July 13, 1943. W. L. ROESSNER 2,324,428

AUTOMATICALLY RELEASABLE RETAINING DEVICE

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Fig. 1.

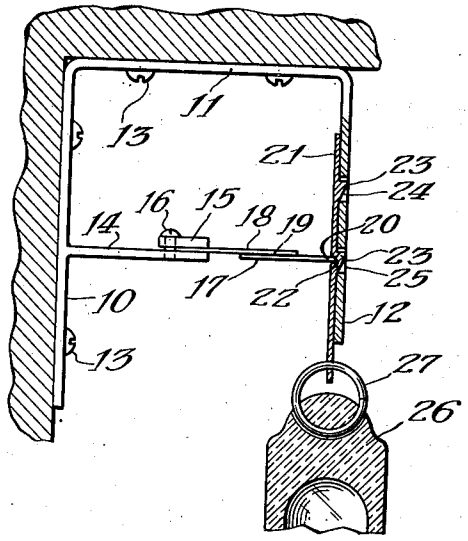


Fig. 2.

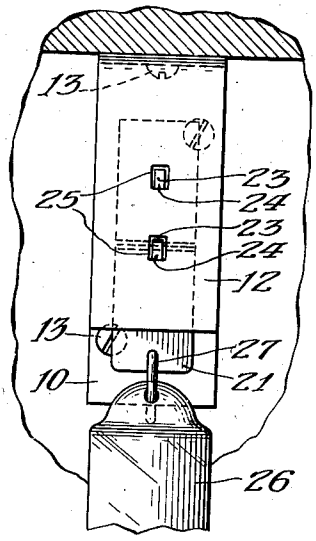


Fig. 4.

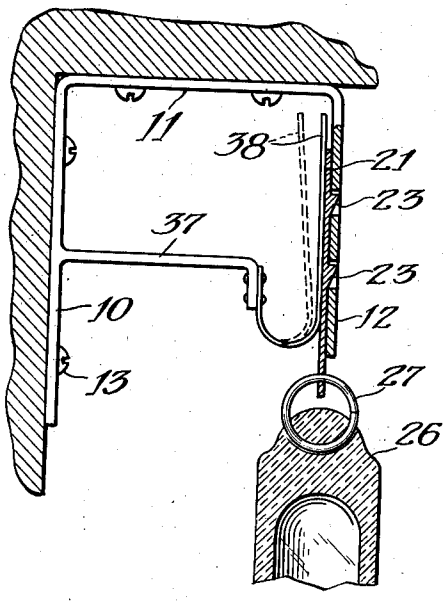
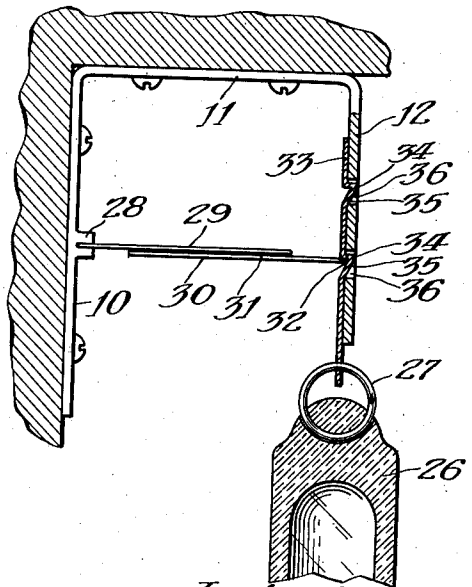


Fig. 3.



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Fig. 5

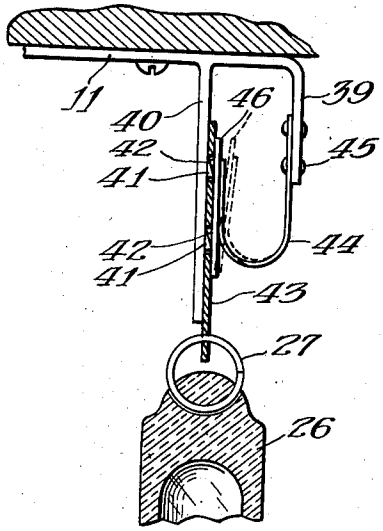


Fig. 6

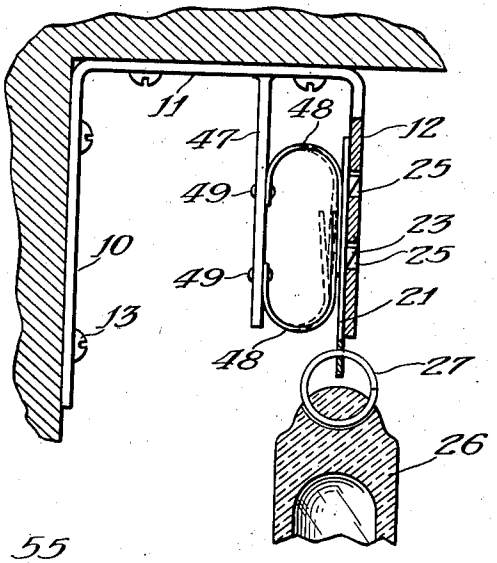


Fig. 7

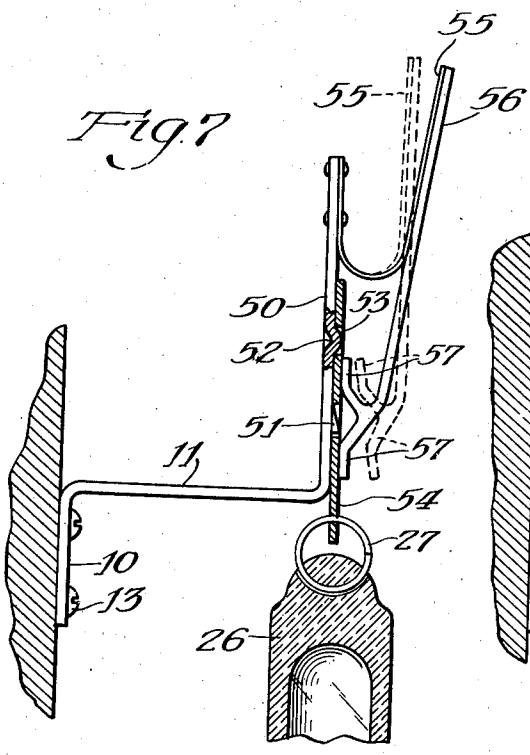
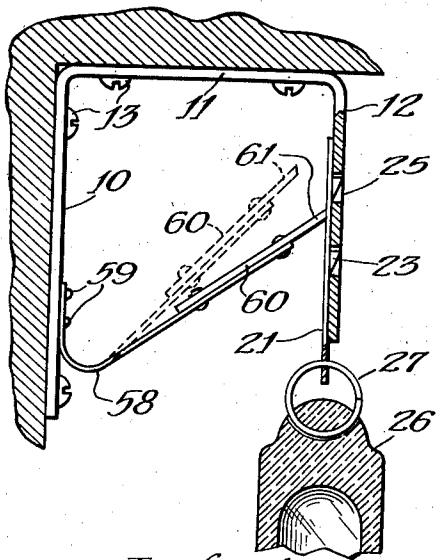


Fig. 8



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UNITED STATES PATENT OFFICE

2,324,428

AUTOMATICALLY RELEASABLE RETAINING DEVICE

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Application March 19, 1941, Serial No. 384,069

7 Claims. (Cl. 169—1)

This invention relates to automatically releasable retaining devices, and particularly to devices of the character described in which the automatic operation is effected by thermo-responsive means.

The invention is especially adapted for releasably supporting grenade type fire extinguishers. When used for this purpose, the main object of the invention is to support the fire extinguisher grenade in predetermined position without premature release, and to release the extinguisher instantaneously when there is fire in the vicinity of the supporting means.

Fire extinguisher grenades heretofore have been supported by grenade encircling members provided with thermo-responsive parts which when subjected to heat result in opening of the encircling members and dropping of the grenade. Such supporting devices have proven objectionable because the thermo-responsive parts of the encircling frame are weak and allow premature release of the grenade, or because the thermo-responsive element does not operate quickly enough to release the grenade when needed. Premature releases are most likely to result when heavy grenades, such as those containing a quart or more of fire extinguishing chemical, are being supported. Belated releases in this type of support are due to the form and location of the fusible members, said members being located closely adjacent the grenade and not wholly in the path of circulation of the heated air currents resulting from a fire.

The device of my invention is designed so that heavy weights can be supported by means including very quickly releasing elements but without being prematurely released, and the thermo-responsive members are fully exposed and subject to the influence of heated air currents so that instantaneous releasing of the retained or supported device results.

Essentially my automatically releasable retaining device comprises a fixed support such as a wall or ceiling bracket, a separate retained member, and a thermo-responsive member which functions to hold the retained member and to automatically release said retained member when affected by heat. The separate retained member is the plate or part to which the extinguisher (or other article to be supported) is connected, or it may be a spring-controlled bolt or part which functions as a means for actuating another part such as an alarm. The thermo-responsive member may be of the type in which fusible solder is employed, or of the bi-metal type. The latter has the advantage that it can respond repeatedly to heat without requiring replacement.

I employ a thermo-responsive member in a novel manner, namely, to exert pressure against the retained member whereby the retained member frictionally engages a part of the fixed support. Preferably, the retained member and the engaged portion of the fixed support are provided with cooperating means whereby part of the weight of the retained member (including the extinguisher or other article carried thereby) is transmitted to the fixed support, but in such manner that instantaneous separation of the engaged parts takes place when the thermo-responsive element responds to heat. Because of the arrangement and relation of the parts to each other, I am enabled to employ thermo-responsive members made of very thin gauge metal, quickly responsive to heat. Furthermore, if the thermo-responsive member is one of the fusible solder type, I can employ very thin gauge brass plates connected by solder having a low melting point, such as 140° F., which has very little tensile strength. Such thermo-responsive devices have not heretofore been used because of their lack of sufficient restraining power and consequent premature releases.

In the drawings:

Fig. 1 is an elevational view, partly in section, of an automatically releasable retaining device embodying my invention, showing an extinguisher grenade, broken away, supported by the device.

Fig. 2 is a side elevation of the same.

Figs. 3–8, inclusive, are views similar to Fig. 1, each showing a modified form of my invention.

In that embodiment of the invention shown in Figs. 1 and 2, the automatically releasable retaining device comprises a wall bearing member 10, a ceiling bearing member 11 and an arm 12, integral with each other. Either or both of the members 10, 11 may be screwed to the wall or ceiling, as indicated by screws 13. Preferably the vertical member 10 is provided with a horizontally extending arm 14 and clamping plate 15 held on the arm 14 by one or more adjusting screws 16. The parts 14, 15 and 16 are used to mount the thermo-responsive member which in this embodiment is of the fusible solder type and consists of two small brass plates 17, 18 held together by solder 19. This thermo-responsive member or fusible link is adjustably held between the arm 14 and clamping plate 15 so that the free end 20 of the thermo-responsive

member will bear edgewise against a separate retained device 21, which has surface contact with the vertical arm 12 of the fixed supporting member. Preferably the thermo-responsive member fits in a groove 22 formed in the separate retained member 21, but frictional engagement between the side surface of the member 21 and the end edge 20 of the thermo-responsive member will suffice for some purposes. Preferably the member 12 of the fixed support and said separate retained member 21 are provided with cooperating means whereby some of the weight of the retained member 21 and parts carried thereby is transmitted to the fixed support arm 12. As shown, said cooperating means consists of projections 23 having inclined surfaces 24 on the retained member 21, which extend into apertures 25 in the arm 12.

The retained member 21 has secured to its lower end a fire extinguisher grenade, only the upper end of which is shown as indicated at 26, the same being secured to the member 21 by a ring 27. A glass grenade containing a quart or more of carbon tetrachloride, weighing four or more pounds, can be supported as shown by means of a fusible solder link made of brass plates .010 inch in thickness, known as standard 30 gauge stock, less than one inch in length and one-half inch wide, connected by fusible solder having a melting point of 140° F., said fusible link bearing against and exerting lateral pressure on the retained member 21 to which the extinguisher is attached. The means described and shown results in frictionally holding the retained member 21 against the fixed support arm 12 without premature release, but because of the horizontal position of the thermo-responsive member and its quick response to heat, resulting from its construction and material, said retained member 21 will be released instantaneously when heated air currents reach the thermo-responsive member.

In describing the modified forms of construction shown in Figs. 3–8, inclusive, those parts which correspond in construction and numerical designation to parts shown in Figs. 1 and 2 will be referred to briefly and without repeated description.

In the modification shown in Fig. 3, the thermo-responsive member is also of the fusible solder type but it is made long enough so as to extend across the space between the member 10 of the fixed support and the separate retained member. Said part 10 is provided with an integral grooved flange 28 adapted to receive the end of one of the plate members 29, 30 of the thermo-responsive device. Said plates 29 and 30 are connected together by fusible solder 31. The end 32 of the thermo-responsive device bears against the retained member 33 which is quite similar to the member 21 excepting that the projections 34, having inclined surfaces 35, are formed by bending the metal of which the retained member 33 is made. The thermo-responsive device functions as described to produce frictional engagement between the retained member 33 and arm 12 of the fixed support, but as soon as the solder 31 is subjected to heat, pressure against the member 33 is relieved and the weight of the extinguisher causes the inclined surfaces 35 of the projections 34 to slide out of the openings 36, allowing the extinguisher to drop.

The retaining devices shown in Figs. 4–8, inclusive, employ thermo-responsive means of the bi-metal type. In Fig. 4, the fixed support 10 has a rigid extension 37 to which is secured the curved bi-metal member 38 which bears against one side of the retained member heretofore described as the member 21 shown in Fig. 1. The solid line position of the member 38 is its normal position but as soon as it is affected by heat, there is a tendency on the part of the free end to move inwardly as indicated in dotted lines, whereby pressure laterally of the retained member 21 is relieved, resulting in instantaneous downward movement of the retained member 21 and parts carried thereby.

The fixed supporting member shown in Fig. 5 comprises the ceiling bearing member 11, a depending arm 39 and a second depending arm 40. In this embodiment the arm 40 is provided with projections 41 which cooperate with openings 42 in the retained member 43. This is a reversal of the cooperating parts on the members 12 and 21 of Fig. 1 but the function is the same. A thermo-responsive device of the bi-metal type is indicated at 44, secured to the arm 39 by rivets 45. If desired, the free end of the member 44 may have secured thereto a bearing plate 46 for bearing against the retained member 43 and thereby holding it in frictional engagement with the arm 40 of the fixed support. The dotted lines indicate the position of the thermo-responsive member 44 when affected by heat.

In Fig. 6, the fixed support employs the parts indicated at 10, 11 and 12 heretofore described and in addition thereto a depending arm 47 to which are secured two thermo-responsive members 48 by rivets 49. The free ends of the members 48 bear on the retained member 21 as will be understood from the previous descriptions. The dotted lines indicate the thermo-responsive members 48 in released positions.

In Fig. 7, the fixed support includes a vertical arm 50 provided with projections 51, 52 which cooperate with the apertures 53 in the retained member 54. It will be understood that these projections and cooperating apertures may be of any desired shape permitting the retained member to slide relatively to the fixed support when lateral pressure on the retained member is relieved. In this form, the thermo-responsive device is of the bi-metal type and comprises a curved member 55 to which is attached a thin metal bar 56 terminating in bearing fingers 57. The solid lines indicate the normal position of the parts 55, 56 and 57, and the dotted lines indicate their positions when the member 55 has been affected by heat.

In Fig. 8, a thermo-responsive member 58 is secured at 59 directly to the fixed support 10. On the free end of the member 58 is a rigid metal arm 60 which bears at 61 against the retained member 21 heretofore described.

It will be understood that the thermo-responsive members herein shown, if subjected to tensile, pulling strain by the weight of the retained member and extinguisher or other article attached thereto, would not be capable of supporting the same. It will also be understood that the cooperating means on the fixed support and retained member, for example, the parts 23, 25 on members 21, 12, are not capable of holding the extinguisher in raised position. However, by employing the thermo-responsive member in such way that it exerts pressure laterally of the retained member so as to produce frictional surface engagement between the retained member and fixed support arm, part of the weight of the retained member and article carried thereby is transmitted to the fixed support but without inter-

fering with the instantaneous release of the retained member as soon as the lateral pressure thereon is relieved.

Changes may be made in details of construction without departing from the scope of my invention.

I claim:

1. An automatically releasable suspending device, comprising a fixed support having a depending arm, a separate retained article suspending member having surface contact with said arm, a thermo-responsive member connected to the support, said thermo-responsive member bearing on said retained article suspending member and exerting pressure thereon, whereby said retained member frictionally engages said support arm, said thermo-responsive member when affected by heat operating to relieve said pressure and allowing the retained member to move both downwardly and horizontally relatively to said support arm, and cooperating means on said support arm and said retained article suspending member whereby part of the weight of the retained member is carried by the support arm while said retained member and the support arm are in frictional engagement.

2. The construction set forth in claim 1 in which the cooperating means on the support arm and the retained article suspending member comprise a projection on one of said members and an aperture on the other of said members for receiving said projection.

3. The construction set forth in claim 1 in which the cooperating means on the support arm and the retained member comprise a projection on one of said members with an inclined surface on the projection, and an aperture on the other said member for receiving the projection with its inclined surface sliding over the edge of the aperture when the retained member moves relatively to the support arm.

4. An automatically releasable suspending device, comprising a fixed support having spaced apart vertical arms, a separate retained article suspending member having surface contact with one of said arms, adjustable fastening means on the other of said arms, and a thermo-responsive means connected to the support by said fastening means and extending across the space between said support arms, said thermo-responsive means bearing on said retained member and exerting pressure thereon, whereby said retained member frictionally engages said support arm, said thermo-responsive means when affected by heat operating to relieve said pressure and allowing the retained member to move relatively to said support arm.

5. An automatically releasable suspending device, comprising a fixed support having a depending arm, a separate retained article suspending member having surface contact with said arm, and a thermo-responsive member connected to the support, said thermo-responsive member comprising a pair of thin metal plates, one partially overlying the other, connected together by solder and substantially horizontally disposed between said fixed support and said retained member, said member bearing on said retained member and exerting pressure thereon, whereby said retained member frictionally engages said support arm, said thermo-responsive member when affected by heat operating to relieve said pressure and allowing the retained member to move by gravity relatively to said support arm.

6. An automatically releasable suspending device, comprising a fixed support having a depending arm, a separate retained article suspending member having surface contact with said arm, and a thermo-responsive member connected to the support, said thermo-responsive member comprising a curved bi-metal bar connected at one end to the fixed support, a free portion of the bar normally bearing against said retained member and exerting pressure thereon, whereby said retained member frictionally engages said support arm, said thermo-responsive member when affected by heat operating to relieve said pressure and allowing the retained member to move by gravity relatively to said support arm.

7. An automatically releasable suspending device, comprising a fixed support having a depending arm, a separate retained article suspending member having surface contact with said arm, and a thermo-responsive member connected to the support, said thermo-responsive member comprising a pair of curved bi-metal bars, each connected at one end to the fixed support, a free portion of each of said bars normally bearing against said retained member, said bearing portions being in different planes, said thermo-responsive member exerting pressure on the retained member whereby said retained member frictionally engages said support arm, said thermo-responsive member when affected by heat operating to relieve said pressure and allowing the retained member to move by gravity relatively to said support arm.

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