

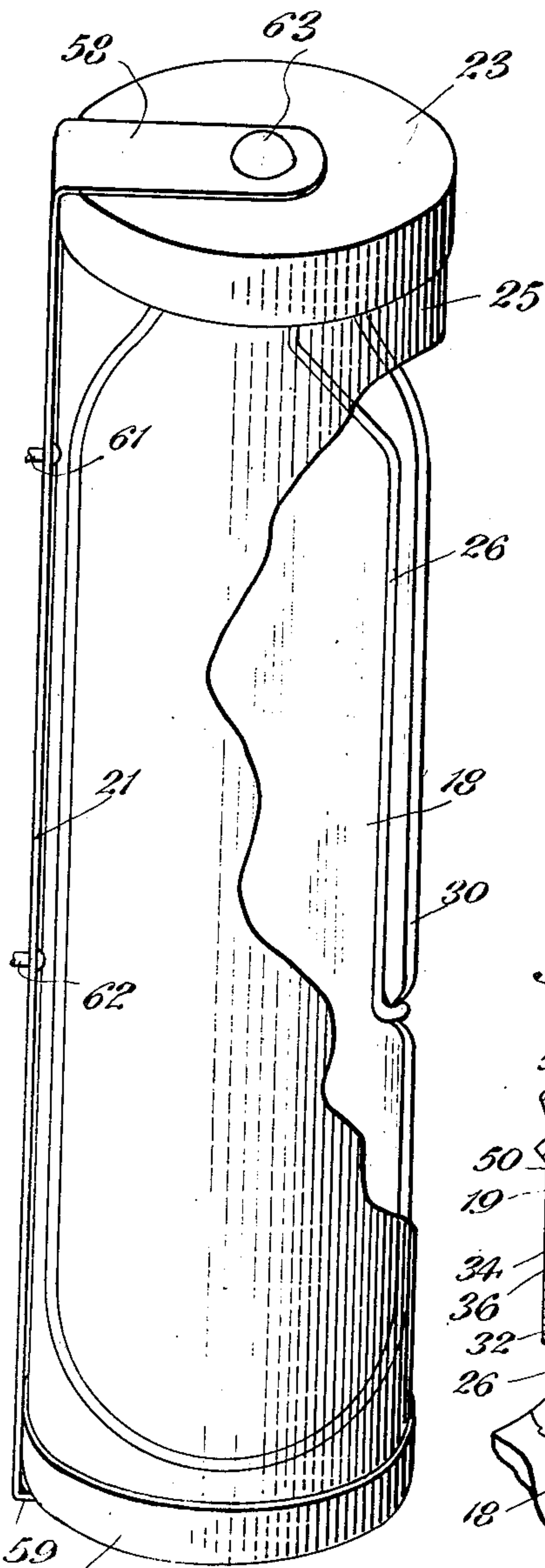
Nov. 17, 1953

C. L. ZABRISKIE  
FIRE EXTINGUISHER STRUCTURE

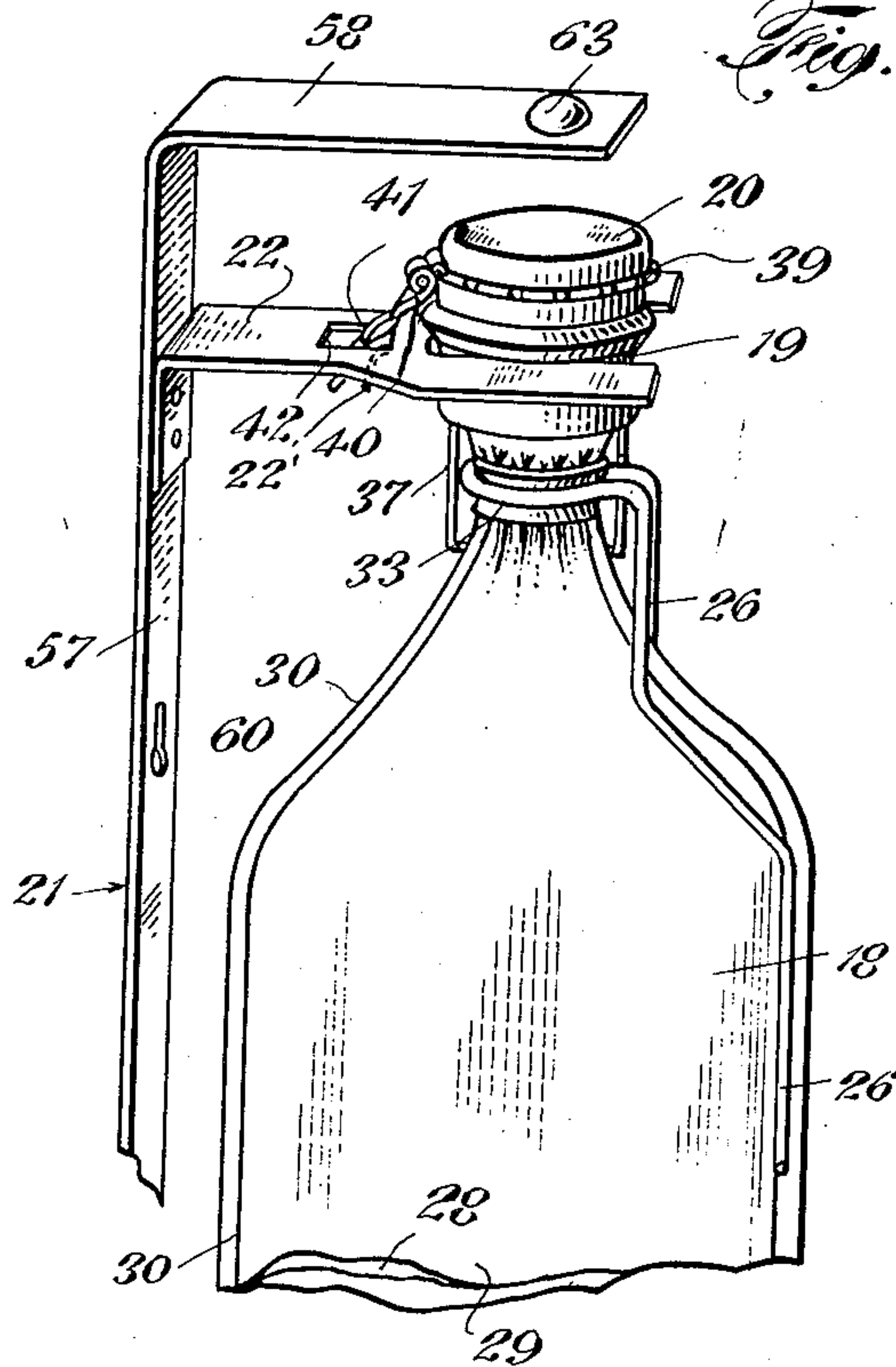
2,659,443

Filed Feb. 17, 1950

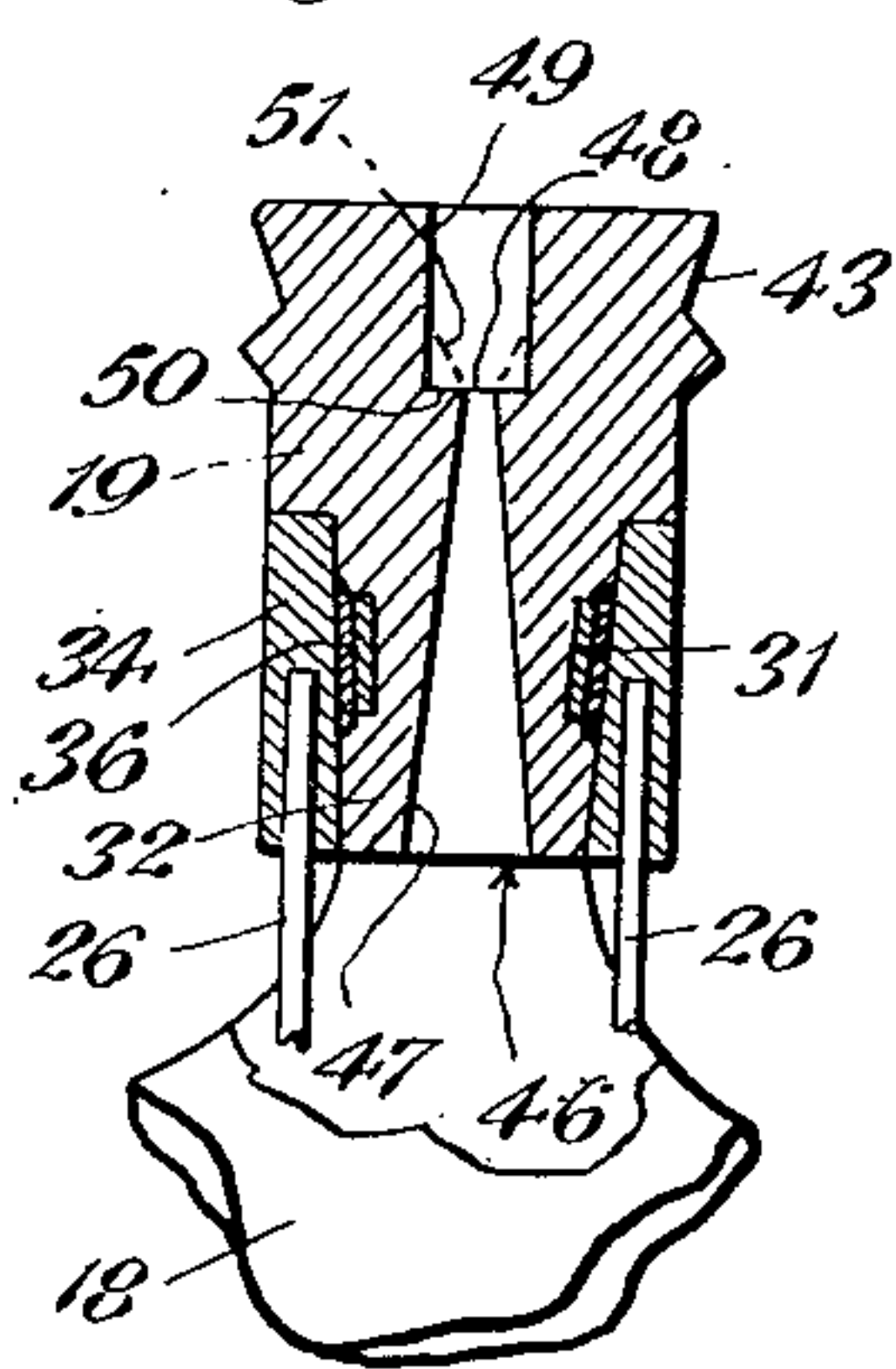
*Fig. 1.*



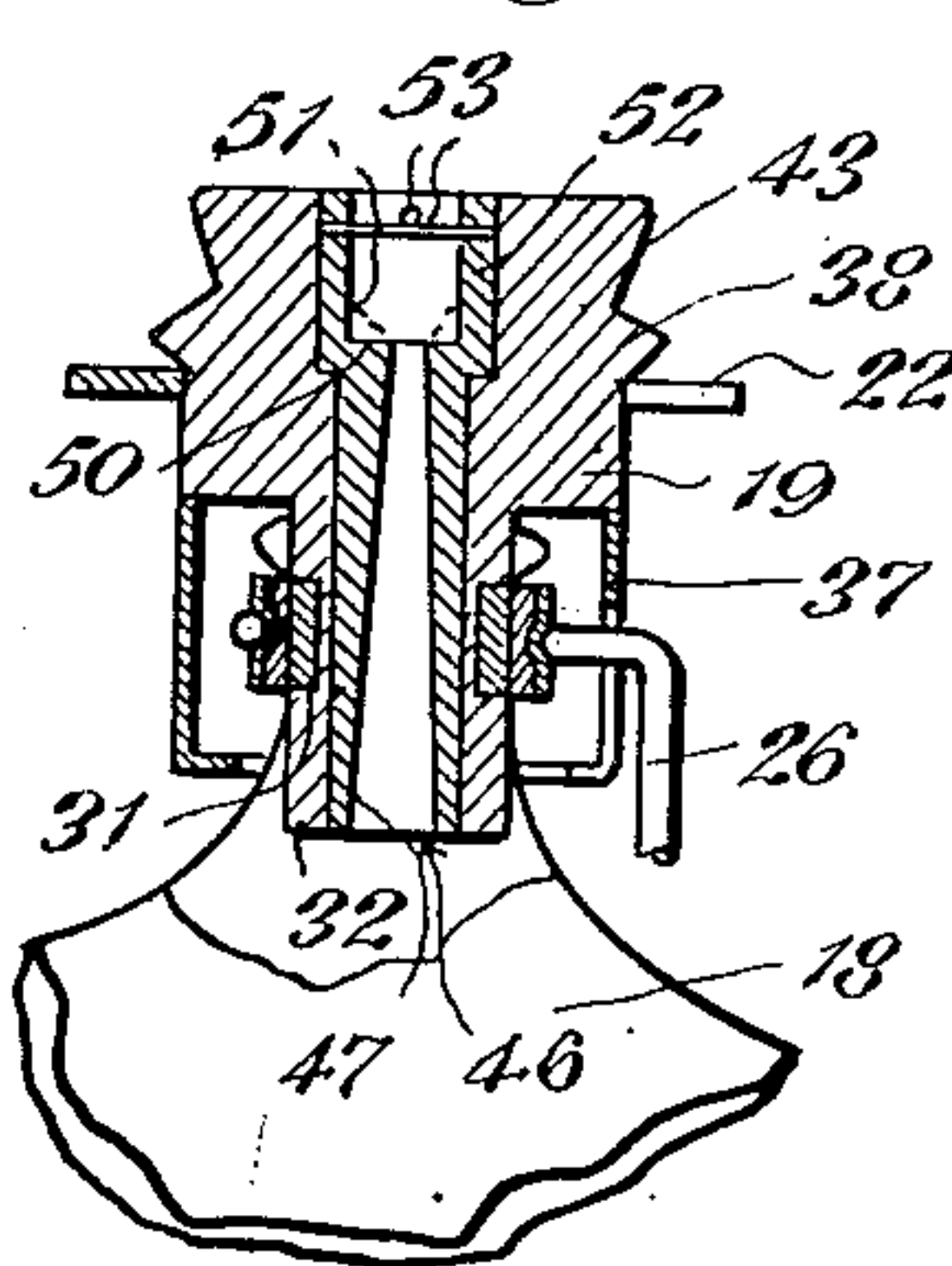
*Fig. 2.*



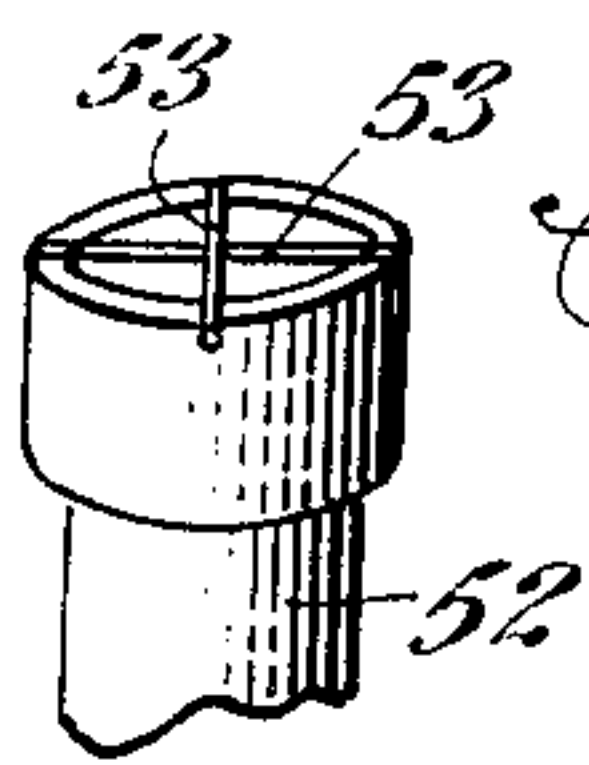
*Fig. 4.*



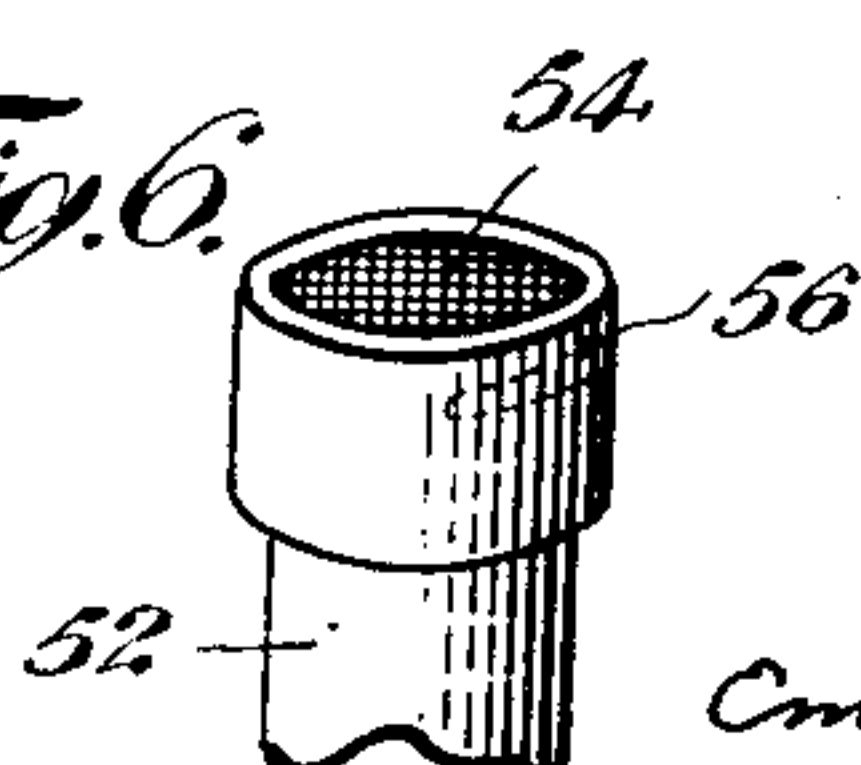
*Fig. 3.*



*Fig. 5.*



*Fig. 6.*



INVENTOR  
Charles L. Zabriskie  
BY  
Emory Varney, Whittleman & Co.  
ATTORNEYS



# UNITED STATES PATENT OFFICE

2,659,443

## FIRE EXTINGUISHER STRUCTURE

Charles L. Zabriskie, New York, N. Y., assignor  
to Essex Products, Inc., New York, N. Y., a cor-  
poration of New Jersey

Application February 17, 1950, Serial No. 144,760

7 Claims. (Cl. 169—35)

1

This invention relates to an improved construction of fire extinguisher. In one of its most desired forms, it is particularly adaptable for use in homes, factories, warehouses, and other like places; however, it may be manufactured in other sizes for particular or special uses.

This invention further relates to improvements in the construction of various parts of the improved fire extinguisher, and provides for a novel flexible container for holding and storing fire extinguishing fluid for a long period of time without loss of the material. This novel extinguisher is especially adapted to be squeezed to force the extinguishing liquid from the container in a stream that will reach a fire at quite a distance from the extinguisher.

Some of the features of this improved invention include the provision of a flexible non-leaking container for holding the fire extinguishing fluid, and the provision of an improved nozzle associated with the container for providing the dispersing of the extinguishing liquid either in a particular size and shape of stream, or in a spray form, and the provision of an improved cooperating support and an enclosure structure that will usually not allow puncturing of the fire extinguisher container, the enclosure cooperating with and being held by the support. In addition, the improved fire extinguisher has complete visibility of the material in it, has no moving parts, the fluid and the container will not corrode, and there is no evaporation of the liquid.

Another feature of the improved invention is the provision of a novel construction of container, preferably of two concentric bags, for the fire extinguishing fluid, and to so weld these bags together that there is no leaking even when being subjected to very high pressure during the playing of the extinguishing liquid on a fire.

This novel invention also provides a very satisfactory flexible fire extinguisher by employing one bag preferably made of two flat pieces of the flexible material bonded or welded together around their edges. Tests have shown such a bag to perform in a most satisfactory manner. Also when employing two bags, it is not necessary to weld or join them together, they may be two separate bags, one assembled within the other.

A further feature is the provision of a satisfactory capping or cover for the container whereby air is not permitted to reach the fire extinguishing liquid, and when the extinguisher is pulled from its support the capping or cover will be automatically removed.

2

Another feature of the invention is to provide an improved type of nozzle for the fire extinguisher, and to form the same so that the container will have a liquid tight attachment thereto and that this nozzle will be engaged by a supporting member for holding the extinguisher in stored position. This nozzle is also, in the preferred form of construction, acting as a holder for an improved type of handle that extends at least part way along the side of the container for purposes of supporting the same and for aiming the same at a fire.

It is a further feature of the invention to construct the inner portion of the nozzle in a manner that will allow insertions of different types of plugs or inserts that will give a small diameter stream having a long carry to the fire, or to provide means so that the liquid issuing will be of broader coverage so that a larger area of the fire may receive the liquid issuing from the extinguisher. This modified portion of the nozzle may be such that the liquid may issue in a stream or in a spray, or in any form between the stream and spray forms.

Another feature of the invention is a particular improved construction of the nozzle so as to provide a leak-proof type of engagement between the liquid container and the nozzle and one which will not permit leaking of the fire extinguishing liquid during a long storage time.

Another feature provides for the fire extinguisher to be mounted in such a manner that during storage it is well protected against harm and puncture, but when desired to be used can be handled quickly and competently in its being removed from its support so that it is immediately usable for putting out a fire. Such construction provides for the automatic uncovering of the nozzle.

A further feature of the invention is to provide a new and improved type of flexible container for the fire extinguishing fluid and to have the inner bag portion of such container made of material that will not react chemically, or otherwise, with the fire extinguishing fluid, and to provide an outer bag that will receive printing and instruction reading matter without deterioration of the outer bag, and to have these two inner and outer bag portions of the container welded together in a non-leaking manner so that with any reasonable strength of pressure on the flexible container it will not burst the welded seam nor the flexible container itself. Thus, the fire extinguishing liquid will issue only through the nozzle of the container.



3

Another feature of the invention is the provision of a novel type of support which will hold the flexible container in a desired position and will also act to engage the nozzle cover portion in a manner to allow automatic removal of such cover when the extinguisher is pulled from the support, and to have an outside covering or tube for protecting the extinguisher as positioned in the support. The tube may be quickly and automatically removed.

Other features and advantages of the invention will be noted from the detailed description given below when taken in connection with the accompanying drawings, wherein

Fig. 1 is a perspective view of the improved fire extinguisher as filled with liquid and as being properly supported in a storage position;

Fig. 2 is a perspective view of a portion of the fire extinguisher showing its mounting in a part of the support, and the arrangement for the movement of the nozzle cover or cap and of an extending arm down the side of the container;

Fig. 3 is a view, mostly in section, of the improved nozzle and illustrating one form of means for joining the container to the nozzle in a leak-proof manner;

Fig. 4 illustrates a modified form of means for joining the flexible container to the nozzle, and for providing anchoring means for the arm extending part way along the side of the extinguisher;

Fig. 5 illustrates a form of nozzle structure such as a plug or insert, which breaks the stream of the fire extinguishing liquid into segments; and

Fig. 6 illustrates another type of fire extinguisher nozzle plug which causes the fire extinguishing liquid to be sprayed as it issues from the extinguisher.

In the form of fire extinguisher structure herein illustrated, the overall structure preferably comprises a fire extinguisher container 18 provided with an improved structure of nozzle 19, a cap or cover 20, usually of non-leaking characteristic when in assembled position on the nozzle, a support 21 with an extension 22 engaging part of the cover and nozzle, an upper top 23, a seat 24, a sleeve or tube 25, and an arm 26 which usually extends part way from the nozzle 19 down the side of the extinguisher 18.

The extinguisher 18 is flexible, pliant or supple in nature and is chemically inactive to the ordinary fire extinguishing liquid, such as carbon tetrachloride, and, in substantially all instances, will maintain the extinguishing liquid without evaporation during the storage period of the fire extinguisher unit. This flexible extinguisher container is preferably made of two bags, an inner one represented at 28 and the outer end at 29. These two bags may be welded together in a most satisfactory manner so that they will not leak even though the pressure placed on the bag to force the liquid out through the nozzle 19 is exceptionally high. The welded portion of the two bags is shown by the edge 30 and the extinguisher container, which has been subjected to many tests, has withstood all of the pressure that could be exerted by two hands of a strong person pressing the flexible bag to force out the extinguishing liquid. Of course, the higher the pressure, the greater the length of the stream of the extinguishing liquid. Also, the extinguishers formed by having bags 28 and 29 as separate units and one assembled within the other, have

been satisfactory and have withstood the same tests.

Preferably, the inner bag 28 is made of polyvinyl-alcohol, and the outer bag 29 is made of flexible vinyl material. The inner bag operates to protect against corrosion or eating away of the bag itself by reason of the fire extinguishing liquid, and the outer bag protects against possibility of moisture reaching the fire extinguishing liquid. The outer bag 29 will receive and hold a printing so that trade names and instructions will be formed on the outside of the flexible container. In the preparation of this extinguisher container, it has been found that the welding can be accomplished so that there is practically a 100% non-leaking result.

In using only one bag, it has been found that a flexible polyvinyl-alcohol of different thickness or structure may be employed. Also printing may be made on it.

It will again be noted that such an improved fire extinguisher has no moving parts, has complete visibility of the material therein, and allows no evaporation or corrosion. The visibility feature is one of the interesting features as it allows inspection by eyesight thereby eliminating the costly refilling operations that are necessary when the non-visible metal containers are employed.

After being used at a fire, the improved fire extinguisher herein may be easily refilled and replaced. In such refilling a plug 52, noted below, may be removed and thereafter replaced.

In joining the flexible container 18 to nozzle 19, reference is made to Figs. 3 and 4. Various types of means may be employed to obtain a non-leaking joint, and it has been found that a suitable base of a somewhat flexible material to engage the opening of the extinguisher container has been most satisfactory. Such a flexible base is shown at 31 in Figs. 3 and 4. The container material is brought into engagement with the lower end 32 of nozzle 19. This end may be tapered as shown in Fig. 4, or may be straight as shown in Fig. 3. The container material will engage base 31 and may be pushed into liquid-proof contact therewith by having ring 33 of arm 26 firmly engage the outside of the container material, as shown in Figs. 2 and 3. Another means of holding the neck of the container 18 in position against base 31 is to provide a tapered part on nozzle 19 and a collar 34, preferably of brass, and which is also tapered and which when pushed into assembled position will force the neck of container 18 into contact with the base 31, and it will be noted that usually the neck of the container will bulge into the flexible base 31, as shown at 36 in Fig. 4, and create a non-leaking joint. If desired, the container material may be tightly tied against base 31. With the structure shown in Fig. 4, the two free ends of the arm 26 are shown as inserted in the collar 34. With either of the types of structures shown in Figs. 3 and 4, it has been found that the flexible container made of concentric bags 28 and 29 will provide a leak-proof joint even when excessive pressures are applied to the container. Thus, the container for the fire extinguishing liquid will still hold the nozzle in leakproof assembly therewith. Other types of satisfactory means for holding the container 18 and the nozzle 19 together may be employed as desired.

When the type of arm 26 with ring 33 is employed, it is desired to include a ferrule 37, usually of brass, and which slides over the ring 33 at



5

the time of the assembly and before the fire extinguishing liquid has been inserted in container 18. This ferrule may be made to create a squeezing effect on the ring 33.

Referring now to the nozzle 19 itself, an annular bead 38 is provided toward the top of the nozzle and receives support 22 thereunder, thus providing a means for holding the container 18 in supporting position after it has been filled. As heretofore noted, the top of the nozzle is closed by a suitable cover 20 which gives a leak-proof closure. To accomplish this feature, a suitable small wire ring 39 is drawn tight by reason of cam 40 operated by extension 41, which after assembly passes through opening 42 in support 22. The forming of opening 22 causes tongue 22' to be formed and depressed. The combined structure of nozzle 19, cap 20 and extension 22 is such that the fire extinguisher container is properly supported in position but which may be readily pulled from its support and in so doing the extension 41 cooperates with tongue 22' in releasing the binding or tension of ring 39 and permits the cap 20 to be automatically forced off from the nozzle 19. The cap 20 in assembled position grips around the tapered part 43 of the nozzle—see Figs. 3 and 4.

For the purpose of obtaining the most efficient stream of the fire extinguishing liquid from the extinguisher container, any suitable opening 46 may be provided in the nozzle. From many of the trials and tests, it has been found that the opening 46 can be formed so that there is a Venturi effect produced in the operation of forcing the fire extinguishing liquid from the container, thereby to obtain a lengthy stream of the extinguishing liquid. In such an instance, the opening 46 in the container has a large diameter 47 at the bottom of the nozzle, and then gradually decreases in diameter to a smaller diameter as at 48 somewhere along the length of the opening 46, and then expands to have a larger diameter 49, as especially shown in Fig. 4. Such a Venturi type of structure may have square shoulders 50 or may have a gradual expansion of diameter shown by dotted lines 51 graduating into the larger diameter 49. A particular use and a desire for a longer stream will guide particularly as to whether the square shoulder type or the gradual change in diameter of structure should be employed.

While it is desirable in many instances to have the Venturi type of structure, this is not always necessary and other types of openings 46 may be provided. However, it is helpful to employ the Venturi structure to obtain a long stream and so that a person may stand around a corner and hold the extinguisher container in one hand and point the nozzle at the fire by employing the arm 26. By being able to stand around the corner, the person's body is not exposed to the fire nor to excessive heat.

Referring to Fig. 3, the opening 46 is also shown as a Venturi type formed in a plug 52 which is inserted in the nozzle 19 in a suitable manner to provide strength of engagement so that it will not be forced out of the nozzle 19 even though there is excessive pressure applied to the flexible container. Such a means of fastening the plug 52 in the nozzle 19 may be by a drive fit or by having cooperating annular bead and an annular groove, or part lengths thereof, or may be threaded into position, or may be assembled in any other satisfactory manner for holding the plug tightly in the nozzle. In the illustration in

6

Fig. 3, the nozzle 52 preferably has a drive fit, and the tests have shown that this is satisfactory to give a proper holding of the plug in position.

In some instances, it is desirable that the stream of extinguishing liquid be broken up during its flow from the container and reference is made to Figs. 5 and 6 wherein it is noted in Fig. 5 there are two pieces of wire 53 shown in crossed relation to each other for breaking the stream into more or less quarter sections. In any event, the stream is broken up to some extent. In Fig. 6, there is shown a screen 54 of relatively small mesh which causes the liquid to spray as it is being expelled from the container. The screen type will permit the extinguishing liquid to spray over quite a sizeable area, and this spray type of operation is used where the operator can be fairly close to the fire without being bodily injured. This screen 54 can be inserted in the plug 52 by simply cutting a part way slot 56 in the plug. Another means of locating the screen is to force it into the opening 49 and then place a ring over the top edge of it and have the ring have tight engagements with the opening.

The tests of this apparatus, as thus far described, have shown that the arm 26 in definite engagement with the nozzle 19 permits the operator to efficiently point the extinguisher container directly toward the fire and to squeeze the flexible container 18 so that the liquid is played directly on the fire. Another advantage of the arm 26, which extends part way down the container, is that one hand may be used to squeeze the flexible container and issue a great deal of the liquid therefrom. The other hand may later grasp the lower part of the extinguisher container 18 and thereby force the remaining portion of the liquid from the container.

In the provision of the improved fire extinguisher structure, the support 21 with its cooperating extension 22 is provided with a U-shaped member 57 having a top extension 58 and a bottom extension 59 and being provided with openings 60 for receiving supporting means such as screws 61 and 62, see Fig. 1, thus to hold the whole fire extinguisher structure in a desired position to permit grasping of the extinguisher. Extension 58 has top 23 engaging it by reason of a convex extension cooperation with a like extension 63, as shown in Fig. 1. Likewise, the same kind of structure may be provided between extension 59 and seat 24.

Included in the fire extinguisher structure is a suitable sleeve or tube 25 which surrounds and protects the extinguisher container 18 and is held in position by top 23, and seat 24, as shown in Fig. 1. Preferably, this sleeve 25 is made of a suitable acetate but if desired, a glass tube may be employed, or there may be provided a pasteboard structure with a window formed in it.

When it is desired to employ the extinguisher, the sleeve 25 is grasped and pulled, and the seat 24 and sleeve drop out of position. The operator then grasps the container 18 with the arm 26 within his hand and quickly pulls the container outwardly and downwardly, thus forcing off cap 20 and then points the container toward the fire and squeezes the container to cause the extinguishing liquid to stream to the fire.

It will be noted that the description gives a very detailed outline of the improved fire extinguisher structure as a unit which may be stored in position nearby an instrument or machine where it is believed fire may take place in the future.



7

It will be further noted that the fire extinguisher structure herein forms a unit structure with all parts cooperating, and provides for a novel type of sealed inner and outer bags forming the flexible container, and provides for a novel definite engagement between the flexible container and the nozzle so that there is a non-leaking engagement, and in addition, a cover or top is provided so that there is no loss of extinguishing material by vaporization or leakage. It will be further noted that the fire extinguisher structure includes a means for supporting the extinguisher container and for automatically uncovering or uncapping the same as the container is pulled out of position. Other features as providing means for breaking up the stream of liquid as it flows from the container, will be noted in the preferred form of plug 52 with modified openings. Also, a satisfactory type of cover 25 may be employed that will usually prevent the container 18 from being punctured by mischievous persons with pins, or the like.

It will be noted from the foregoing description that a simple extinguisher container may be provided of one bag structure with a simplified nozzle and cap and laid on a shelf within easy arm reach and the cover quickly pulled off by one hand and squeezing take place immediately.

It will be understood that various modifications and changes may be made in the preferred form of the invention herein, and such modification and changes are to be understood as part of this invention, as outlined in the following claims.

The invention claimed is:

1. In a fire extinguisher structure, the combination of a support, an extension attached thereto, a fire extinguisher double wall flexible container, a nozzle fastened in waterproof manner in an opening in said container, said nozzle having a part thereof engaging said extension for supporting said extinguisher, a waterproof cover for engagement with said nozzle, and an arm engaging said nozzle and extending part way down the side of said extinguisher for supporting said extinguisher after it has been removed from said support and for aiming the fire extinguishing liquid to a fire area as said extinguisher is flexed to force the fire extinguishing liquid through said nozzle.

2. In a fire extinguisher, a flexible container for holding fire extinguishing liquid, a nozzle for insertion in an opening in said container, an annular groove in said nozzle near the end thereof in said opening, a flexible element in said groove against which a part of said container is pressed to form leak-proof engagement therebetween, an encircling binder to hold said container material and said flexible element together, an enlargement on the outer surface of said nozzle above said groove arranged to receive a support extension, said nozzle having a passageway through the interior thereof for allowing said fire extinguishing liquid to pass from said extinguisher when pressure is applied to said container.

3. In a fire extinguisher, a flexible container for holding fire extinguishing liquid, a nozzle to be inserted in an opening in said container, an annular groove formed in said nozzle, a flexible base mounted in said groove and receiving in engagement therewith the flexible container material, and an encircling binder to hold said container material in leak-proof engagement with

8

said base, said nozzle having a passageway formed therein to allow the extinguishing liquid to pass therethrough to a fire.

4. In a fire extinguisher, the combination of a flexible container for holding fire extinguishing liquid, said container comprising an inner bag of material inert to said first extinguishing liquid and an outer bag of moisture-proof material that will receive and hold printing matter, said bags having their edges welded together in leak-proof fashion, a nozzle mounted in an opening in said container and fastened in leak-proof manner thereto, said nozzle having a bulged portion for receiving a support extension for holding said container in a storage position, said nozzle having a passageway formed therein to allow said extinguishing material to pass from said extinguisher to a fire.

5. In a fire extinguisher, the combination of a flexible container for holding fire extinguishing liquid, a nozzle assembled in an opening in said container in a leak-proof manner, said nozzle having an opening therein of a large diameter at the end near the liquid and at the exit end thereof and having a small diameter opening at a position between said large diameter openings, said nozzle also having an annular groove near the end which engages the flexible container material, a resilient base assembled in said groove, and a binding material for forcing said flexible material into leak-proof engagement with said resilient base.

6. In a fire extinguisher, the combination of a flexible container of supple nature for holding fire extinguishing liquid, a nozzle received in an opening in said container, an annular groove in said nozzle near the end receiving said flexible container material, a resilient base mounted in said groove, a binding means for forcing said flexible container material into leak-proof engagement with said base, said nozzle having an annular bead employed to support said container, said nozzle also having a passageway formed therein to permit the flow of said extinguishing liquid from said container, a cover assembled on said nozzle and closing said passageway in a leak-proof manner, a support, an extension from said support for engaging said bead on said nozzle for holding said extinguisher container in storage position, and a protecting sleeve held by said support in position around substantially all of said extinguisher container, said sleeve being spaced a considerable distance from said container.

7. In a fire extinguisher structure, the combination of a flexible container for holding fire extinguishing liquid, said container comprising an inner bag of polyvinyl alcohol and an outer bag of vinyl material, said bags being welded together to form a leak-proof container, a nozzle mounted in an opening in said container, a groove formed in one end of said nozzle that is inserted in said opening, a resilient base positioned in said nozzle, a binder engaging said flexible material opposite said base for forcing said material into leak-proof engagement with said base, a bead formed on the exterior of said nozzle at a point above said groove, said nozzle having a passageway formed therein to allow the extinguishing liquid to flow from said extinguisher, said passageway having large diameter openings at each end of the nozzle and a small diameter opening between said large diameters and having gradual tapering of said passageway to and from said small diameter opening, a cover assembled on said nozzle for closing said passageway in a leak-proof manner, an arm



9

extending from said cover, a support for holding  
said extinguisher container in storage position,  
an extension carried by said support and being  
of length to engage said annular bead on said  
nozzle, said arm engaging said extension in a  
manner to cooperate to force said cover from said  
nozzle when said extinguisher is pulled from said  
support, a top carried by said support, a base  
carried by said support, and a sleeve surrounding  
said container for protecting the same and being  
mounted between said top and said base.

CHARLES L. ZABRISKIE.

10

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,242,165	Fitzgerald	Oct. 9, 1917
1,361,752	Cross	Dec. 7, 1920
1,794,451	Dyson	Mar. 3, 1931
1,850,008	Gore	Mar. 15, 1932
2,222,267	Schnabel	Nov. 19, 1940

FOREIGN PATENTS

Number	Country	Date
200,872	Great Britain	July 18, 1923