

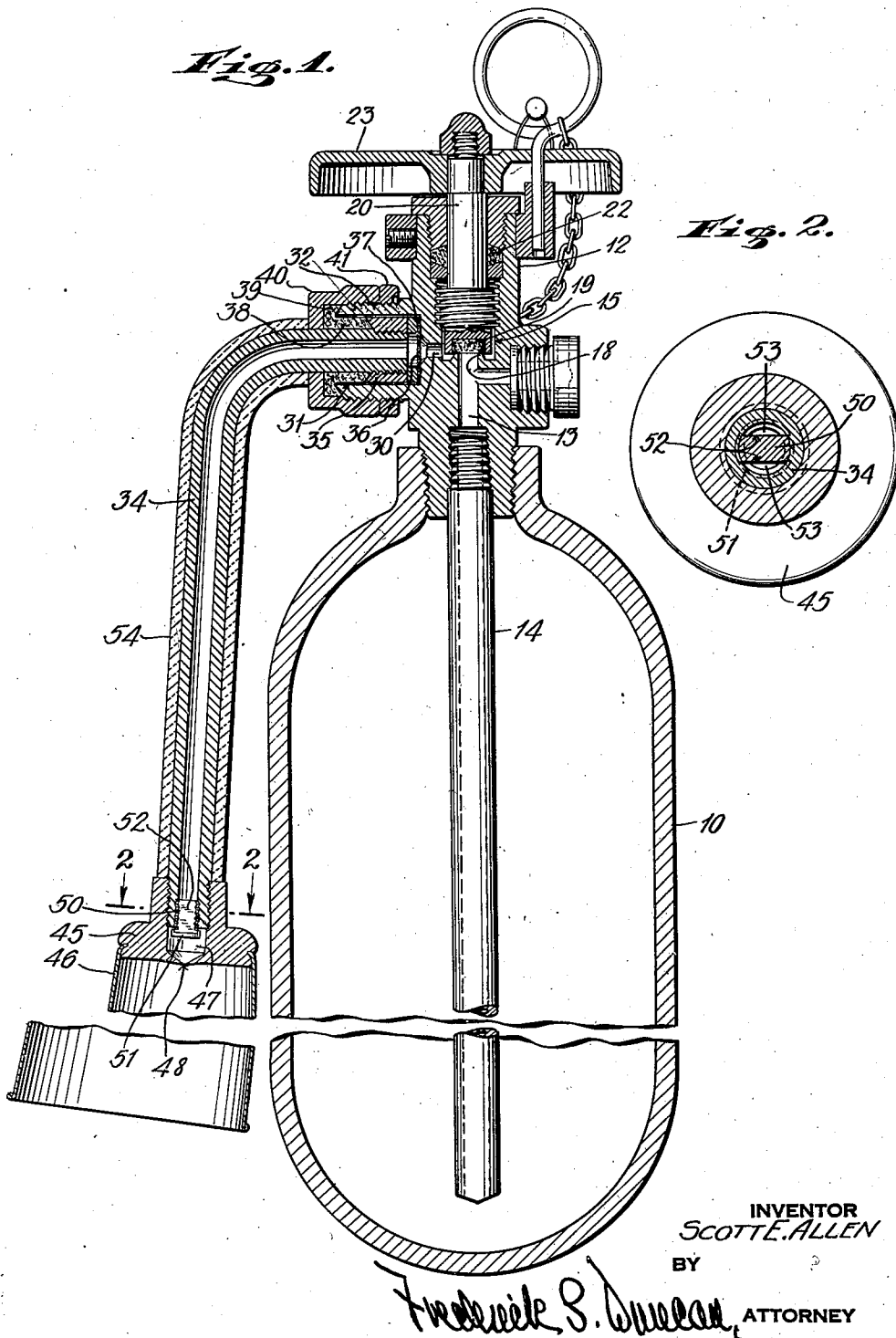
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FIRE EXTINGUISHER

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FIRE EXTINGUISHER

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The present invention relates to fire extinguishers employing a high pressure extinguishing fluid and more especially to means for controlling the discharge of such fluid.

5 My invention relates particularly to portable extinguishers, although it is not limited thereto. It is common practice to provide cylinders containing high pressure extinguishing fluid, such, for example, as liquid carbon dioxide, in sizes 10 which may be conveniently carried by hand to the scene of the fire, the cylinders being provided with discharge pipes that are adjustable to direct the extinguishing medium where desired. It is also common practice to provide the discharge 15 pipe with a discharge horn adapted to prevent entrainment of air in the discharging fluid and also, in the case of carbon dioxide, to transform the fluid into "snow" or solidified particles of carbon dioxide.

20 It is an object of my invention to provide a novel swivel coupling for connecting the discharge pipe to the cylinder, this coupling being arranged to form a gas-tight joint without interfering with the swiveling movement of the discharge pipe.

25 Another object of my invention is to provide means at the discharge end of the pipe for connecting a discharge horn thereto and, further, to provide the discharge end of the pipe with 30 anti-recoil means which will give a balanced discharge of the fluid when the horn is disconnected from the pipe.

Owing to the high pressure of liquefied carbon dioxide the discharge of the fluid develops a 35 recoil powerful enough to throw the cylinder violently about and do considerable damage, unless the cylinder is securely held. For this reason, it is requisite that the discharge pipe be provided with suitable anti-recoil means, such, 40 for instance, as a nozzle forming a plurality of jets which are so disposed that they will react against one another.

An object of the invention is to provide a very simple anti-recoil device of this character which 45 will not project diametrically from the pipe and hence will not interfere with the coupling of a horn over the device upon the end of the discharge pipe.

It will be understood that the strength of the 50 recoil depends upon the area of the discharge orifice. The horn is provided with a relatively small orifice through which the highly compressed fluid enters the horn where it expands enormously. The recoil is relatively small as 55 long as the horn is attached because of the minute size of the orifice. Hence, an operator may readily control the horn and direct the discharge at will. In order to prevent material expansion of the fluid in the space between the 60 end of the discharge pipe and the horn orifice,

which expansion might result in sufficient chilling to freeze up the orifice, it is desirable to provide relatively large ports at the end of the pipe permitting the fluid to reach the horn orifice 5 in a comparatively warm state. With ports of this size an anti-recoil balance is necessary when the horn is detached.

Other objects of my invention will appear in the following description of a preferred embodiment and thereafter the novelty and scope of 10 the invention will be pointed out in the claims.

In the accompanying drawing:

Figure 1 is a view in vertical section of a portable fire extinguisher embodying my invention; 15 and

Fig. 2 is a view in section on line 2-2 of Fig. 1, showing details of my novel anti-recoil device.

In Figure 1, I show a cylinder 10 adapted to contain liquid carbon dioxide. This cylinder is provided with a discharge head comprising a 20 chambered body 12 which is screwed into the neck of the cylinder 10. The lower part of the body 12 has a passage 13 extending longitudinally therethrough and into which a siphon tube 14 is screwed, this tube extending to the bottom of 25 the cylinder, so that when the cylinder is discharged it will draw liquid rather than gas from the cylinder.

The passage 13 opens into a valve chamber 15 in which, surrounding said passage, is an annular valve seat 16 for a valve 19. This valve is carried on the end of a stem 20 which has threaded engagement with the chamber 15. The stem 20 passes through a stuffing box 22 out of the upper end of the body 12 and is fitted with 35 a hand wheel 23 by which the valve may be screwed open or closed at will.

When the valve 19 is screwed open the fluid in the cylinder 10 discharges into the chamber 15 and thence through an outlet port 30. This 40 outlet port opens into a chamber 31 formed in an annular boss 32 projecting laterally from the body 12. A discharge pipe 34 is coupled to this boss. The inner end of the discharge pipe has a head 35 tightly screwed upon or otherwise 45 secured to the end of the pipe. Between the head 35 and the inner end of the chamber 31 is inserted a suitable screen 36 and a washer 37. Mounted on the pipe 34 is a sleeve 38 of flexible packing material having, at its outer end, an 50 annular head 39 which laps over the end of the boss 32. A cap nut 40 fits over this head and is screwed upon the boss 32. A lock nut 41 serves to hold the cap nut at the desired adjustment. The end of the head 35 against which the pack- 55 ing material bears is beveled inwardly or dished so that end pressure on the packing sleeve will tend to force the packing material inwardly to hug tightly against the outer surface of the pipe 34. The end face of the boss is reversely beveled, 60

and the head 39 is correspondingly undercut to fit thereagainst.

It will be observed that the washer 37, head 35 and sleeve 38 have a loose fit in the chamber 31, so that some of the fluid discharging from the cylinder 10 will find its way through the screen 36 to the outside of sleeve 38 and will tend to force the packing material all the tighter against the outer surface of the pipe 34. The head 39 prevents this fluid from escaping. I have found that by this arrangement it is possible to obtain a perfect seal against leakage without rendering the coupling so stiff as to hamper free swiveling movement of the pipe with respect to the discharge head.

It is not necessary, in all cases, to undercut the head 39 and bevel the end of the boss 32, but I prefer to do so, because with certain types of packing material, if a squared end face is provided on the boss, the packing material may be compressed to such an extent as to crowd tightly into and completely fill the chamber 31. The beveled end face of the boss produces a centrifugal thrust on the head of the packing sleeve and prevents undue lengthwise compression of the sleeve. It is essential to maintain clearance between the outer wall of the sleeve and the chamber 31 in which compressed fluid may enter so as to force the packing material tightly against the outer wall of the discharge pipe 34. In such case, the higher the pressure of the fluid the more tightly will the coupling be sealed against leakage. Obviously, the outer cylindrical area of the packing is greater than its inner cylindrical area and consequently a close fit on the pipe 34 is insured.

The discharge pipe 34 is bent so that it will normally lie substantially parallel to the cylinder 10, and the free end of the pipe is externally threaded to receive the head 45 of a horn 46. This head 45 is formed with a chamber 47 having an orifice 48 in the outer end wall thereof, through which fluid may discharge into the horn 46. An anti-recoil device is provided at the outer end of the pipe 34 which consists of a plug 50 threaded into the pipe and provided with a head 51. This plug is flattened at opposite sides, as indicated at 52 in Fig. 2, leaving passages 53 through which the fluid may escape. However, the head 51 causes the fluid escaping from the passages 53 to be diverted laterally in opposite directions, thereby balancing the recoil of one discharge against that of the other. It will be understood that the flattening of the body of the screw is carried part way into the head as well leaving an overlying lip spaced from the end of the pipe 34 at the outer end of each discharge passage when the plug is screwed home into the end of the pipe. The head 51 is of smaller diameter than the chamber 47, so that when the horn is applied to the end of the tube 44, it will not interfere with the passage of fluid out of the pipe 34. The size of the passages 53 is such that the fluid will reach the orifice 48 with insufficient expansion to cause excessive chilling, thereby keeping the head 45 relatively warm and preventing the orifice from being choked up with solidified carbon dioxide. Since there will be some expansion of the fluid in its passage through the pipe 34 and to the orifice 48, I prefer to provide the pipe 34 with a covering 54 of heat insulation material.

I have described my invention as applicable to the discharge of carbon dioxide, but it will be understood that the coupling and the anti-re-

coil device may also be employed with other fluids and in other connections. Hence I wish it to be understood that my invention is not limited to the particular application shown and that I reserve the right to make various changes in form, construction and arrangement of parts without departing from the spirit and scope of my invention as set forth in the claims.

I claim:

1. A stuffing box comprising a tubular body adapted to carry fluid under pressure, a cylindrical member projecting into said body and relatively rotatable therein, a sleeve of compressible packing material fitted upon the member but spaced from the inner wall of said tubular body to provide an annular fluid pressure chamber therebetween, an annular abutment on said member for the inner end of said sleeve, and means for sealing the outer end of the sleeve to said body to close the outer end of said pressure chamber.

2. A stuffing box comprising a tubular body adapted to carry fluid under pressure, a cylindrical member projecting into said body and relatively rotatable therein, a sleeve of compressible packing material fitted upon the member but spaced from the inner wall of said tubular body to provide an annular fluid pressure chamber therebetween, an annular abutment on said member for the inner end of said sleeve, said sleeve being formed with an annular flange overlapping the outer end of the tubular body, and means on the body for pressing said sleeve endwise against the abutment and for compressing said flange against the outer end of the body to form a fluid-tight seal for the outer end of said pressure chamber, the outer end of the body being beveled away from the inner periphery of the chamber.

3. A stuffing box comprising a tubular body adapted to carry fluid under pressure, a cylindrical member projecting into said body and relatively rotatable therein, a sleeve of compressible packing material fitted upon the member but spaced from the inner wall of said tubular body to provide an annular fluid pressure chamber therebetween, an annular abutment on said member for the inner end of said sleeve, said sleeve being formed with an annular flange overlapping the outer end of the tubular body, and means on the body for pressing said sleeve endwise against the abutment and for compressing said flange against the outer end of the body to form a fluid-tight seal for the outer end of said pressure chamber, the outer end of the body being beveled away from the inner periphery of the chamber, and the end of the abutment engaging the sleeve being reversely beveled.

4. A stuffing box comprising a tubular body adapted to carry fluid under pressure, a cylindrical member projecting into said body and relatively rotatable therein, a sleeve of compressible packing material fitted upon the member but spaced from the inner wall of said tubular body to provide an annular fluid pressure chamber therebetween, an annular abutment on said member for the inner end of said sleeve, said sleeve being formed with an annular flange overlapping the outer end of the tubular body, and means on the body for pressing said sleeve against the abutment and for simultaneously compressing said flange against said outer end of the body to form a fluid-tight seal for the outer end of said pressure chamber.

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