Aug. 10, 1954 C. LISCIANI 2,685,984

THERMAL RESPONSIVE SAFETY CLOSURE

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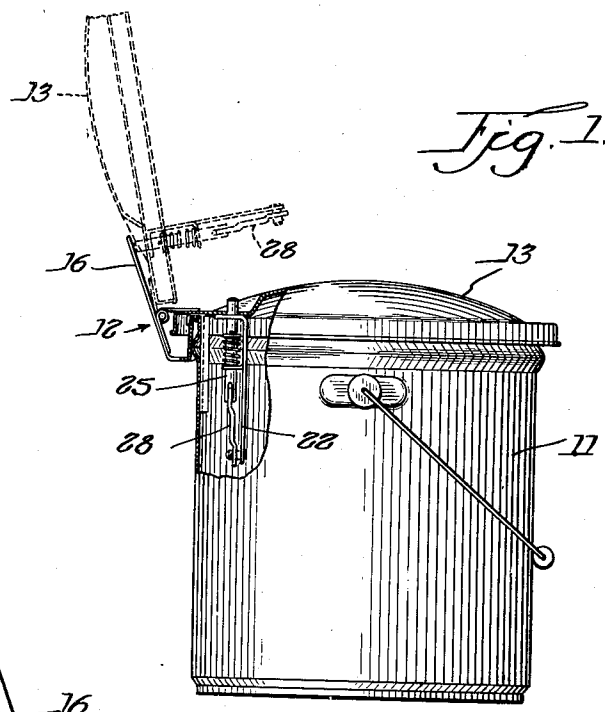


Fig. 1.

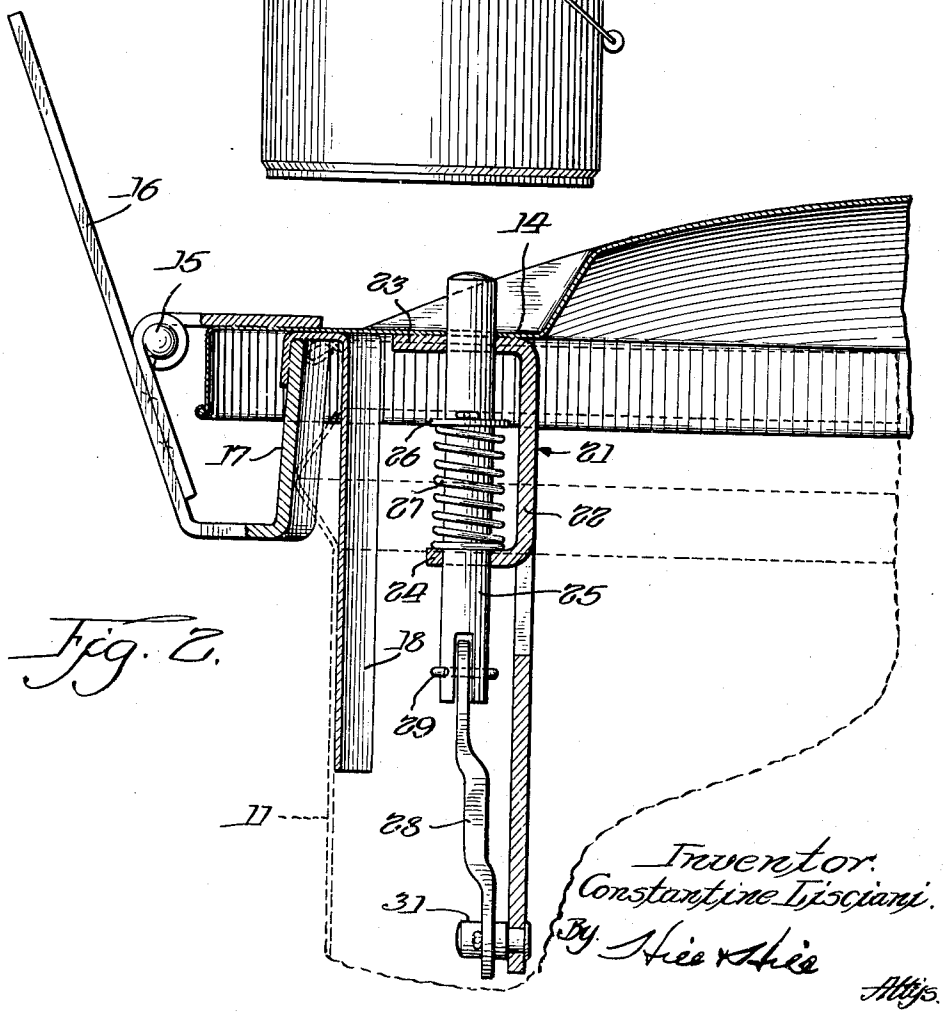


Fig. 2.

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THERMAL RESPONSIVE SAFETY CLOSURE

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3 Claims. (Cl. 220—89)

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The present invention relates to a thermal responsive closure device for containers of inflammable material.

More particularly, the invention relates to a thermal responsive closure device having an improved thermal responsive release mechanism.

While there are many known thermal responsive closure devices for use on containers of inflammable material, none of these are suitable for use with disposable containers, such as a five gallon paint can. Such containers are inexpensive and non-returnable once the product contained therein has been used, and are often used by many plants as receptacles for sticky, combustible materials, such as masks, paint rags, brushes, and the like, and then thrown away. It is apparent that containers used in this manner with no cover member constitute a fire hazard. It is desirable that such containers have a cover member therefor which is normally adapted to be maintained open, but which will close over the container in response to a fire occurring therein. Further, it is necessary that the cover devices for such containers be sufficiently quick-acting in response to a fire being created in its vicinity, and be relatively inexpensive to manufacture.

It is therefore one object of the present invention to provide thermal responsive closure devices which can be easily attached to and removed from disposable containers of inflammable materials.

Another object of the invention is to provide an improved thermal responsive closure device for containers of inflammable material which is more sensitive in its action than previously known devices of the same nature, and which is relatively cheap to construct.

A further obect of the invention is to provide a thermal responsive device having a novel thermal responsive release mechanism for use with a closure member for containers of inflammable material, the release mechanism being relatively cheap to manufacture, and positive in its action.

A feature of this invention is the provision of a closure device for a container of inflammable material which includes a U-shaped clip adapted to fit over the side of the container and having a stop element formed on one of its legs, a cover member hinged to the stop element, and a thermal responsive release mechanism secured to the cover member and co-acting with the stop element for closing the cover member over the container in response to the occurrence of a large amount of heat in the vicinity of the container.

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Another feature of the invention is the provision of a thermal responsive release mechanism for use on a closure device for containers of inflammable materials which includes a chassis member, an axially movable pusher element slidably seated on the chassis member, a biasing spring co-acting with the chassis member and the pusher element for normally biasing the pusher element to axially move in a predetermined direction, and a connecting link constructed of a fusible material connected to the pusher element and to the chassis member for retaining the pusher element against the action of the bias spring.

Other objects, features, and many of the attendant advantages of this invention will be appreciated readily as the same becomes understood by reference to the following detailed description when considered in connection with the accompanying drawing, wherein similar parts in each of the several figures are designated by the same reference numeral, and wherein:

Fig. 1 is a side elevational view of a partially broken away, disposable container for inflammable materials having an improved thermal responsive closure device mounted thereon; and

Fig. 2 is a sectional view of the container shown in Fig. 1, and illustrates the construction of the improved closure device and release mechanism comprising the invention.

Referring now to Fig. 1 of the drawings, a container is shown at 11. The container 11 may be a five gallon paint can, or some other similar disposable container suitable for use as a receptacle for inflammable waste materials, which is relatively inexpensive and may be discarded along with the waste products contained therein. Removably mounted on the container 11 is a closure device 12 comprising the invention.

The closure device 12 includes a cover member 13 adapted to fit over the open top of the container 11, and, as is best shown in Fig. 2, having an indented portion 14 formed on one side thereof. The cover member 13 is hingedly secured to container 11 by a hinge 15 having one of the legs thereof secured to the indented portion 14 by welding, or some other means, and the remaining leg thereof secured to a stop element 16. The stop element 16 is formed integrally with a U-shaped clip having leg portions 17 and 18, the leg portion 17 of the clip being extended and being reversely bent to form the stop element 16. The U-shaped clip 17 and 18 is adapted to slide over the edge of container 11 in the manner

shown, and serves to secure cover member 13 on container 11. By reason of the provision of the U-shaped clip for attaching cover member 13 to container 11, it can be readily appreciated that the securing or removing of the cover member on or off the container is a very simple operation requiring very little or no effort at all.

The cover member 13 is adapted to be swung open to the position shown in dotted lines in Fig. 1, where it co-acts with the stop element 16 which serves to retain the cover member in the open position. Mounted on cover member 13 is a thermal responsive release mechanism 21 which is adapted to co-act with the stop element 16 to close the cover member 13 over container 11 in response to the occurrence of a large amount of heat in the vicinity of the container. The release mechanism 21 includes a unitary chassis member 22 having a plurality of integral supports 23 and 24 extending transversely thereto. The support 23 is secured to the under surface of indented portion 14 of cover member 13 by welding, or some other means, and each of the supports 23 and 24 have apertures therein adapted to align with an aperture in the indented portion 14 of the cover member. Slidably seated in the apertures of supports 23 and 24, and the indented portion 14 of cover member 13, is a pusher element comprising a push rod 25. Push rod 25 has a shoulder portion 26 formed thereon against which one end of a biasing means comprising a compression spring 27 abuts. The remaining end of compression spring 27 abuts against one side of support 24 in such a manner that the spring tends to force push rod 25 upwardly from its position shown in Fig. 2 and out through the aperture in cover member 13. Push rod 25 is restrained against the action of biasing spring 27 by a connecting link 28 constructed of a fusible material, and having one end connected to push rod 25 by a removable pin 29, and having the remaining end connected to chassis member 22 by a lock pin 31.

When the cover member 13 is closed over the container 11, the thermal responsive release mechanism 21 extends down into the container in the manner shown in Figs. 1 and 2. Upon the cover member being swung open to the position shown in dotted lines in Fig. 1, the thermal responsive release mechanism extends transversely out from the cover member in the manner indicated so as to position the fusible connecting link 28 over the opening in the container. By this construction, should a fire occur within the container, the fusible connecting link being positioned directly over the opening in the container, is exposed to a maximum degree to any heat generated thereby, and is melted away to a thickness such that it no longer can restrain bias spring 27. Upon the connecting link 28 releasing bias spring 27, push rod 25 is forced out through the aperture in the recessed portion 14 of the cover member, and acts against the stop element 16. This action causes the cover member 13 to be swung to a closing position, and thereby smothers the fire occurring in the container 11.

From the foregoing description, it can be appreciated that the invention provides an improved thermal responsive closure device which can be easily attached to, or removed from disposable containers for inflammable materials. The closure device is constructed mainly of sheet metal parts which may be punched out of integral pieces of sheet metal, and is therefore relatively cheap to manufacture. Because of the simplicity of the design of the elements out of which it is constructed, assembly of the elements into a complete structure is readily accomplished, and serves to reduce the overall cost of the closure device. Because of the novel construction of the release mechanism of the closure device, the fusible element of the mechanism is exposed to a maximum degree to a fire occurring in the container on which the device is used, and results in an extremely sensitive reaction to any fire occurring in the container. These and other features and advantages of the invention combine to provide a greatly improved thermal responsive closure device for use with disposable containers of inflammable materials.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understod as limiting myself to the exact form, construction, arrangement, and combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. A closure device for a container including a cover member movable from closed to open position with respect to the opening of the container, a U-shaped clip adapted to slide down over and engage the sidewall of the container for detachably mounting the closure device on the container, one of the leg portions of said U-shaped clip being reversely bent to form a stop, a hinge having one of the legs thereof secured to said stop and the remaining leg thereof secured to said cover member permitting the cover member to be raised to its open position and lowered to its closed position, and a thermally responsive release means operatively secured to said cover member and comprising a chassis member and an axially movable spring-biased pusher element adapted to coact with said stop in the open stable position of the cover member with the free end of the pusher element abutting the stop, and said thermally responsive release mechanism comprising a fusible link operatively connected to said pusher element and to said chassis, said fusible link underlying said chassis member in the open position of the cover member whereby the link is exposed to a maximum degree to any fire in the container, so that upon the melting of the link, the spring-biased pusher element causes the cover member to move to an unstable position away from the stop allowing the cover member to close the opening of the container.

2. A detachable closure device for an opening of a container including a cover member, a U-shaped clip adapted to slide down over and engage the sidewall of the container at the opening for detachably mounting the closure device on the container, one of the leg portions of said U-shaped clip being reversely bent to form a stop, a hinge having one of the legs thereof secured to said stop and the remaining leg thereof secured to said cover member, and a heat-responsive release mechanism mounted on said cover member for closing the same over said opening of the container, said release mechanism including a chassis member operatively secured to said cover member, an axially movable pusher member slidably seated on said chassis member between the chassis member and the other leg member of the clip engaging the interior of the container and adapted to engage said stop in the open position of said cover member, biasing means coacting

with said chassis member and said pusher member for normally biasing said pusher member to move in a direction towards said stop in the open position of said cover member, said chassis member extending below the pusher member, a fusible connecting link operatively connected between the lower ends of said pusher member and said chassis member for restraining said pusher member against the action of said biasing means, and said fusible connecting link underlying said chassis member in the open position of said cover member, whereby the link is exposed to a maximum degree to any fire in the container so that upon melting of said connecting link with the cover member in its open position, the cover member is biased to its closed position.

3. A closure device for a container including a cover member for the opening of the container, a U-shaped clip adapted to slide down over and engage the sidewall of the container for detachably mounting the closure device on the container, one of the leg portions of said U-shaped clip being reversely bent to form a stop, a hinge having one of the legs thereof secured to said stop and the remaining leg thereof secured to said cover member, and a heat-responsive release mechanism operatively mounted on the under portion of said cover member for closing the same over said container, said heat-responsive release mechanism including a unitary chassis member having integral supports extending transversely

thereto, said supports having apertures therein aligned with an aperture in said cover member, a push rod slidably seated in the apertures in the integral supports of said chassis member and the cover member and adapted for engaging said stop in the open position of said cover member, spring means coacting with said chassis member and said push rod for normally biasing said push rod to move in a direction toward said stop in the open position of said cover member with the release mechanism extending transversely over the opening, said chassis member extending outwardly beyond an end of the push rod, a fusible connecting link operatively connected between said end of the push rod and the contiguous end of said chassis member for restraining said push rod against the action of said spring means, and said fusible connecting link underlying said chassis member in the open position of said cover member, whereby the link is exposed to a maximum degree to any fire in the container so that upon melting of said connecting link with the cover member in its open position, the cover member is biased to its closed position.

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