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2,159,168

FIRE EXTINGUISHER

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Fig. 1.

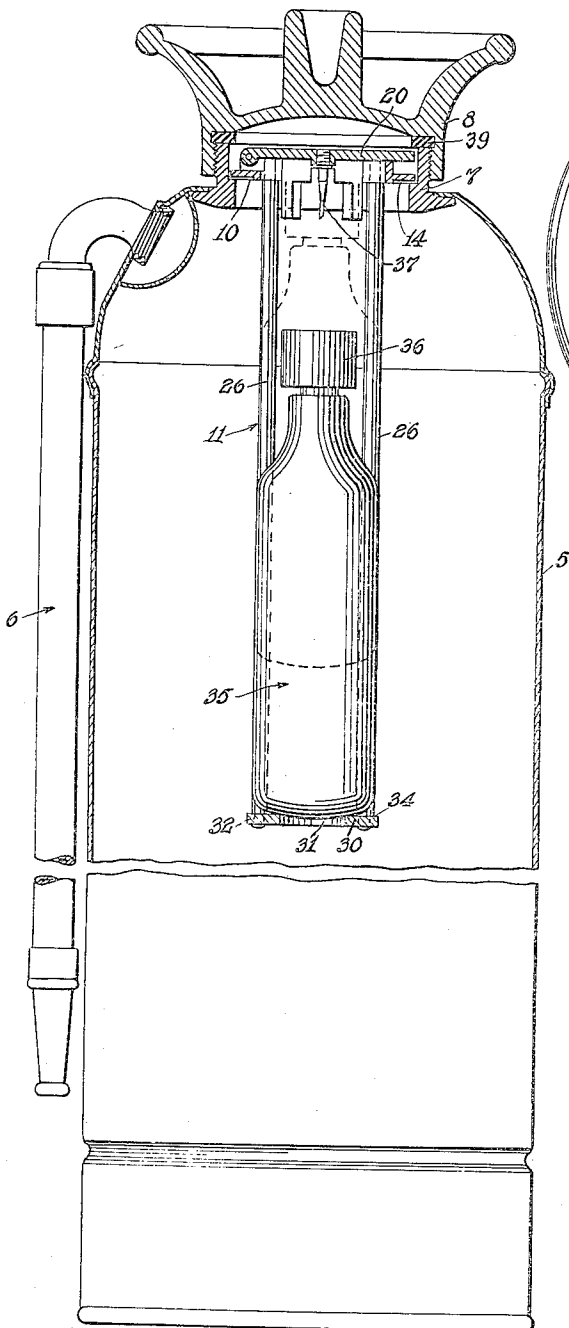


Fig. 2.

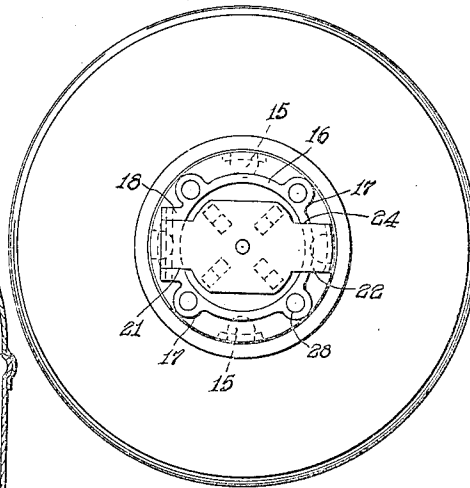


Fig. 3.

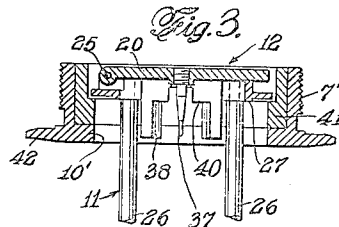
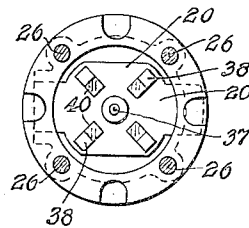


Fig. 4.



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FIRE EXTINGUISHER

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3 Claims. (Cl. 169—31)

This invention relates to fire extinguishers, and is herein illustrated in connection with a fire extinguisher of the type wherein the fire extinguishing liquid is forcibly expelled under the action of a pressure-generating medium, such as carbon dioxide, normally contained within a sealed cartridge supported within the extinguisher by a cartridge-retaining cage and adapted to be punctured incident to inversion of the extinguished so as to render the contents of the cartridge available for use as a pressure-generating medium.

An important object of the present invention is to provide a generally improved combined cartridge-retaining cage and cartridge puncturing means which is simple in construction and reliable in use.

The present invention has the advantages, among others, that it permits the easy conversion of well known fire extinguishers of the soda and acid type into extinguishers characterized by the fact that the extinguishing liquid is expelled by a pressure-generating medium, such as carbon dioxide contained within a cartridge having a seal which must be punctured when the fire extinguisher is used. To make the conversion just mentioned it is merely necessary to remove the ordinary cage and acid bottle, and to insert instead the combined cage and puncturing means (containing the carbon dioxide cartridge) which embodies the present invention. By mounting the cartridge-piercer in a pivotally-supported hinge plate at the top of the cage, the danger that the cartridge-piercer will be bent by careless handling of the extinguisher elements during assembly and re-assembly after charging is reduced to a minimum.

Other objects and advantages of the invention will become apparent from the following description when taken in connection with the accompanying drawing, in which—

Fig. 1 is a fragmental view showing, partly in section and partly in elevation, a fire extinguisher equipped with the present invention; Fig. 2 is a plan view of the extinguisher with the closure cap removed; Fig. 3 is a sectional view of a fire extinguisher collar, which is somewhat modified with respect to the collar of Fig. 1 and with which is associated an adapter ring on which the cartridge-retaining cage is supported, and Fig. 4 is a bottom view of the head or flange unit of the cartridge-retaining cage.

For the purpose of illustration and convenience in description, a commercial form of fire extinguisher is herein shown as comprising a container

5, adapted for the reception of a fire extinguishing liquid to be forcibly expelled therefrom by way of a suitable hose and nozzle unit 6. The container 5 is equipped at its upper end with an externally screw-threaded collar 7, which affords a filling opening for the extinguisher. The collar 7 is adapted to receive a conventional form of removable closure cap 8 and is provided interiorly with an annular seat or ledge 10 adapted to support a cartridge-retaining cage 11 either directly, as shown in Fig. 1, or indirectly, as shown in Fig. 3.

The cartridge-retaining cage 11 comprises a head or flange unit 12, which includes an annular plate 14, adapted, as shown in Fig. 1, to rest on and be supported by the ledge 10. In order to retain the cage 11 against rotation when it is positioned, as shown in Fig. 1, the annular plate 14 is provided on its lower face with a plurality of recesses 15 adapted to receive a plurality of complementary lug-like protuberances (not shown) formed on the ledge 10 and extending upwardly therefrom.

As shown most clearly in Figs. 1 to 3, the annular plate 14 is provided adjacent its central opening with an upwardly extending flange 16, formed at equi-distantly spaced points along its perimeter with a plurality of radially disposed lug-like protuberances 17 which extend outwardly to the perimeter of the annular plate and upwardly to the plane of the upper face of said flange. As shown most clearly in Fig. 2, the upwardly extending flange 16 terminates at its opposite ends in a pair of lug-like ears 18, which are disposed in a parallel and spaced relation and to which is connected a hinge plate 20. The hinge plate 20 is formed with diametrically opposed lip-like extensions 21 and 22, the former of which is accommodated intermediate the lug-like ears 18 and the latter of which is adapted to be accommodated within a notch-like recess 24 formed in the upwardly extending flange 16. It is to be observed that the lip-like extension 22 is of such length that it projects outwardly well beyond the flange 16, when the hinge plate 20 is closed, so as to insure the hinge plate against undue pivotal displacement as will hereinafter more clearly appear. The lug-like ears 18 and the lip-like extension 21 constitute elements of a hinge connection between the upwardly extending flange 16 and the hinge plate 20, which connection includes a hinge pin 25 carried by the lip-like extension and pivotally supported in the lug-like ears. As shown most clearly in Figs. 1 and 3, the hinge pin 25 is so located and the notch

24 is of such depth that the hinge plate, when closed, lies flush with the upper face of the upwardly extending flange 16 which is in turn flush with its associated protuberances 17.

5 Secured to the head or plate unit 12 at equidistantly spaced points, are a plurality of cage-forming rods 26 which are grouped about the axis of the upwardly extending flange 16 in a parallel relation to such axis. Preferably the upper
10 ends of the cage-forming rods 26 are reduced in diameter, as shown most clearly in Figs. 1 and 3, thus providing shoulders 27 which abut the lower face of the annular plate 14 when, incident to assembling the cage 11, the reduced ends of the rods are inserted in a plurality of rod-receiving
15 openings 28 formed in the lug-like protuberances 17. The reduced ends of the cage-forming rods 26 may be secured within the several rod-receiving openings 28 in any suitable manner as
20 by soldering or riveting them to the head or flange unit 12. Secured to the lower ends of the cage-forming rods 26, is a cartridge-supporting plate 30 having, if desired, a central opening 31 formed therein and provided at its margin with
25 a plurality of rod-receiving openings 32 adapted to receive the lower ends of the rods, the diameter of each of which is reduced so as to provide a shoulder 34 against which the cartridge-supporting plate is firmly held when the reduced
30 ends of the rods are secured within the respective openings, as by upsetting their extreme ends into rivet-like engagement with the lower face of the cartridge-supporting plate.

The cage 11 is adapted to retain therein a
35 so-called gas cartridge 35, containing a pressure-generating medium, such as carbon dioxide, and provided at its upper or head end with a closure 36 having at the bottom of a cavity therein a suitable seal, not shown, by which the pressure-generating medium is retained within the cartridge
40 until such seal is pierced or punctured, as when the cartridge, incident to inverting the extinguisher, moves by gravity from its full-line position to its dotted-line position in Fig. 1. In
45 order that such displacement of the cartridge 35 may result in said seal being pierced or punctured, the hinge plate 20 is provided with a needle-like puncturing device or cartridge piercer 37, of the conventional side-grooved type, with
50 which the cartridge seal engages as the cartridge moves into its dotted-line position. The cartridge piercer 37 is so connected to the hinge plate 20 that it extends toward the cartridge 35 in exact axial alignment therewith when the
55 hinge plate is closed, it being observed in this connection that the cartridge is of such outside diameter with respect to the diametrical spacing of the cage-forming rods 26 that such rods serve to retain the cartridge in axial, or substantially
60 axial, alignment with the cartridge piercer 37 at all times. In order to prevent any possible tilting of the cartridge and to further insure proper axial alignment of the puncturable area of the cartridge seal with the cartridge piercer
65 at the instant the seal engages the piercer, the hinge plate 20 is provided with a plurality of guide lugs 38 which are grouped about the cartridge piercer 37 and are so spaced from each other as to receive therebetween the cartridge
70 closure 36 and thus properly and positively guide or direct it with relation to the piercer as the cartridge approaches its dotted-line position of Fig. 1 and just prior to puncturing of the seal and while puncturing is taking place. As to the
75 guide lugs 38, it will be observed that they are

formed with shoulders 40, serving as stops which limit the extent to which the piercer 37 penetrates the cartridge seal as the cartridge closure 36 engages and comes to rest on such shoulders.

In order that the cage 11 may be retained
5 against longitudinal displacement when the extinguisher is conditioned for use and in order that the hinge plate 20 may then be effectively held in its closed position, the head or flange unit 12 is so designed with reference to the collar
10 7 that the usual gasket ring 39, carried by the closure cap 8, engages or substantially engages the upper faces of the several lug-like protuberances 17 and the upper face of the lip-like extension 22 where such extension projects out-
15 wardly beyond the flange 16.

From the foregoing, it will be appreciated that the cartridge-retaining cage 11 is such that it may be easily placed in and removed from the extinguisher by way of the collar 7 and that the
20 cage itself is such that access to it, for the purpose of removing a spent cartridge or introducing a charged cartridge, may be easily gained by reason of the fact that the hinge plate 20 carrying the cartridge piercer 37 is so incorporated
25 in the head or flange unit 12 that it may be swung to its open position. It is to be especially noted that when the extinguisher is being conditioned for use, assurance is had, incident to screwing the closure cap 8 into sealing position,
30 that the hinge plate 20 and its associated cartridge piercer 37 are properly positioned, inasmuch as it is necessary to move the hinge plate to its closed position before the closure cap can be applied. Thus there is provided a unitary
35 structure (adapted for insertion in an ordinary fire extinguisher container) which not only supports a cartridge for longitudinal movement but also provides puncturing, guiding and stopping means which insures that the cartridge will be
40 properly punctured in exactly the right spot.

If it is desired to adapt the cartridge-retaining cage 11 for use in connection with extinguishers equipped with screw-threaded collars, which, although similar to the collar 7, are, for example,
45 larger in diameter and greater in length (as in the case of the collar 7' of Fig. 3), such adaptation may be effected by utilizing an adapter ring of appropriate design. An appropriate adapter ring for use with the collar 7' is shown in Fig. 3
50 and there indicated by the numeral 41. This adapter ring is seated on the annular ledge 10', with which the collar 7' is provided, and is formed with an annular seat or ledge 42, which corresponds to the ledge 10 of Fig. 1 and on which
55 the annular plate 14 of the head or flange unit 12 is adapted to rest in such position that the hinge plate 20 may be held closed and the cartridge-retaining cage 11 maintained against displacement, in the manner described in connection with the closure cap 8 of Fig. 1, when a cap of that type is placed on the collar 7' and screwed into sealing position.

Aside from the modification herein described in connection with Fig. 3, it is obvious that various
65 other modifications may be resorted to without departing from the spirit of the invention or the scope of the following claims.

What is claimed is:

1. For use in a fire extinguisher, a cage adapted
70 to retain a cartridge containing a pressure-generating-medium for movement from a normal position to cartridge-puncturing position upon inversion thereof and comprising a head unit toward which the cartridge is adapted to move
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when assuming puncturing position, said unit including a pivotally supported hinge plate, and a cartridge piercer carried by said plate and normally disposed in alignment with the axis of the path of movement of said cartridge.

- 5 2. For use in a fire extinguisher, a cage adapted to retain a cartridge containing a pressure-generating medium for movement from a normal position to cartridge-puncturing position upon inversion thereof and comprising a head unit toward which the cartridge is adapted to move when assuming puncturing position, said unit including a pivotally supported hinge plate, a cartridge piercer carried by said plate and normally disposed in alignment with the axis of the path of movement of said cartridge, and a plurality of guide lugs carried by said hinge plate and grouped about said piercer and adapted to receive therebetween a portion of the cartridge and retain the latter against tilting as it assumes puncturing position.
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- 20

3. For use in a fire extinguisher, a cage adapted to retain a cartridge containing a pressure-generating-medium for movement from a normal position to cartridge-puncturing position upon inversion thereof and comprising a head unit toward which the cartridge is adapted to move when assuming puncturing position, said unit including a pivotally supported hinge plate, a cartridge piercer carried by said plate and normally disposed in alignment with the axis of the path of movement of said cartridge, and a plurality of guide lugs carried by said hinge plate and grouped about said piercer and adapted to receive therebetween a portion of the cartridge and retain the latter against tilting as it assumes puncturing position, said guiding lugs having shoulders formed thereon serving as stops limiting the cartridge in its movement to cartridge-puncturing position.

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