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VISUAL INDICATORS

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2 Sheets-Sheet 1

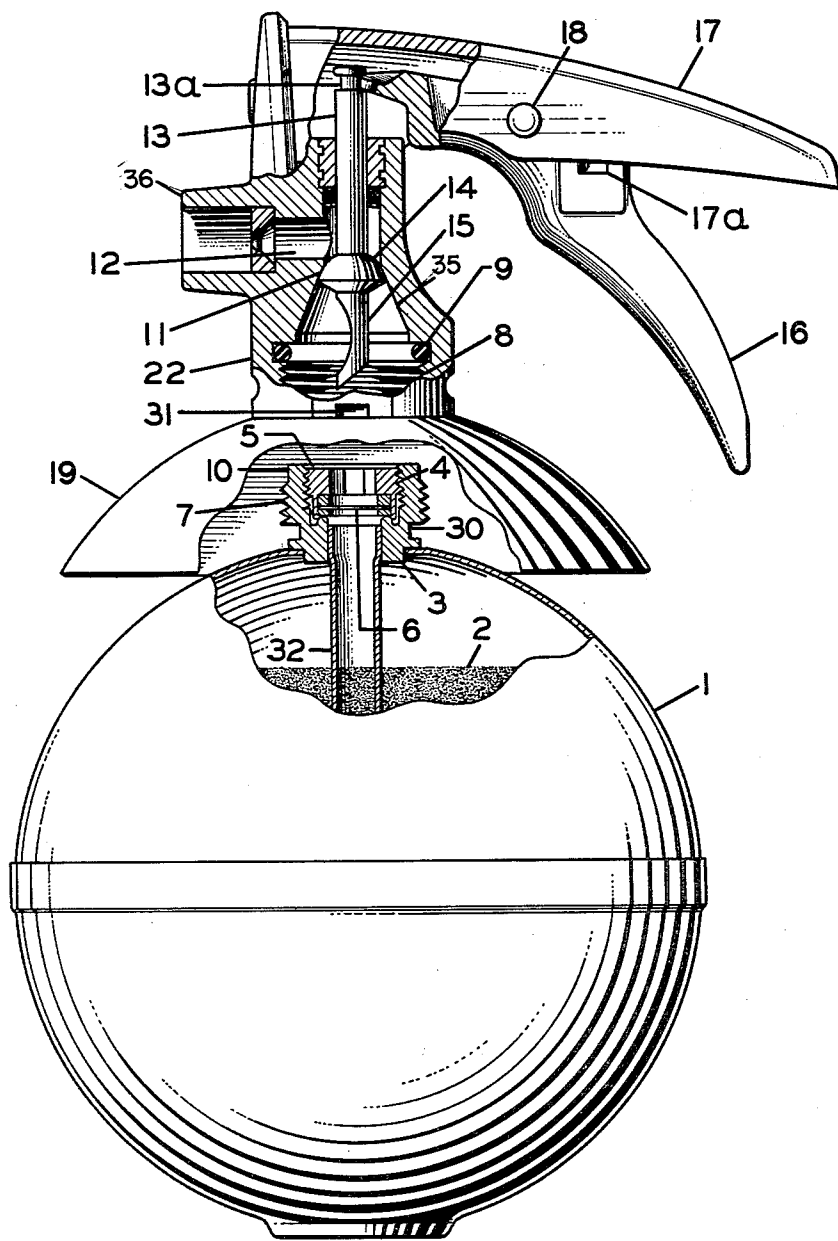


FIG. 1

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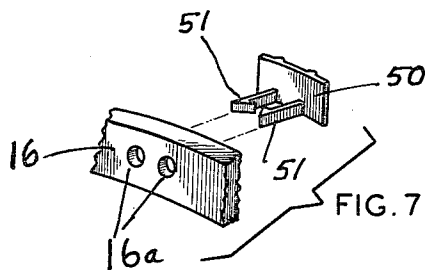
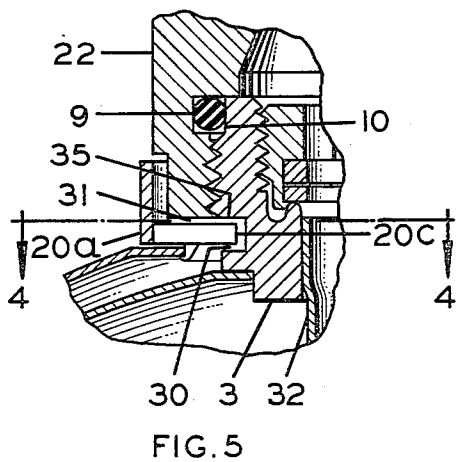
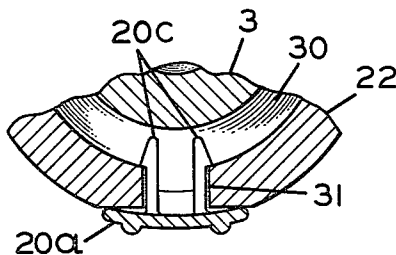
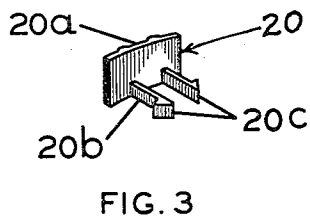
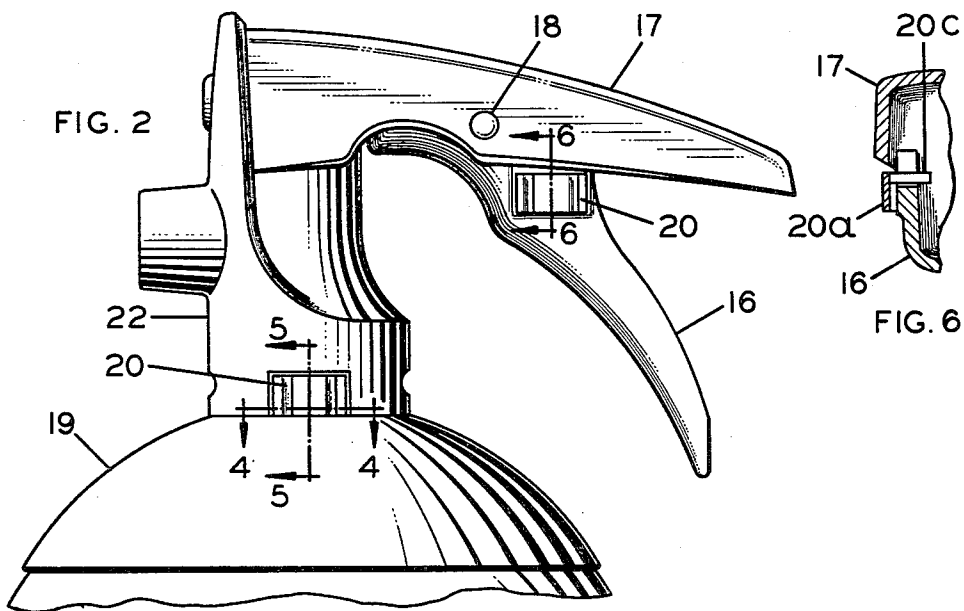
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2 Sheets-Sheet 2



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3 Claims. (Cl. 116-114)

This invention relates to indicators and gauges, and more particularly to indicators which show visually whether parts are properly aligned and have been maintained in that alignment.

It is a requirement of Underwriters' Laboratories and most users prefer that fire extinguishers be fitted with a device which indicates whether the extinguisher has been discharged or tampered with. It is an object of this invention to furnish such indicators. It is a further object of this invention to furnish an indicator which may be installed with a minimum use of tools. It is a still further object of this invention to provide a device to indicate the proper assembly of parts of the correct dimensions.

Other objects of my invention will be obvious from the following description and accompanying drawings, wherein

FIGURE 1 is an overall view of a fire extinguisher, shown partially disassembled and partially sectioned,

FIGURE 2 is an overall view of a fire extinguisher head assembly with the indicators in place,

FIGURE 3 is a perspective view of the replaceable frangible indicator,

FIGURE 4 is an enlarged horizontal section taken on lines 4-4 of FIGURE 2 through an installed indicator,

FIGURE 5 is an enlarged vertical section taken on lines 5-5 of FIGURE 2 through an installed indicator,

FIGURE 6 is a vertical sectional view taken on lines 6-6 of FIGURE 2, and

FIGURE 7 is a perspective view of an alternate structure for an indicator.

Referring to the drawings, FIGURE 1 discloses a fire extinguisher comprised of two major parts, a shell 1 containing the dry chemical agent 2, sealed under sufficient pressure to discharge it, and a removable head assembly indicated generally by the numeral 36 to control and direct the discharge. The pressurized shell is fitted with a collar 3 having internal threads 4 which engage the seal assembly 5 to position a frangible disc 6 which retains the pressure within the extinguishing agent-containing shell 1.

The head casting 22 contains an axial bore 35, a portion of which forms valve seat 11, communicating with a discharge passageway 12. An axially movable shaft 13 is fitted at its lower end with a sealing plug 14 and a puncture pin 15. The shaft is engaged at its upper end 13a by a trigger 16 pivotally mounted in a handle 17 by a rivet 18. A nameplate 19 with a contour matching the shell 1 is mounted on the lower portion of the head casting 22. The trigger 16 is provided with a rectangular opening 17a for receiving therein a frangible indicator 20.

When the extinguisher is prepared for use, the shell assembly is threaded into the head assembly by engaging the external threads 7 on the collar 3 with the internal threads 8 on the head as shown in FIGURE 5. When assembled the O ring 9 seats against the surface 10 on the collar providing a pressure tight seal. When these parts are properly assembled, the groove 30 in the collar will register with the rectangular slot 31 in the head assembly, as shown in FIGURE 5. Squeezing the trigger 16 causes the shaft 13 to descend thus forcing the puncture pin 15 to pierce the frangible disc 6 enabling the extinguishing agent 2 under pressure in the shell 1 to pass

up the pickup tube 32 and be discharged through the passageway 12. However, if the shell assembly is not threaded into the head assembly far enough, the gasket 9 will not seal against the seat 10 properly and the puncture pin 15 cannot completely pierce the frangible disc 6. Faulty operation will result from either cause. However, if these parts are not manufactured or assembled so that satisfactory operation will result, groove 30 will not be in register with slot 31 and it will be impossible to insert a frangible indicator of the type illustrated in FIGURE 3.

The frangible indicator 20 consists of a body portion 20a and two arms 20b extending at right angles from said body portion, the terminal ends of the arms having the shape of outwardly facing hooks 20c, the barbs of which lie in the same plane as both of the arms. In use, the indicator is inserted into a slot so dimensioned that the arms are deflected towards each other during insertion and when the indicator is fully inserted, the arms return to their original position, the hook portion engaging the rear of the slot. The physical properties of the material from which the indicator is made are such that attempts to withdraw the indicator will fracture the arms, thereby causing the body portion 20a to drop off and by its absence reveals tampering.

The indicator 20 shown in FIGURE 3 is made from a relatively low strength, relatively brittle or frangible material. A preferred material is a methacrylate plastic although polystyrene or low tensile strength brittle metal might also be used. Since, in the act of insertion of the indicator, the arms are deflected toward each other, the design may be modified to impart more or less flexibility for deformation in this plane. However, the shear forces operate in a plane parallel to the indicator body, thus, since the forces at play during insertion of the indicator operate at right angles to those encountered during shearing operation, the design of the indicator may be modified to take advantage of structural materials available.

An added advantage of the methacrylate material is that when an indicator is broken, the parts tend to separate with some force. This causes the broken parts to be noticeably displaced from their original position. In contrast, when an indicator made from polystyrene, for example, is fractured, the fractured parts occasionally tend to remain in nearly the original position, giving a potentially erroneous indication of safety.

The indicator described above may also be produced with a very close dimensional tolerance which permits the indicator not only to reveal proper assembly of the parts but also, in some cases, affords an opportunity to check the dimensional accuracy of the parts assembled.

FIGURE 2 illustrates the assembled extinguisher with the indicator 20 inserted in the slot in the head. This assembly is shown in greater detail, in sections, in FIGURES 4 and 5. As shown in FIGURE 4, once the indicator has been inserted in the slot 31, the hooks 20c engage the inner edge of the slot in the head casting to prevent removal of the indicator. Unless the parts are properly assembled, as shown in the detailed section in FIGURE 5, the indicator cannot be inserted. If having been assembled and the indicator inserted, the collar should begin to disengage from the head assembly by unscrewing, one-quarter turn of disengagement is sufficient to cause the surface 35 of the collar to bear on the hooks 20c and any further disengagement causes the hooks to shear off and the indicator to drop out, indicating an unsafe condition.

Because the indicator 20 can be manufactured to very close dimensional tolerances, it is possible to determine the location of the surface 35 relative to the edges of the slot 31 within very narrow range or limits. However, this indicator 20 by itself is not sufficient to show the

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extinguisher as in a safe or ready condition, since it may have been discharged without disturbing the indicator. A second frangible indicator 20 is therefore installed in opening 17a of trigger 16, as shown in FIGURES 1 and 6, to indicate movement of the trigger 16 relative to the handle 17. When the trigger 16 is moved upwardly the lower edge of handle 17 will bear on hook arms 20b of the indicator and shear them off causing the indicator body 20a to drop off.

FIGURE 7 illustrates an alternate type of construction for an indicator 50, the opposed hooks 51 facing inward. This type of indicator is adapted to be inserted in a pair of holes 16a, provided on trigger 16, as shown in FIGURE 7, the hooks engaging the material remaining between them.

From the foregoing description, it will be apparent that a variety of different constructions may be utilized in practicing the present invention. It is to be understood that the foregoing specific constructions should be considered merely as illustrative embodiments of the present invention and that modifications and changes may be made which are intended to be included within the scope of the appended claims.

I claim:

1. A frangible indicator to disclose the position of one element movable relative to another element, one of said elements having at least one opening whose limits are defined by edges, said indicator having a body portion, two substantially parallel arms extending from said body portion, oppositely facing barbs on the terminal ends of said arms, the barbs adapted to engage the edges of said opening cooperatively to retain the indicating element substantially immovably in indicating position.

2. A fire extinguisher comprising a fixed element and an element movable relative to said fixed element, a frangible indicator retained in one of said elements, said frangible indicator comprising a body portion and a plurality of frangible arms extending from said body portion, said frangible indicator being received and retained in an opening provided in one of said elements, said frangible arms being positioned in the path of movement of said movable element whereby movement of said movable element relative to said fixed element will fracture said frangible arms and permit the body portion of said indicator to fall out from said opening.

3. A fire extinguisher including a fixed element and an element movable relative to said fixed element, a frangible indicator retained in one of said elements, said frangible indicator comprising a body portion and at least two frangible arms extending from one edge of said body portion, said frangible indicator being received and retained in an opening provided in one of said elements, and said frangible arms being positioned in the path of movement of said movable element so that movement of said movable element relative to said fixed element will fracture said frangible arms and permit the body portion of said indicator to fall out from said opening.

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