Sept. 2, 1958 C. L. ZABRISKIE 2,850,212

FLUID DISPENSING APPARATUS

Filed Aug. 19, 1954 3 Sheets-Sheet 1

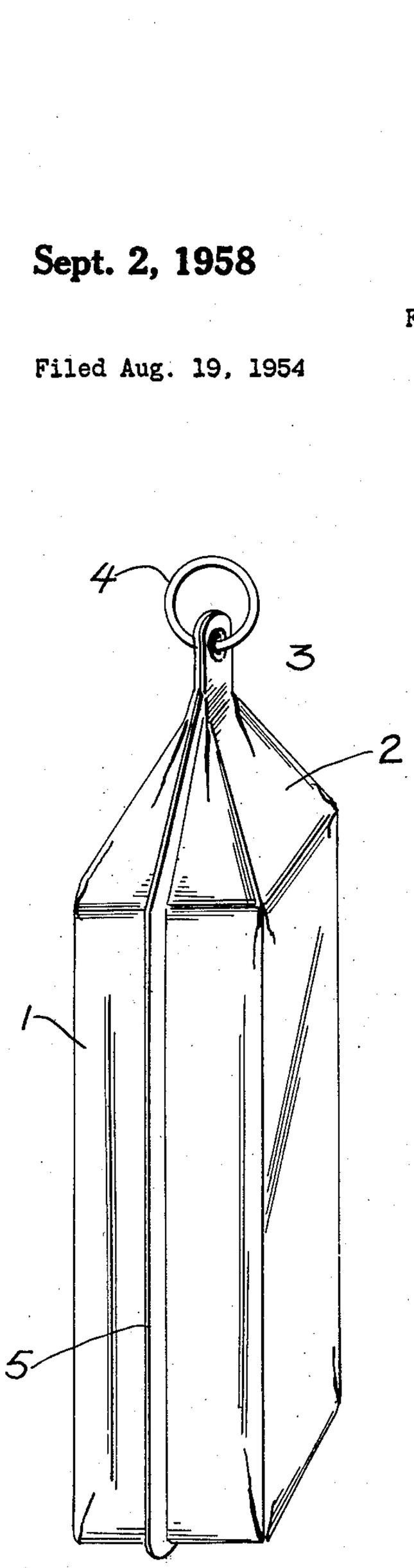

Fig. 1.

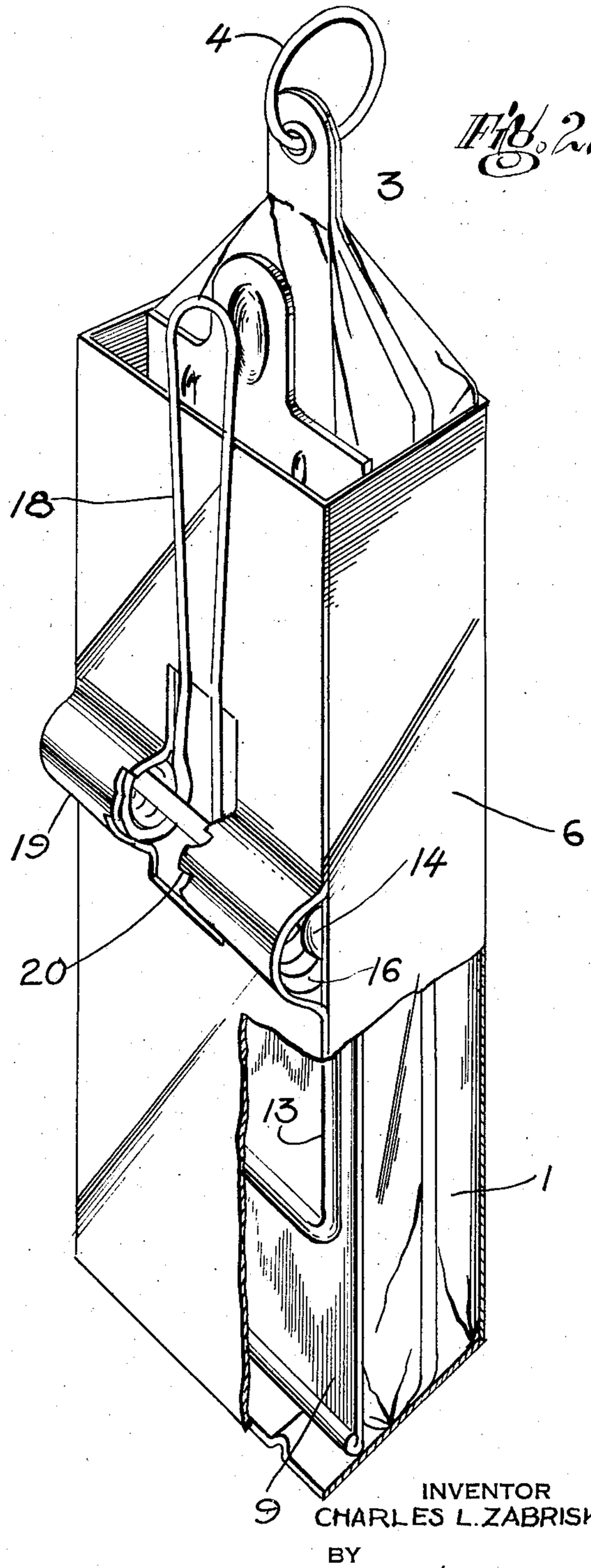

Fig. 2.

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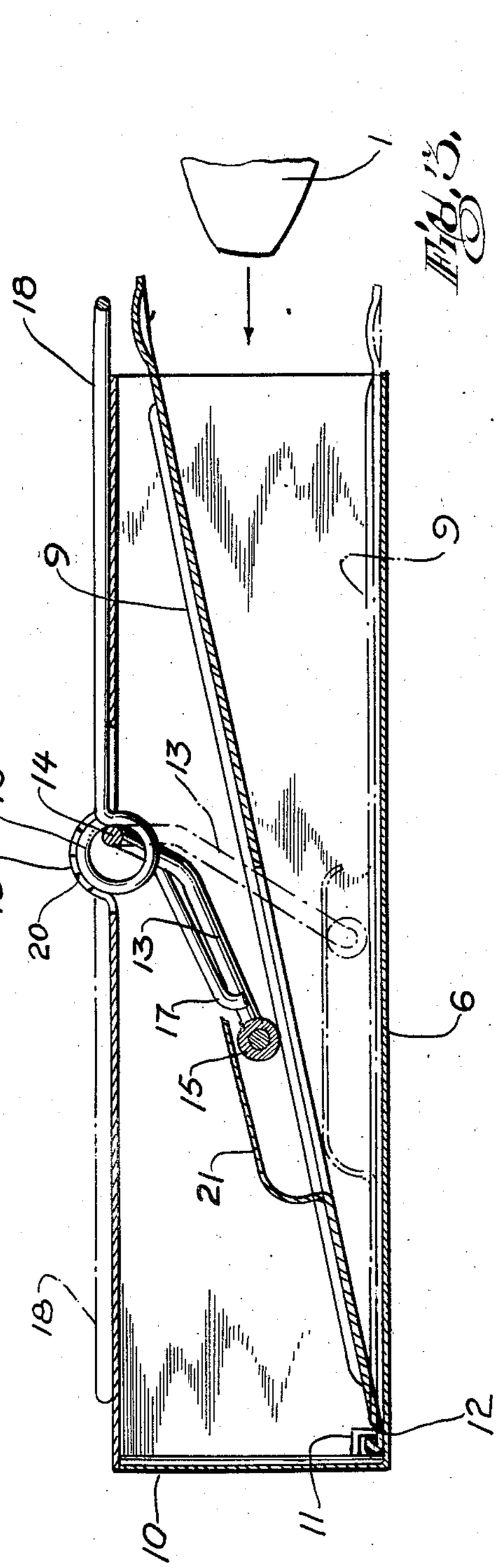

Fig. 5.

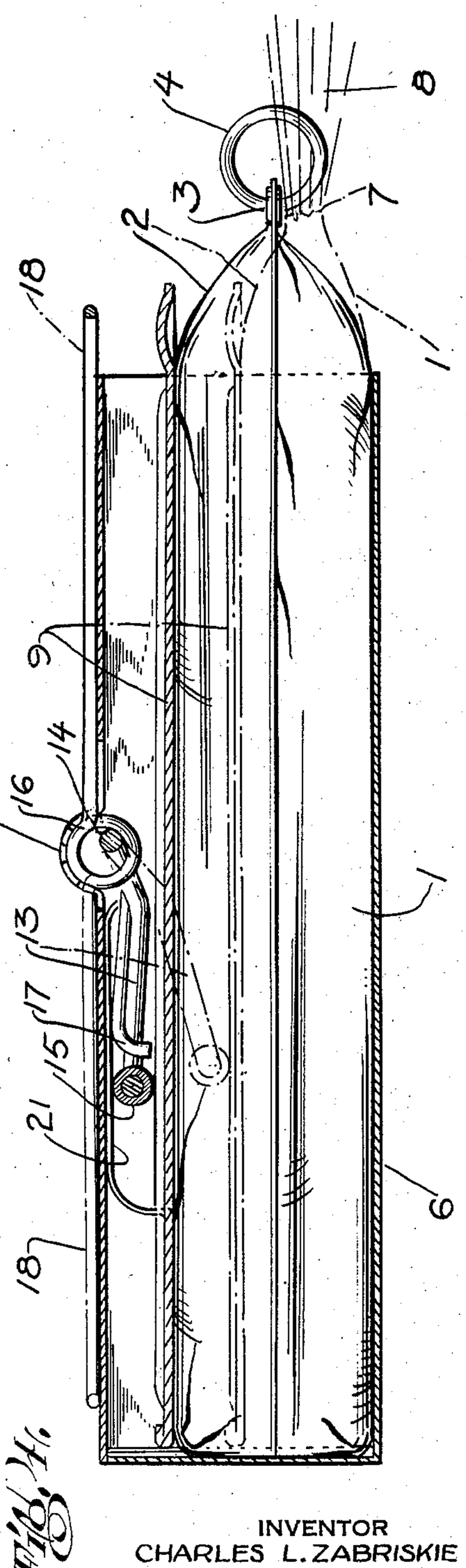

Fig. 4.

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FLUID DISPENSING APPARATUS

Filed Aug. 19, 1954 3 Sheets-Sheet 3

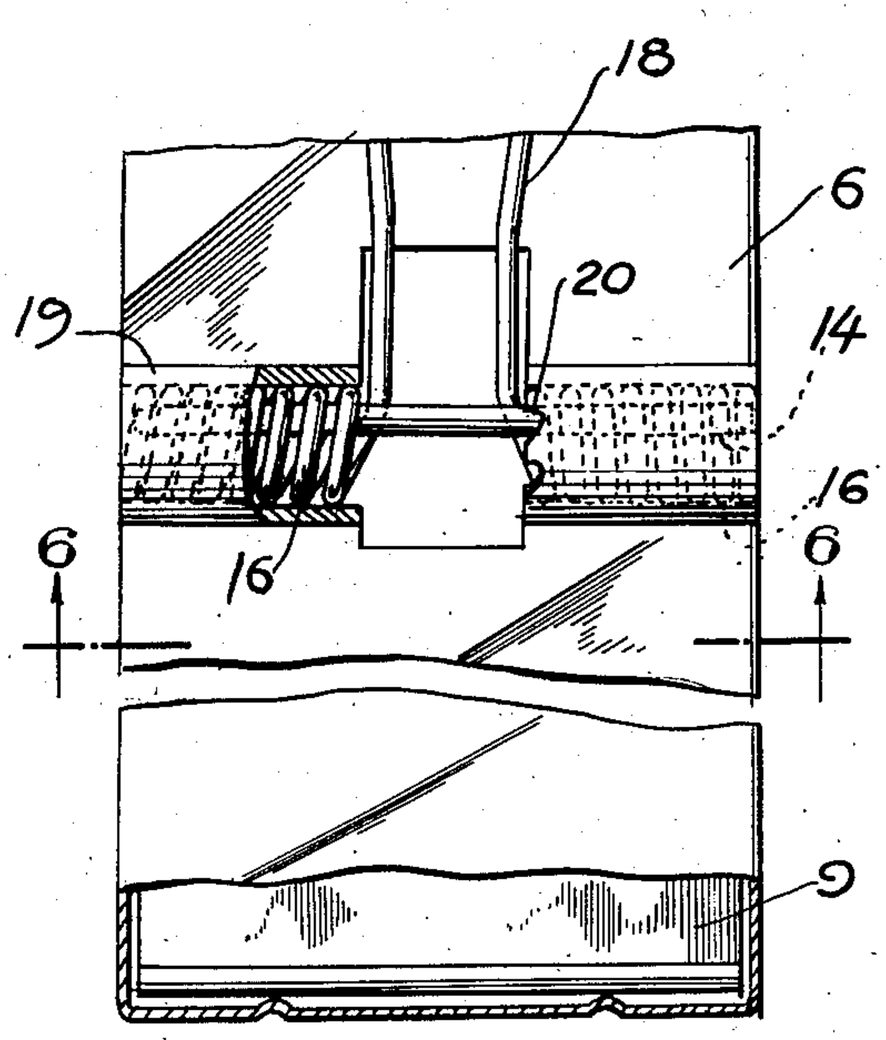

Fig. 5.

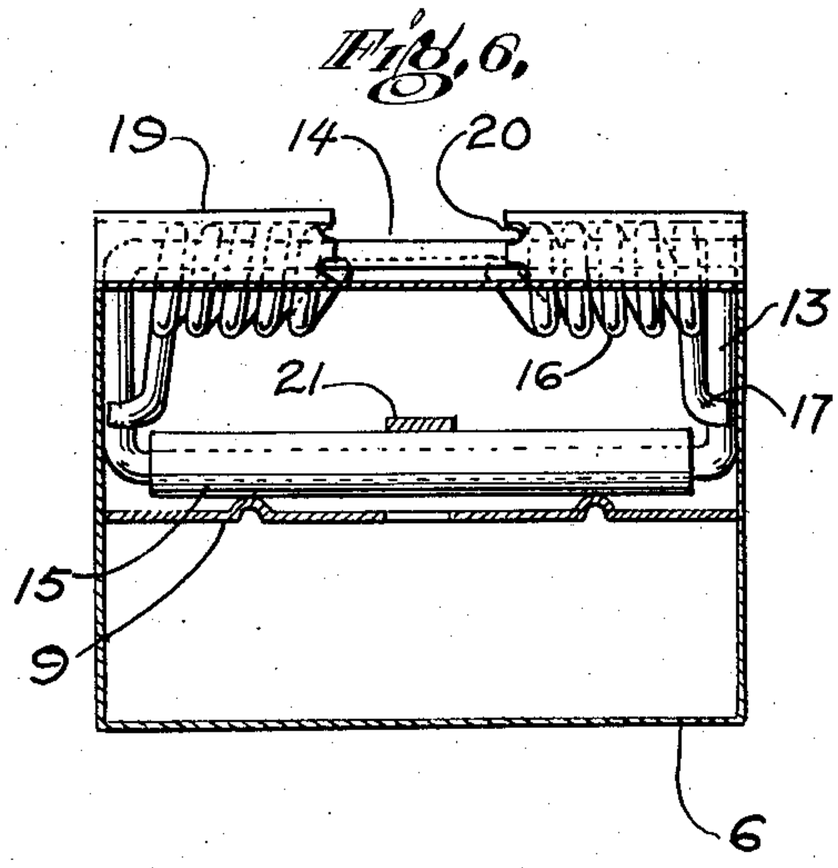

Fig. 6.

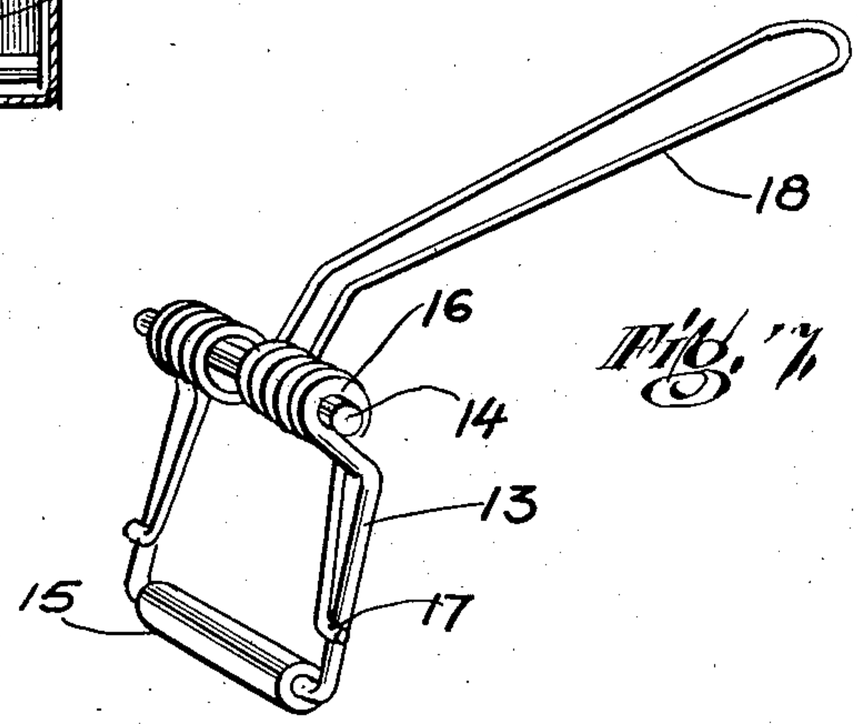

Fig. 7.

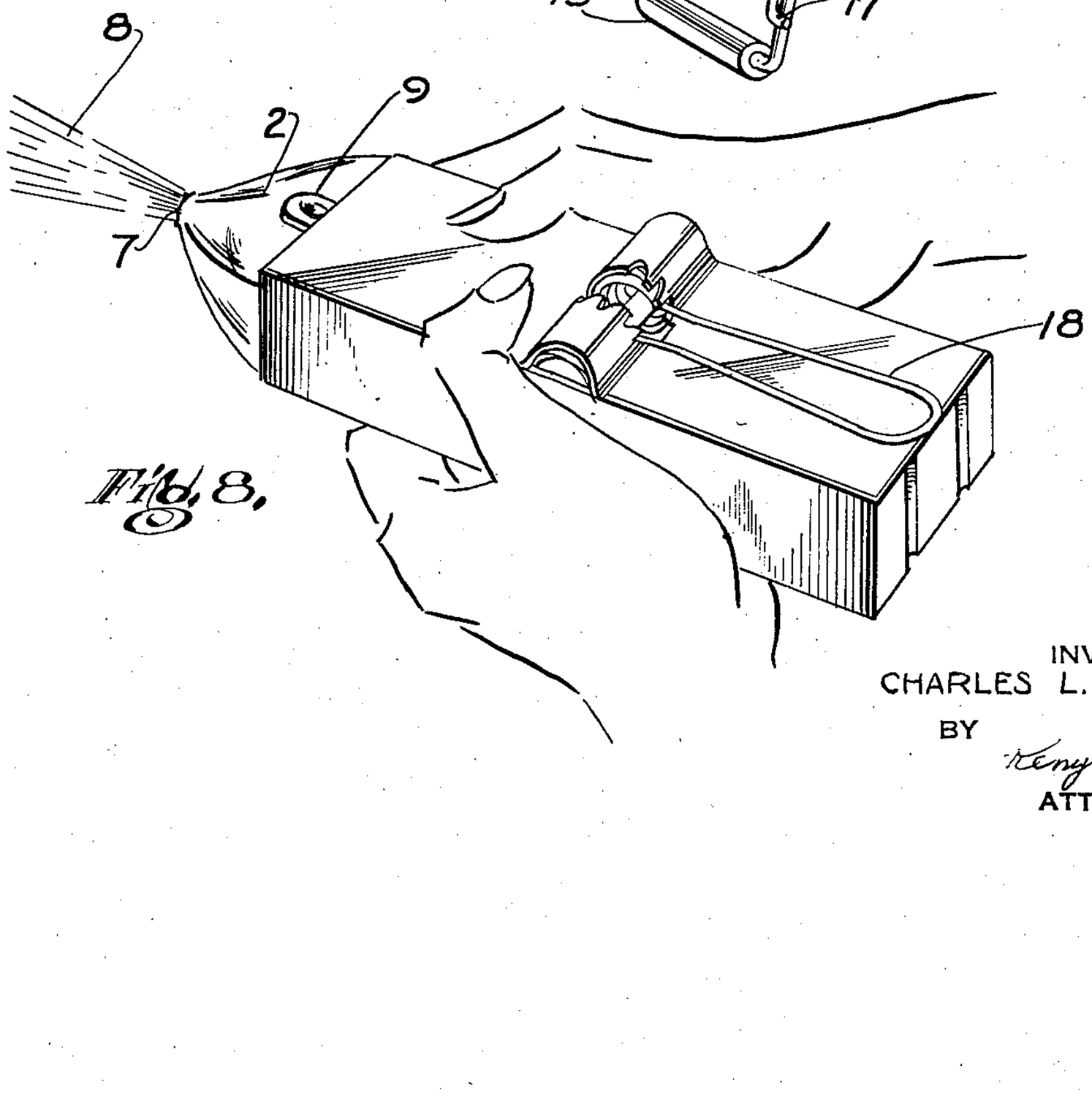

Fig. 8.

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FLUID DISPENSING APPARATUS

Charles L. Zabriskie, New York, N. Y.

Application August 19, 1954, Serial No. 450,849

10 Claims. (Cl. 222—103)

This invention relates to a fluid dispensing apparatus adapted to discharge fluid, contained in replaceable and removable flexible bags, in a predetermined direction.

This invention utilizes a fluid dispensing package such as the container disclosed in my pending application Serial No. 248,073, filed September 24, 1951, now Patent No. 2,759,547, entitled, "Fluid Dispensing Package and Container Therefor," or any other fluid container such as described hereinafter. It has been found that the fluid dispensing bag comprising a flexible container containing a fluid, requires, especially in the larger sizes, a means of applying external pressure thereto to assure the steady and complete emptying of the container. It is an object of the present invention to provide an apparatus adapted to aid the user in exerting pressure on the fluid container whereby the fluid is discharged through the container orifice in a steady stream with a resultant substantially complete emptying of the container. It is a further object of this invention to provide a simple holder for the fluid container whereby the fluid container can be easily inserted and removed as required.

An embodiment of this invention is shown in the accompanying drawings wherein:

Figure 1 shows a perspective view of the fluid container;

Figure 2 shows a perspective view, partially cut away, of the fluid dispensing apparatus comprising the fluid container and holder therefor;

Figure 3 shows a cross-sectional view of the holder and a portion of the fluid container entering said holder;

Figure 4 is a cross-sectional view of the holder and fluid container, with the fluid container in position in the holder;

Figure 5 is a top view of the holder, partially cut away, showing the placement of the handle in respect to the spring and holder;

Figure 6 is a cross-sectional view taken on line 6—6;

Figure 7 is a view showing the depressor member, handle and spring assembly; and

Figure 8 shows a perspective view of the fluid dispensing apparatus comprising a fluid container and holder therefor in operation discharging the fluid from the apparatus.

As illustrated in Figure 1 the fluid container 1 may be constructed from a flexible material in accordance with my pending application Serial No. 248,073. The container has a mouth portion 2 proportioned and shaped to direct any fluid in the container through an orifice which is formed when the grommet 3 is pulled from the container. This pulling action is made easier by the ring 4 which passes through the grommet and which when pulled removes the grommet from the container thus forming an orifice through which the fluid can pass as pressure is applied to the container. The container is formed of two sheets of flexible material, such as polyvinyl alcohol, and the two sheets are sealed along seal 5 as shown in Figure 1.

The fluid container may have other shapes which are generally oblong so that the container will fit in the

holder 6. Rather than providing the container with a grommet as described above, other means for forming an orifice in the container may be utilized such as a sharpened point hinged to the container or any other means of piercing the container. One of the properties of polyvinyl alcohol, which has been suggested as a container material, is that it will not tear away from an orifice as pressure is applied to the container with a resultant discharge through the orifice. Thus any orifice that is formed will serve to direct the fluid passing therethrough in accordance with the original shape of the orifice.

Another means of providing an orifice in the container is to delineate a relatively small area of the wall of the container with a narrow perimetric portion which has a lesser thickness than the rest of the container so that this portion will rupture when sufficient pressure is applied to the container. When this thinner and thus weaker portion ruptures a line of rupture will result around the small area and the small area will be forced out of the wall leaving a discharge orifice through which the fluid will discharge as pressure is applied to the container.

Referring to Figs. 2–4 the fluid container 1 slides down into the open end of the rigid holder 6 which is formed of four sides and a closed end. To operate the fluid dispensing apparatus, as illustrated in Figure 8, the grommet 3 is pulled out of the container thus forming an orifice 7 through which the fluid 8 can be forced. The force or pressure is applied to the container when in position in the holder by pressing against one side of the container while three sides of the holder hold the container in position. This pressure or force may be accomplished by pressing inwardly on one of the four sides of the holder which is disconnected and free to move inwardly or as illustrated in the drawings may be accomplished by having a movable plate 9 within the holder which can be moved to squeeze the fluid container and thus force the fluid through the orifice 7. The movable plate 9 may be substantially parallel to a side of the holder as illustrated in Figs. 2 and 4 thus functioning when forced inwardly much as a side of the container would function when forced inwardly. Another illustration, as shown in Fig. 3, shows the plate hinged along one end to a side adjacent the closed end 10 of the container by a hook 11 and groove 12 arrangement. In the latter illustration, where the plate is hinged along one end, the plate may be forced to pivot on the hinge arrangement and squeeze the container disposed between the plate and a side of the holder thus forcing the fluid to discharge from the container.

Any means can be utilized to force the plate 9 against the fluid container 1 and thus squeeze the container between the plate and sides to force the fluid from the container. One illustration of a means of exerting pressure against the plate to force it against the container is shown in the accompanying drawings. A depressor member 13 is disposed between the plate 9 and a side of the holder. The top end of the depressor member, as shown an inverted yoke shaped wire, is rotatably secured to a shaft 14 and the lower end bears, through a roller 15, on the plate. A spring or as shown a pair of helical springs 16 is wound on the shaft 14 with one end 17 of each spring encircling and bearing against the depressor member to spring bias the depressor member between the plate and side at a predetermined tension. The other end of each spring is attached to a handle 18 which may be rotated in such a manner that the helical spring or springs 16 are tightened thus increasing the bearing pressure of the other end or ends 17 of the springs against the plate with a resultant forcing of the plate away from the one side and toward the fluid container 1 which is disposed between the plate and the other three sides. The housing 19 for the helical spring or springs is notched

with notches **20** so that the handle can be rotated to any desired position with a related tightening of the spring or springs and with a related pressure against the fluid container.

Thus in operation the operator takes a fluid container **1** and slides it into the rigid holder **6** between the plate **9** and a side opposed to the side the depressor member **13** bears against. Next an orifice is formed in the container. In the embodiment illustrated the operator, with the aid of the ring **4**, pulls the grommet **3** from the fluid container, the plate now bearing against the container sufficiently due to the initial and predetermined spring bias that the fluid container will not slide back out of the holder during this grommet removing operation. Once the grommet is removed the tapered mouth portion **2** is so shaped that any fluid passing through the orifice **7**, resulting from the removal of the grommet, is directed in a predetermined manner. Thus if the fluid is a fire extinguishing fluid, such as carbon tetrachloride, it can be directed onto the fire to be controlled or extinguished.

The operator next rotates the handle **18** to any desired notch **20** and this rotation tightens the helical springs **16** so that the ends **17** thereof bear against and depress the depressor member **13**. This serves to depress the plate **9** and squeeze the fluid container to discharge the fluid therefrom. As the fluid stops discharging the operator can set the handle in succeeding notches until the fluid is exhausted. With release of pressure on the handle the handle will rotate in the opposite direction to its initial position and the plate will be lifted away from the fluid container by the upward lift of the roller **15** on the housing **21** attached to the plate so that the container may be removed, a full container inserted, and the above operation repeated as many times as desired.

Another method of operation is to insert a container filled with fluid, rotate the handle **18** to a desired notch **20** thus exerting pressure on the fluid container and then as desired pulling the grommet **3** away from the bag to form an orifice with a resultant discharge of fluid commensurate with the setting of the handle.

In the event that there are not enough of these apparatus for all persons in the vicinity desiring to eject fluid onto a fire for instance, it must be realized that the fluid container may be exhausted by hand pressure in accordance with application Serial Number 248,073 as well as by the apparatus of this invention.

It will be realized that the handle **18** may be connected to the depressor member directly with a hinge rotatably attaching these members at their point of joinder to a side of the holder. Any rotation of the handle will then be transferred directly to the plate through the depressor member with a resultant increase of pressure due to the lever action about the hinge as a fulcrum.

Further it is contemplated that the so called depressor member **15** in the form of a wire yoke can be disposed around and under the plate **9**, the container can be placed in the holder between the plate and the side of the holder from which the yoke depends and a lever or spring action can be so arranged that with rotation of the handle the yoke will lift toward the side from which the yoke depends with a resultant similar pressure as described above acting on the container.

The pressure applied to the fluid container by the above operational steps is a steadier and greater pressure than is generally possible by simply squeezing the container in the hands. This results in a more uniform ejection having a longer trajectory which is generally desired in using the apparatus as for fighting fires.

Having thus described my invention I claim:

1. A portable fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a removable container having a flexible wall for confining said fluid, said wall having a relatively small and a relatively large area, a narrow perimetric portion joining said relatively small area and said relatively large area, said portion having a lesser thickness than the thickness of said area, said portion defining a line of rupture between said relatively small area and relatively large area to provide a discharge orifice from said container, said portion adapted to rupture by increased internal pressure in said container a rigid means for holding said container and a means manually controlled acting in conjunction with said holding means to exert pressure on said container whereby said portion will rupture and the fluid will discharge through said discharge orifice.

2. A fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a removable flexible container containing said fluid and having a mouth portion forming an orifice proportioned and shaped to direct any fluid passing therethrough, a rigid holder for said container enclosed on four sides and at one end, a movable plate disposed within and substantially parallel and adjacent one side of said holder, a depressor member disposed between said plate and said one side, a spring adapted to spring bias said depressor member with a predetermined pressure between said plate and said one side and a means of increasing the tension of said spring to force the plate away from the one side toward the container disposed between said plate and the other three sides of the holder whereby the fluid is discharged from the container.

3. A fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a removable flexible container containing said fluid and having a mouth portion forming an orifice proportioned and shaped to direct any fluid passing therethrough, a rigid holder for said container enclosed on four sides and at one end, a movable plate disposed within said holder, said plate being hinged along one end to a first side adjacent the said closed end of said holder, a depressor member disposed between said plate and a second side opposite said first side, a spring adapted to spring bias said depressor member with a predetermined pressure between said plate and said second side, and a means of increasing the tension of said spring to force the free end of said plate toward said first side whereby the fluid is discharged from the container which is disposed between said plate and said first side.

4. A fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a removable flexible container containing said fluid and having a mouth portion forming an orifice proportioned and shaped to direct any fluid passing therethrough, a rigid holder for said container enclosed on four sides and at one end, a movable plate disposed within and substantially parallel, and adjacent one side of said holder, a depressor member disposed between said plate and said one side, at least one helical spring one end of which bears against said depressor member to spring bias said depressor member with a predetermined pressure between said plate and said one side and a handle attached to the other end of each helical spring, said handle adapted to rotate about the axis of each helical spring with a resultant varying of the tension of the spring whereby when the spring tension is increased the depressor member forces the plate away from the one side toward the container disposed between said plate and the other three sides of the holder whereby the fluid is discharged from the container.

5. A fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a removable flexible container containing said fluid and having a mouth portion forming an orifice proportioned and shaped to direct any fluid passing therethrough, a rigid holder for said container enclosed on four sides and at one end, a movable plate disposed within said holder, said plate being hinged along one end to a first side adjacent the said closed end of said holder, a depressor member disposed between said plate and a second side opposite said first side, at least one helical spring one end of which bears against said depressor member to spring bias said de-

pressor member with a predetermined pressure between said plate and said second side and a handle attached to the other end of each helical spring, said handle adapted to rotate about the axis of each helical spring with a resultant varying of the tension of the spring whereby when the spring tension is increased the depressor member forces the free end of the plate away from the said second side toward the container disposed between said plate and said first side whereby the fluid is discharged from the container.

6. A fluid dispensing apparatus according to claim 4, in which the fluid to be dispensed is carbon tetrachloride.

7. A fluid dispensing apparatus according to claim 4, in which the flexible container is constructed of a polyvinyl alcohol film.

8. A fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a removable flexible container containing said fluid and having a mouth portion forming an orifice proportioned and shaped to direct any fluid passing therethrough, a rigid holder for said container enclosed on four sides and at one end, a movable plate disposed within and substantially parallel and adjacent one side of said holder, a depressor member formed of a yoke shaped wire disposed between said plate and said one side, a pair of helical springs one end of each bearing against said depressor member to spring bias said depressor member with a predetermined pressure between said plate and said one side and a yoke shaped handle attached to the other ends of the helical springs, said handle adapted to rotate about the axis of the said springs with a resultant varying of the tension of the springs whereby when the tension of the springs is increased the depressor member forces the plate away from the one side toward the container disposed between said plate and the other three sides of the holder whereby the fluid is discharged from the container.

9. A fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a removable flexible container containing said fluid and having a mouth portion forming an orifice proportioned and shaped to direct any fluid passing therethrough, a rigid holder for said container enclosed on four sides and at one end, a movable plate disposed within said holder, said plate being hinged along one end to a first side adjacent the said closed end of said holder, a depressor member formed of a yoke

shaped wire disposed between said plate and a second side opposite said first side, a pair of helical springs one end of each bearing against said depressor member to spring bias said depressor member with a predetermined pressure between said plate and said second side and a yoke shaped handle attached to the other ends of the helical springs, said handle adapted to rotate about the axis of the said springs with a resultant varying of the tension of the springs whereby when the tension of the springs is increased the depressor member forces the free end of the plate away from the said second side toward the container disposed between said plate and said first side whereby the fluid is discharged from the container.

10. A portable fluid dispensing apparatus adapted to discharge a directed stream of fluid comprising a movable container having a flexible wall for confining said fluid, said wall having a relatively small and a relatively large area, a narrow perimetric portion joining said relatively small area and relatively large area, said portion having a lesser thickness than the thickness of said area, said portion defining a line of rupture between said relatively small area and relatively large area to provide a discharge orifice from said container, said portion adapted to rupture by increasing internal pressure in said container, a rigid holder for said container enclosed on four sides and at one end, a movable plate disposed within said holder and a means manually controlled acting in conjunction with said holder to force said plate inwardly and exert pressure on said container whereby said portion will rupture and the fluid will discharge through said discharge orifice.

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