

[54] **SAFETY FEATURE FOR FIRE EXTINGUISHERS**
 [72] Inventor: **Roger Q. Estes**, C/O Shelledy 319 Peyton Bldg., Spokane, Wash. 99201
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Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—Thomas C. Culp, Jr.
Attorney—Wells, St. John & Roberts

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 [51] Int. Cl.A62c 13/00
 [58] Field of Search.....169/30, 31 R; 239/309; 292/307 R, 316, 326; 102/64, 65, 65.2, 65.4

[57] **ABSTRACT**

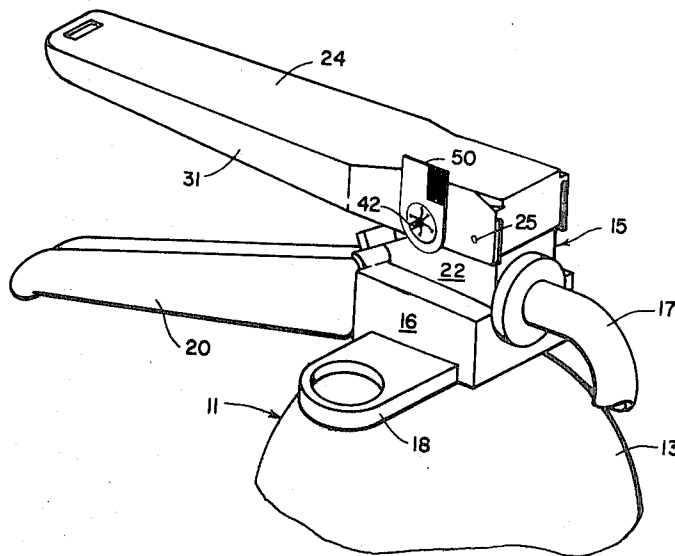
A safety feature is described for preventing the inadvertent operation of a fire extinguisher during normal handling but which will enable the fire extinguisher to be operated when desired. The safety feature includes a pull pin that is made of a frangible material that has sufficient shear strength characteristics to withstand normal handling forces but which will break when forces are applied commensurate with the intentional operation of the extinguisher. A frangible seal means is mounted on the end of the pull pin to prevent the pin from being pulled without first breaking the seal means.

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9 Claims, 7 Drawing Figures



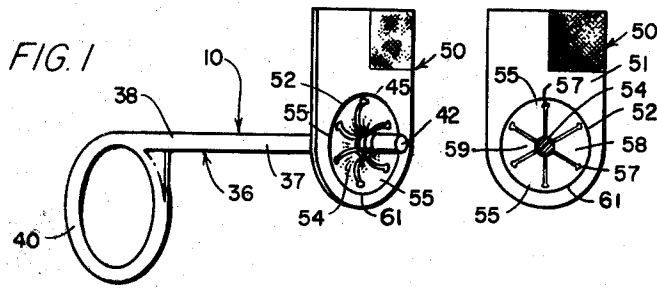


FIG. 2

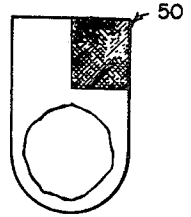


FIG. 3

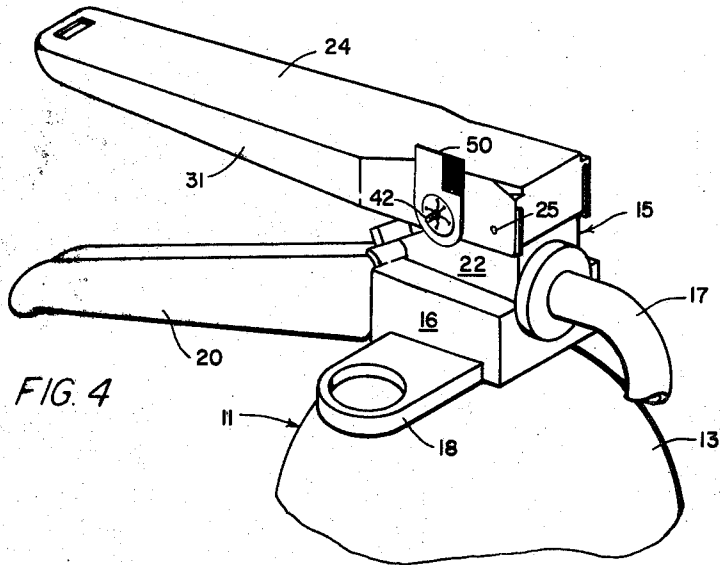


FIG. 4

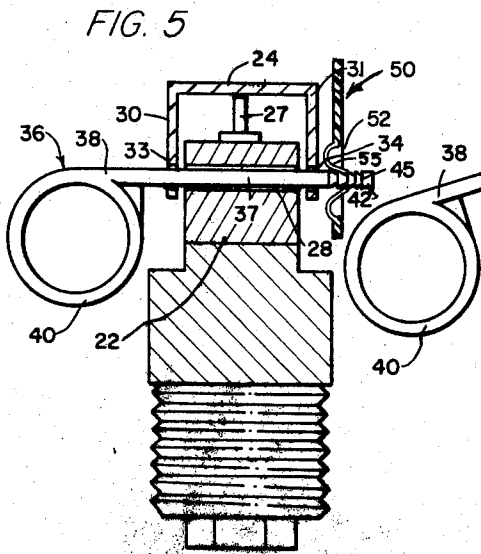


FIG. 6

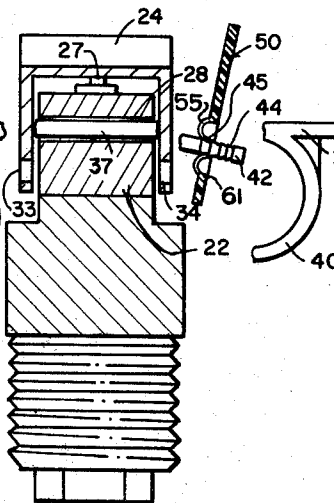
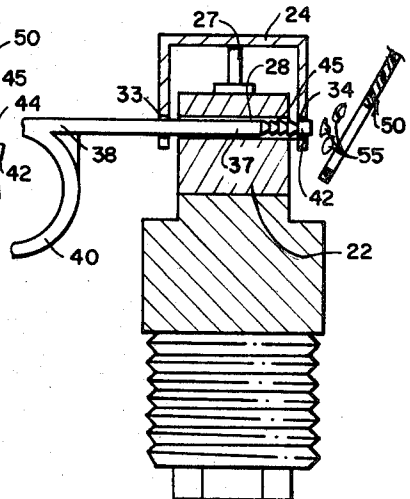


FIG. 7



SAFETY FEATURE FOR FIRE EXTINGUISHERS

BACKGROUND OF THE INVENTION

This invention relates to safety features for fire extinguishers to prevent the inadvertent discharge of the fire extinguishing material.

Most commercially available manually operated fire extinguishers are required to have safety features for preventing inadvertent operation of the extinguisher. Such fire extinguishers generally have a container for storing a fire extinguishing material under pressure and a discharge valve that is lever actuated for discharging the fire extinguishing material from the container. The universally commercially acceptable means of preventing inadvertent operation of the lever is to provide a pull pin that extends through apertures in the lever to prevent the movement of the lever. Many state and municipal codes require an additional feature of a seal means of some sort to indicate whether or not the fire extinguisher has been tampered with or previously used. The seal means generally constitutes a wire, strung through the pin apertures, with a leaded seal interconnecting the ends. The wire is broken when the pin is pulled and the lever depressed.

Although the traditional pull pin and wire and leaded seal combination have been widely accepted, such acceptance has not been without many problems.

During a fire, people become frightened and often do not react in a rational manner. It is not unusual for a person to attempt to operate the fire extinguisher without first pulling the safety pin. When the extinguisher does not operate when moderate force is applied, the person will panic and apply additional force on the lever to bend the pin so that it cannot be removed thereby rendering the fire extinguisher inoperative. Manufacturers of fire extinguishers have been subjected to a good number of lawsuits dealing with the failure of the fire extinguisher to operate when manual pressure is applied to the operating mechanism. Frequently the handle and pin are so badly bent that the fire extinguisher has to be repaired before it can be reused. Although the safety pin serves the purpose of preventing inadvertent operation of the fire extinguisher, it also presents a substantial obstacle to the intentional operation of the extinguisher under stress.

Furthermore, application of the wire and leaded seal to the fire extinguisher is a laborious task which adds substantial maintenance cost to the party designated with the responsibility of maintaining the fire extinguishers. Some state and municipal statutes and ordinances require that the extinguishers be tested periodically with the seals replaced.

One of the principal objects of this invention is to provide a new safety feature for fire extinguishers that will overcome the above mentioned problems.

An additional object of this invention is to provide a safety pin that will serve the purpose of preventing inadvertent operation of the fire extinguisher during normal handling and which will also enable the intentional operation of the fire extinguisher even though the pin is not pulled.

A further object of this invention is to provide a combination safety pin and seal means that is very easy to install and maintain and thereby greatly reduce the maintenance cost involved in maintaining and periodically testing the fire extinguishers.

An additional object of this invention is to provide a safety feature including a safety pin and seal means that are interconnectable in an interlocking fashion to prevent the pin from being removed without breaking the seal means.

A further object of this invention is to provide a safety feature including a pull pin and seal means that can be readily manufactured and easily installed in a fire extinguisher.

These and other objects and advantages of this invention will become apparent upon the reading of the following detailed description of a preferred embodiment.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of this invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of a safety feature for a fire extinguisher embodying the principal features of this invention in which the figure shows a safety pin with a seal mounted on one end thereof;

FIG. 2 is a vertical cross-sectional view radially through the pin showing the seal mounted on the end of the pin;

FIG. 3 is an isolated face view of the seal showing the pin removed with a portion of the seal broken;

FIG. 4 is a perspective view of the upper section of a fire extinguisher showing the safety feature mounted on the fire extinguisher;

FIG. 5 is a vertical cross-sectional view taken along line 5-5 in FIG. 4 showing a pin inserted into the upper end of the fire extinguisher with the seal mounted on the end of the pin;

FIG. 6 is a vertical cross-sectional view similar to FIG. 5 except showing manual operation of the fire extinguisher in which the pin is broken to enable the fire extinguisher to be operated; and

FIG. 7 is a vertical cross-sectional view similar to FIG. 5 except showing the seal being broken away from the end of the pin.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

This invention concerns a safety feature 10 shown in FIG. 1 that is used on manually operated fire extinguishers such as the one shown in FIG. 4. The fire extinguisher is generally designated by the numeral 11. The manually operated fire extinguisher 11 of the type shown has a container or bottle 13 for storing the fire extinguishing material under pressure. The container has an open upper end that is enclosed by a head assembly 15. The head assembly 15 has a discharge valve 16 through which the fire extinguishing material is discharged. A nozzle 17 is attached to the discharge valve 16 for spraying or directing the fire extinguishing material outward from the container. Often such a head assembly 15 has a mounting bracket 18 for enabling the fire extinguisher to be readily mounted on a wall or post. The head assembly 15 has a handle 20 that extends outward from the head assembly for facilitating easy handling of the fire extinguisher. The head assembly 15 has a boss 22 formed thereon for supporting a pivotally mounted lever 24. The lever 24 is pivotally mounted to the boss 22 by a pin or shaft 25 extending through the lever and boss adjacent the forward end of the lever. The outer end of the lever 24 extends outward overlying the handle 20 to enable the operator of the fire extinguisher to grip the handle and lever in one hand and press downward on the lever 24 to actuate the discharge valve 16. The discharge valve 16 has a plunger 27 (FIGS. 5-7) that extends upward engaging the lever 24.

To receive the safety feature, an aperture 28 is formed in the boss 22 substantially parallel with the pivot shaft 25. The lever 24 has sides 30 and 31 that extend downward alongside the boss 22 adjacent the ends of the aperture 28. Corresponding apertures 33 and 34 are formed in the sides 30 and 31 respectively and are aligned with the aperture 28 when the lever is in the inoperative position.

The safety feature 10 includes a frangible safety pin 36 that is mountable in the apertures 28, 33 and 34. The frangible safety pin 36 has a shaft 37 of a selected diameter that extends through the apertures 28, 33 and 34. The frangible safety pin has an end 38 that extends outward to one side with a ring 40 formed thereon to constitute a gripping means to facilitate the easy removal of the pin from the head assembly. The frangible safety pin 36 has another end 42 that extends outward on the other side of the head assembly for receiving a seal means 50. The end 42 has a series of recessed notches 44 successively formed on the end to form a plurality of axially spaced shoulders 45 that have surfaces that extend perpendicular to the axis of the shaft 37.

The frangible safety pin 36 is constructed of a rather rigid material that has sufficient shear strength to prevent the lever from shearing the pin 36 between the apertures 28, 33 and 34 under normal handling conditions but which will break when

sufficient forces are applied to the lever that are normal during the intentional actuation of the extinguisher. The pin 36 will break before it will bend.

The frangible safety pin 36 may be made of a reinforced thermoplastic material such as nylon, styrene-acrylonitrile, polycarbonate, acetal, polypropylene, acrylonitrile-butadiene-styrene or of a frangible metal material.

The safety feature 10 also includes a seal means 50 that is mountable on the end 42 to prevent the pin 36 from being removed from the fire extinguisher without breaking the seal means. The seal means 50 has a substantially flat body 51 with a frangible section 52 formed therein offset from the center of gravity of the body. The frangible section has a central aperture 54 formed therein and in which the aperture has a normal unbiased diameter that is slightly less than the diameter of the end 42. The central aperture 54 is surrounded and defined by a plurality of radially extending prongs 55 (FIG. 1 and 2) that are formed in the frangible section 52. The radial prongs 55 are formed by intermediate radial slots 57 that extend radially outward from the central aperture 54.

Each of the prongs 55 is rather pie-shaped with the tip removed to form a sector of the central aperture 54. Each of the radial prongs 55 has a base 58 with an end 59. Between the base 58 and the end 59 the prongs are curved in radial cross-section to provide a resilient characteristic to the prongs when deflected by the insertion of the end 42 into aperture 54 and to provide a rather rigid characteristic to the prongs when the end 42 is subsequently pulled from the aperture 54. The prongs 55 starting at the base 58 curve in a "C" or "U" shape with the curve terminating at the end 59. A stress groove 61 is formed in each of the radial prongs 55 near the base 58 to weaken the prongs at a maximum stress location. The seal means 50 may be made of a desired material such as plastic or glass material that is frangible.

To install the safety feature 10 to the fire extinguisher, the pin 36 is first inserted through the apertures 28, 33 and 34 with the end 42 extending outward to one side of the lever 24. The seal means is then inserted onto the end 42. Since the undeflected diameter of the aperture 52 is less than the diameter of the end 42, the prongs 55 deflect or bend slightly tending to close the curve of the prongs to open up the aperture 54 to receive the end 42. The seal means is pushed onto the end 42 until the prongs ends 59 reside in one of the notches 44 with the ends 59 directed axially toward the end 42 engaging a perpendicular surface of one of the shoulders 45.

The slight resilient nature of the prongs 55, when deflected causes the seal means to firmly engage the pin to prevent the seal means from rotating about the end 42. The prongs 55 form a one-way axial interlock with the notches 44 to prevent the removal of the safety means, once it is installed, without first breaking the prongs. When the pin 36 is gripped by the ring 40 and pulled as shown in FIG. 7, a substantial force is exerted on the prongs 55 attempting to bend the prongs in the opposite axial direction. Such a force causes the prongs 55 to break off along the grooves 61 (FIGS. 3 and 7).

Should a fire occur and an excited person grab the fire extinguisher and apply a normal gripping force to the lever 24, the lever sides 30 and 31 will shear the pin between the apertures 33, 34 and 28 as shown in FIG. 6. However, if the person operating the fire extinguisher is more familiar with the fire extinguisher, he may first pull the pin 7 from the fire extinguisher causing the end 42 to move inward to bear the seal body 51 against the side 30. Additional movement of the pin 36 causes the end 42 to shatter and break one or more of the radial prongs 55 to release the seal means from the end.

An additional feature of this invention is the capability of the seal means when mounted on the end 42 to have a portion of the body 51 extend upward above the lever as shown in FIG. 4 so that an inspector can readily see that the fire extinguisher is in tact and has not been tampered with or previously used. If the seal is broken, but still remaining on end 42 the seal will rotate so that no portion of the body 51 will extend above the lever. Thus, the inspector can notice at a glance

whether or not further inspection of the fire extinguisher is needed.

One side of the body 51 has a mat finish to accept printed or written matter thereon. Normally the inspection date or dates would be written on the side having the mat finish to enable one to read when the fire extinguisher was last or previously inspected.

It should be understood that the above described embodiment is simply illustrative of the principles of this invention and that numerous other embodiments may be readily devised by those skilled in the art without deviating from the principles thereof. Therefore, only the following claims are intended to define this invention.

What is claimed is:

1. A safety feature for a fire extinguisher having a container to store fire extinguishing materials therein and a head assembly closing the container, in which the head assembly has a discharge valve with means to manually actuate the valve to release the fire extinguishing material, said safety feature comprising:

a removable pull pin for extending through the head assembly to prevent the inadvertent actuation of the discharge valve, said pull pin having two ends;

a frangible seal means for affixably mounting on one end to prevent the pull pin from being removed from the head assembly without breaking the seal means to visibly display whether or not the pull pin has been previously removed; and

gripping means associated with the other end to facilitate the manual removal of the pin and the breaking of the seal means prior to intentional actuation of the discharge valve.

2. The safety feature as defined in claim 1 wherein the seal means is insertable onto the one end and wherein the one end and the seal means have cooperating interlocking means to prevent the seal means from being removed once the seal means is inserted onto the one end without first breaking the seal means.

3. The safety feature as defined in claim 2 wherein the interlocking means includes a shoulder formed on the one end and wherein the seal means has means for engaging the shoulder once the seal means is inserted on the one end to prevent the seal means from being removed without first breaking the seal means.

4. The safety feature as defined in claim 2 wherein the interlocking means includes a recessed notch formed in the one end to define a shoulder and wherein the seal means has a plurality of frangible radial prongs surrounding an aperture that has a normal diameter less than the diameter of the one end in which the prongs may be deflected slightly by the one end to enlarge the aperture to receive the one end to enable the seal means to be inserted onto the one end with the prongs deflected and engaging the shoulders to prevent the removal of the seal means without first breaking at least one of the prongs.

5. The safety feature as defined in claim 4 wherein the radial prongs are made of thin plastic material that may be slightly bent in one axial direction to receive the one pin end and which is sufficiently fragile to break when the one pin end is moved in the other axial direction with respect to the seal means.

6. The safety feature as defined in claim 5 wherein each radial prong has a stress groove formed therein to facilitate breakage of the prong when the one pin end is moved in the other axial direction with respect to the seal means.

7. A safety feature for a fire extinguisher having a container to store fire extinguishing material therein, a head assembly closing the container, in which the head assembly has a discharge valve and a boss with a lever pivotally mounted thereon for actuating the discharge valve, in which the lever and boss have apertures formed therein that are aligned when the fire extinguisher is not in use, said safety feature comprising:

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a removable safety pin for extending through the boss and lever apertures to prevent the inadvertent actuation of the valve by the lever during normal handling, in which the safety pin is made of a frangible plastic material having sufficient shear strength characteristics to withstand normal handling yet being capable of shearing between the apertures in response to the intentional manual operation of the lever to enable the discharge valve to be intentionally actuated even though the safety pin is not removed.

8. The safety feature as defined in claim 7 wherein the removable safety pin has two ends extending from the head as-

sembly in which gripping means is associated with one and to facilitate the manual removal of the safety pin and a frangible seal means mountable on the other end which is broken when the safety pin is removed from the head assembly.

9. The safety feature as defined in claim 8 wherein the safety pin has a recessed notch formed in the other end to interlock with a frangible prong of the seal means when the seal means is mounted on the other end to prevent the seal means from being removed from the pin without breaking the frangible prong.

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