the container, so that, as explained in detail hereinafter, the piston will be pressed against the container wall with greater or less force at different stages of the operation, just as required to secure the best results.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a central longitudinal section through a fire-extinguisher embodying my improved piston construction; Fig. 2 is a cross section on line 2—2 of Fig. 1; Figs. 3 and 4 are detail longitudinal sections, upon an enlarged scale, showing a portion of the piston and of the adjacent container wall in two different conditions, to illustrate the working of my improved construction; and Figs. 5 and 6 are partial longitudinal sections of two other forms of my invention.

The general features of the fire-extinguisher shown in these drawings form no part of my present invention, and will therefore be described but briefly.

A is the cylindrical container, divided into a compartment A′ adapted to hold the charge of extinguishing liquid (for instance, carbon tetrachlorid), and another compartment A″, adapted to be filled with compressed air.

B is a suitable cock or valve controlling the outlet from the compartment A′, and C is an air-valve, similar to those employed for pneumatic tires, and protected by caps D, D′; this valve serves for the admission of compressed air to the compartment A″.

The two compartments A′, A″ are separated by the floating piston E, to which my invention relates more particularly. As shown in Figs. 1 to 4 this piston comprises two metal plates or washers E′ through which extends loosely a central screw E″ receiving at one end a nut E*, the other end of the screw having a suitable head engaging one of the washers E′. Between the two washers is located the piston body E^2 and the piston cup or washer E^3, made of leather or other suitable material which will present a smooth surface for sliding engagement with the inner wall of the container A. The edge or flange of this leather washer is bent toward the air-compartment A″. The piston body E^2 consists of appropriate soft elastic material, for which purpose I have found felt particularly suitable. The washers E′ are of smaller diameter than the piston body, so that, as shown, the marginal portion of the latter will project beyond the said hard (metal) washers or plates. The piston body is preferably treated with glycerin by dipping it into a glycerin bath, and the leather washer E^3 also preferably receives a coating of glycerin, at least on its outer side. This coating or impregnation with glycerin is employed for the purposes indicated in Letters Patent of the United States No. 1,106,144 issued to me on August 4, 1914; that is to say, the glycerin is employed partly as a lubricant for the piston, and partly for the purpose of absorbing any moisture that may be present and of thus preventing the formation of hydrochloric acid or other injurious compound. The nut E* projects below the piston proper and is adapted to strike the projection A^3 on the bottom A^2 so as to prevent the piston proper from coming in contact with the bottom of the container when the piston is in its lowermost position; this nut preferably has a funnel-shaped guiding surface for the purpose of centering a rod which may be introduced through the projection A^3, when it is desired to push the piston back after the charge of fire-extinguishing fluid has been expelled. The piston may also be connected with a wire guard E^4 of the same character as the one shown in my above-mentioned patent, the purpose of said guard being to keep the piston steady and also to prevent it

from striking against the housing of the air valve C.

It will be obvious that the pressure of the air in the compartment A'' and the equal counteracting pressure of the liquid in the compartment A', are greatest when the piston is in the initial or highest position shown in Fig. 1, and will decrease as the piston moves toward the outlet cock B. The pressure acting on opposite sides of the piston compresses the soft elastic piston body E^2 so as to reduce its thickness and to force its marginal portion toward the wall of the container. When the parts are in the position shown in Figs. 1 and 3, the air pressure acting downwardly and the pressure or resistance of the liquid acting upwardly on the piston, are greatest so that the marginal portion of the piston body E^2 will be pressed outward most forcibly. This will result in "flattening" the marginal or peripheral portion of the piston body as shown best in Fig. 3, so as to cause the cup or washer E^3 to be brought in contact with the wall of the container along a comparatively wide surface. Thus the danger of the passage of air or of carbon tetrachlorid from its proper compartment to the other compartment will be least at the time when pressure is greatest, since at that time the barrier formed by the piston washer E^3 will be most effective. When the cock B is opened and the liquid is discharged by the movement of the piston under the influence of the compressed air, it will be obvious that the air pressure decreases more and more as the piston approaches the outlet. The soft elastic piston body E^2 will therefore be subjected to a longitudinal compression and radial expansion of gradually diminishing force, and as a result thereof the area of the surface on which the washer E^3 is in contact with the wall of the container will become progressively less, reducing to a corresponding extent the amount of friction between the piston and the wall of the container. Thus, as the propelling force of the compressed air decreases, this is compensated for by the reduction in the friction between piston and container. When the piston is in its lowermost position, the body E^2 and the washer E^3 may be substantially in the relation illustrated in Fig. 4, in which the thickness of the piston body is greater than in Fig. 3 and in which the contact surface between piston washer and container wall is much smaller than in Fig. 3. When the fire-extinguishing fluid has been expelled fully, the air valve C is opened to allow air to escape from the compartment A''; the piston is then exposed only to atmospheric pressure on both sides, and the contact surface between the piston washer and the container wall will be reduced to a minimum. It therefore will be easy to push the piston back preparatory to refilling the compartment A' with the fire-extinguishing liquid.

In the form of my invention illustrated by Fig. 5, the piston washer or cup E^3 is dispensed with, and the container wall is engaged directly by the marginal portion of the piston body E^5, which might consist as before of felt treated with glycerin, or such body might be made of a composition containing gelatin, glycerin and graphite, or in general any soft elastic material. In Fig. 6, the piston body E^5 is used in conjunction with two disks or layers of felt F which, if desired, may be treated with glycerin. In each of these two cases, I have also shown the metal plates E' and the screw E'' for holding the parts of the piston together. It will be understood that the operation of the forms of my invention shown in Figs. 5 and 6 is the same as explained above with reference to Figs. 1 to 4 inclusive.

Various modifications may be made without departing from the nature of my invention as defined in the appended claims.

I claim:

1. The combination of a container having an outlet, a manually operatable valve controlling said outlet, and a piston movable in said container and dividing it into two compartments adapted to be filled respectively with a compressed gaseous medium and with liquid, said piston being made of soft elastic material and engaging the wall of the container with progressively diminishing force as the pressure of said gaseous medium decreases during the movement of the piston toward said outlet.

2. The combination of a container having an outlet, a manually operatable valve controlling said outlet, and a piston movable in said container and dividing it into two compartments adapted to be filled respectively with a compressed gaseous medium and with a liquid, said piston being deformable in response to variations of pressure within the container in such a manner as to reduce the friction between piston and container wall when the pressure decreases.

3. The combination of a container having an outlet, a manually operatable valve controlling said outlet, and a piston movable in said container and dividing it into two compartments adapted to be filled respectively with a compressed gaseous medium and with a liquid, said piston being compressible axially and expansible radially in response to an increase of pressure within the container.

4. The combination of a container having an outlet, a manually operatable valve controlling said outlet, and a piston movable in said container and dividing it into two compartments adapted to be filled respectively with a compressed gaseous medium and with a liquid, said piston comprising

a holding device having two connected abutments, rigid washers mounted loosely between said abutments so as to be capable of moving toward and from the same, and a piston proper located between said washers, said piston proper being compressible axially and expansible radially in response to an increase of pressure within the container.

5. The combination of a container having an outlet, a manually operatable valve controlling said outlet, and a piston movable in said container and dividing it into two compartments adapted to be filled respectively with a compressed gaseous medium and with a liquid, said piston comprising a body of soft elastic material and a cup-shaped washer of smooth-surfaced material having its flange fitted around the edge of the piston body and in engagement with the container wall.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses.

WILLIAM L. HARRISON.

Witnesses:
WILLIAM J. MCENTEE,
EDITH M. NICHOLSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."