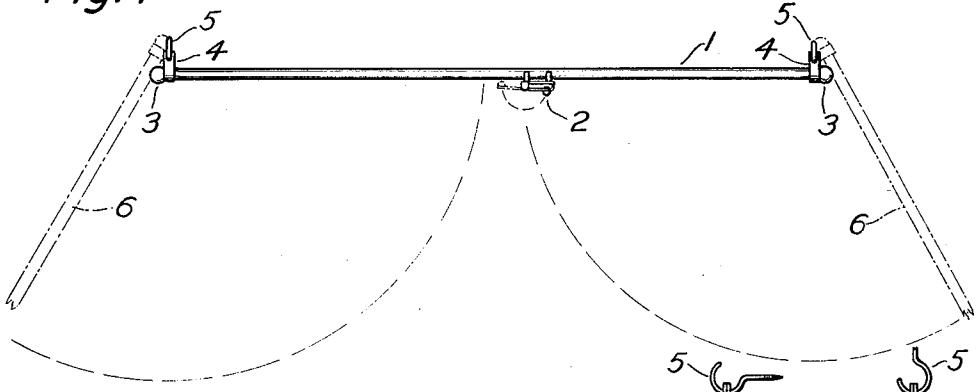
March 11, 1952 E. J. SWEETLAND 2,588,587

FIRE EXTINGUISHER

Filed Oct. 18, 1948

Fig. 1



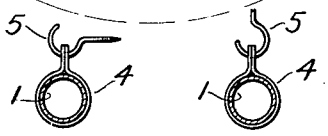


Fig. 2

Fig. 3

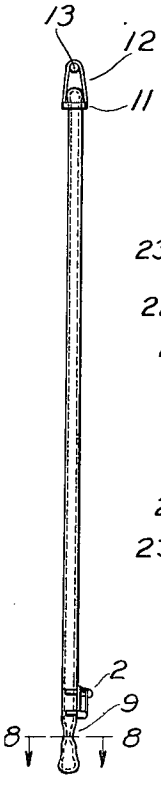


Fig. 4

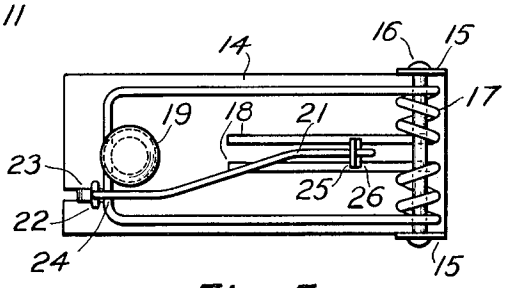


Fig. 5

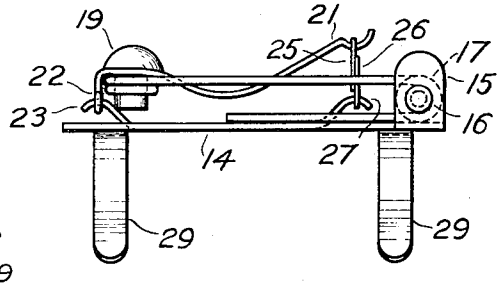


Fig. 6

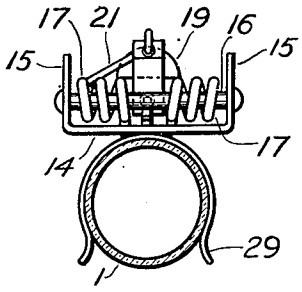


Fig. 7

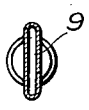


Fig. 8

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2,588,587

UNITED STATES PATENT OFFICE

2,588,587

FIRE EXTINGUISHER

Ernest J. Sweetland, Piedmont, Calif.; Nellie Sweetland, Ernest J. Sweetland, Jr., and American Trust Company executors of said Ernest J. Sweetland, deceased

Application October 18, 1948, Serial No. 55,210

6 Claims. (Cl. 169—26)

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This invention relates to fire extinguishers.

The object of the invention is to provide an elongated tubular container made of frangible material, such as glass, for a fire extinguishing fluid, with an adjustably fitted automatic breaker for breaking the container to release the extinguishing fluid when the temperature rises to a predetermined degree.

A further object is to provide an elongated frangible tube to contain a fire-extinguishing fluid with a pivotal mounting at each end of the tube, and an automatic breaker intermediate of the pivotal mountings in such manner that when fire occurs the extinguishing fluid is distributed over a considerable area by the oscillatory motion of the unbroken portions of the tube during discharge of the fluid.

A further object is to provide a self-contained breaker for glass tubing for the purpose described, which breaker is readily installed upon or removed from the tubing.

A further object is to provide glass tubing used as a container for fire-extinguishing fluid with a constricted opening which serves as a sprinkler nozzle, and which retards the discharge of fluid from the tube, and promotes distribution of the fluid while the tube is oscillating with a pendulum-like motion.

A further object is to provide a breaker for tubular fire extinguishers made of frangible material which is self contained and requires no attachment to the wall or ceiling, and requires no special bracket, since the breaker is attached to and carried by the tube itself.

A further object is to provide a breaker for frangible fire extinguisher tubes wherein a fusible link is employed under conditions which place a minimum amount of pull against the fusible link, which makes it possible to use a link of very small and inexpensive construction.

A still further object is to provide a breaker for frangible fire extinguisher tubes which permits the tube to be installed in vertical as well as horizontal position, and which permits of relatively wide distribution of the extinguisher fluid where such distribution is desired, but at the same time permits of the discharged contents of the tube being concentrated at a definite point. The latter use being applicable where there is particular fire risk concentrated in a relatively small area.

The following description and the appended drawings illustrate one form of my invention, but it should be understood that the invention is subject to various modifications, and that my

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apparatus is not limited by the specific means set forth herein for purposes of illustration, but only by the scope of the appended claims.

Referring to the appended drawings:

Fig. 1 represents a tubular fire extinguisher mounted in accordance with my invention to provide for distribution of fire-extinguisher fluid through an oscillating movement of parts of the fire extinguisher tube.

Fig. 2 shows means for pivotally attaching the ends of the extinguisher tube to a wall.

Fig. 3 shows means for pivotally attaching the ends of the tube to a ceiling.

Fig. 4 shows a vertical mounting for the extinguisher tube.

Fig. 5 is a plan view of the breaker mechanism drawn to a much larger scale than is shown in Figs. 1 and 4 in order to show the details of construction.

Fig. 6 is a side elevation of the breaker mechanism.

Fig. 7 shows an end view of the breaker.

Fig. 8 is a section along the lines 8—8 of Fig. 4.

Referring in detail to the drawings, the numeral 1 indicates a tube made of glass, or other frangible material, which is of considerable length as compared with the diameter. The length and diameter are not limited to any particular dimensions, but tubes from one inch to two inches in diameter and from four feet to eight feet in length are satisfactory sizes for ordinary installations. The wall thickness of the tube may vary from about $\frac{1}{32}$ inch in the tubes of small diameter up to two or three times that thickness in tubes of large diameter and length, depending upon the specific application. Any fire extinguishing fluid may be employed, but carbon tetra-chloride, with the addition of suitable reagents to reduce the freezing point, is an example of a material well suited to the purpose. While in the following specification and claims where the tube is referred to as being "filled" with fire extinguishing material, it should be understood that a few cubic inches of air or vapor space is always left in the tubes to form a cushion to provide for expansion of the fluid brought about by rise in temperature.

The breaker, which as a whole is designated by the numeral 2 in Fig. 1 is so mounted that the hammer strikes adjacent the center of the tube, thereby shattering it at about the middle when the temperature rises to the desired degree, but it should be understood that the breaker is slidable with reference to the tube and may be placed in any desired position along its length,

depending upon where it is desired to have the tube shattered. Obviously the point at which the tube is shattered influences the distribution of the fluid.

The tube is hermetically sealed at both ends, and in the process of sealing the ends are widened, as shown at 3. This prevents the supporting rings, 4, from slipping over the ends of the tube when it is shattered. The details of these supports are more clearly shown in Figs. 2 and 3. Fig. 2 shows the position of the hook, 5, when the tube is mounted upon a wall surface, and Fig. 3 shows the shank of the hook in vertical position for mounting the tube on a ceiling. The rings 4 are formed to the shape shown in Figs. 2 and 3, and the straight upper ends of the ring are preferably soldered or spot-welded together, and the rings are slipped over the end of the tube before the last end is sealed and enlarged.

Referring again to Fig. 1, it will be noted that when the breaker shatters the tube near the middle, the ends of the tube naturally swing to a position somewhat like that represented by the dotted lines 6. During their downward swing the unbroken portions of the tube start to discharge their contents, and continue to do so while the tube-ends oscillate in a pendulum-like manner until they come to rest in almost a vertical position. In this manner the fluid is distributed over an area which in length is considerably greater than the length of the original tube. Such distribution is highly desirable as it not only increases the chances of the fluid falling upon the area where it is most needed, but it also promotes rapid evaporation of the fluid. Rapid evaporation of the heavy volatile extinguisher fluid is desirable as through evaporation a blanket of heavy vapor is formed which excludes atmospheric oxygen and thereby aids in extinguishing the fire, even though the fluid itself does not come in direct contact with the material which is burning.

When the tube is mounted vertically, as shown in Fig. 4, there is no oscillation of the tube when broken. When installed in this manner the breaker is located near the lower end as shown, and in this case the fluid discharges rather slowly through the constricted nozzle 9, which is directly pointed toward the place where it is desired to discharge the fluid. Constrictions, such as shown at 9, may be made at any location in the tubes, if desired, to retard and distribute the discharge. This applies to tubes mounted horizontally as well as vertically.

In Fig. 4 the upper end of the tube is provided with a ring 11, which, by means of sling 12, supports the tube upon the pin 13.

Referring to Figs. 5, 6 and 7, the base plate 14 is provided with a pair of upstanding ears 15 which are either formed integral with the base plate, or secured by welding or otherwise. The rivet 16 is headed at its two extremities to hold it firmly in place after it has been passed through the helical spring member 17, the extremities of which rest against the base plate, as shown at 18. This spring is coiled around the shank of the rivet 19 in such a manner that the rivet is firmly held in the grip of the spring so that the rivet 19, which acts as a hammer to break the glass tube, is forcibly rotated to deliver a blow to the glass tube when the spring is released.

In the drawings the breaker is shown in cocked position and is held in that position by the lever 21. This lever has a ring 22 at its lower extremity which engages the hook 23 while the shank of the lever passes across a slight depression of the spring wire at the point 24.

25 and 26 represent the two parts of the fusible link which are soldered at their abutting surfaces with solder which has a melting point corresponding to the temperature at which it is desired to have the contents of the tube released. The portion 26 of the link has a perforation which is engaged by the hook 27, while a perforation in part 25 is engaged by the hook end of the lever 21.

It is well known that solders which have a low melting point will not hold under a great strain for a long period of time. It is therefore desirable that the strain on the soldered link be reduced to a minimum. This is accomplished in the present invention by the lever 21, which is arranged in such manner that even though the spring has a great force to drive the hammer 19, very little strength is required in the link.

The clips 29 are preferably of spring steel and are secured to the base plate 14 in any convenient manner. They grip the tube firmly and permit the breakers to be adjusted to any desired position by sliding them along the tube, or by rotating them about the axis of the tube.

Since the breaker is slidably mounted upon, and carried by the tube, it may be adjusted to any position along the length of the tube, which makes it possible to place the breaker in position, at the time of installation, for the most satisfactory distribution of the fluid for the location in which each particular tube is installed.

From the foregoing it will be understood that the adjustable breaker mechanism may be applied to any tubular container or container having a tubular portion, and that when the parts of the link 25 and 26 are released by fusion of the solder which holds them together, the force of the spring 17 drives the lever 21 upwardly and out of the way so that the hammer 19 is forcibly driven against the fragile container of the extinguisher fluid to break it and release the fluid.

Attention is directed to the advantages gained by providing a breaker which is adjustably attached to the tube, and is wholly carried by the same, thereby providing a self-contained fire-extinguishing unit which is portable and independent of wall brackets or other stationary mechanisms such as are commonly used in connection with automatic fire extinguishers. This feature provides a high degree of versatility in making installations, and makes it possible to install fire extinguishers in locations where there are extraordinary fire hazards, but which are entirely inaccessible for the installation of other types of extinguishers. For example, the tube and breaker illustrated in Fig. 4, either with or without the constriction 9, may be suspended between the studding of the walls of houses already built by lowering the suspended tube from above. Such installations are highly desirable, especially in cases where flues and electric wiring are located between the walls. The tubular container with its attached breaker also lends itself to installation between the joists of floors, above window draperies and other like locations where extinguishers of the types generally used are not suitable. A simple nail or clothes hook in a closet provides an adequate mounting for the tubular unit; or it may be placed horizontally upon any supporting surface.

It is also pointed out that fire extinguishers are widely used in rural homes and summer cot-

tages that are left unattended for long periods of time. The best of extinguishers heretofore provided mar the beauty of home decoration, and do not lend to concealment without impairing their efficacy. The present invention is almost invisible, and when installed to the best advantage, it is located near the angle where the wall and ceiling meet, and if it is colored to match the wall, is not noticeable at all; or, if not colored, the clear glass tube filled with colorless fluid reflects the surrounding colors, and, if seen at all, is pleasing rather than otherwise. Such an installation also provides the best distribution of fluid, and a higher degree of protection than grenades of the usual globe-shape, the content of which is localized over a single spot.

While I have illustrated the tube in Fig. 4 hanging in a vertical position, the same tube with the nozzle 9 may, with the use of the same ring 11 and sling 12, be installed in a horizontal position, with any suitable support to hold up the end opposite the sling. When so mounted, the tube, when fractured at the point 9, will swing with a long pendulum-like stroke to distribute the fluid over a wide area. The tube shown in Fig. 4 is so constructed that the glass is thinnest and the tube weakest at the point 9. It therefore lends itself well to manual use, and when it is so required, the user breaks off the lower end of the tube and discharges the contents by hand where required.

My invention affords an effective auxiliary to water sprinkler systems by installing the glass tubes, end to end, in parallel with the water system. In such an installation it is desirable to use fusible links associated with the glass tubes which melt at, say 160° F. while the sprinkler heads of the water system "let go" at, say 200° F. By this arrangement incipient fires may be put out by the volatile fluid without the water sprinklers being used at all. By this type of installation water damage may be avoided, yet the water sprinklers operate as usual, if needed.

I claim:

1. A fire extinguisher comprising an elongated frangible tubular container filled with a fire-extinguishing material; pivotal supports adjacent each end of said container to be fastened to a wall or ceiling to permit unrestricted oscillating movements of the end portions of said container when the intermediate portion of the container has been fractured; means to fracture said container comprising a base-structure; means to attach said base-structure to said tubular container; a hammer carried by said base-structure; spring means to actuate the hammer to break said container at a point intermediate of said supports; means to hold said hammer in cocked position against the force of the spring-actuating mechanism comprising a fusible link adapted to melt at a predetermined temperature to release said hammer to fracture the container and distribute the contents thereof by the oscillatory motions of the end sections of said container upon said pivotal supports.

2. A fire extinguisher comprising an elongated frangible tube containing a fire-extinguishing material; mountings at each end of said tube comprising pivotal means to be secured to a stationary surface to hold said tube in spaced relation to said surface to permit free lateral oscillatory motion to the end portions of said tube when the tube is fractured at a point intermediate of said supports; a breaker to fracture said tube fixed to and carried by said tube; said breaker comprising a hammer and a spring to drive said hammer with a forcible blow against the frangible tube; retaining means to hold said hammer in cocked position against the force of said spring including a fusible link adapted to melt and release said hammer at a predetermined temperature.

3. A fire extinguisher comprising an elongated tube containing fire extinguishing fluid; a pair of supporting members to circumferentially engage said tube adjacent the ends thereof; bearings in said supporting members to engage stationary pivotal supports; temperature responsive means to break said tube at a point intermediate of said supporting members to permit the unbroken ends of said tube to oscillate with a pendulum-like motion from said pivotal supports while the contents of said tube is being discharged.

4. A fire extinguisher comprising an elongated frangible tube containing fire extinguishing material and hermetically sealed at the ends; means to suspend said tube in a substantially horizontal position comprising a pivotal support at each end of said tube; a temperature-responsive element operable to part said tube in response to a rise in temperature into two distinct tubular parts each of which is free to swing freely from one of said pivotal supports with a pendulum-like motion when said tube is parted, to allow the fire extinguishing material to be discharged freely from the open ends of said tubes.

5. The fire extinguisher described in claim 4 wherein said temperature-responsive element is slidable upon said tube to vary the length of the pendulous sections into which the tube is broken.

6. A fire extinguisher comprising: an elongated tube containing fire extinguishing material; means mounted on both ends of said tube for effecting pivotal connections between said ends and a supporting structure; and a thermo-responsive breaker mounted intermediate the ends of said tube whereby upon the operation of said breaker said tube will be broken into two sections, each section being then free to swing about its articular connection.

ERNEST J. SWEETLAND.

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