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Griffin

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[54] **COMBINATION PROTECTIVE CAP AND STAND FOR A PRESSURIZED GAS CYLINDER**

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[52] **U.S. Cl.** ..... **220/85 P,** 220/55 D, 220/55 AN

[51] **Int. Cl.** **B65d 25/00**

[58] **Field of Search** ..... 220/85 R, 85 CH, 85 P, 220/59, 55 R, 55 AN, 55 T, 55 A, 55 D

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Primary Examiner—John Petrakes

[57] **ABSTRACT**

A combination protective cap and stand for a pressurized gas cylinder intended for use both as a cap for protecting the discharge valve of the cylinder when used in one manner, and intended to provide a stand for the cylinder when used in a second manner, the cap formed of a cylindrical body member having its opposed ends diverging radially outwardly to form a greater diameter than the central portion thereof such that the side wall surfaces are of a longitudinally concave configuration, a plurality of latches pivotally mounted about the side surfaces of the cap and each including a hook member and latch retaining member, and a collar ring adapted to be bolted about the top portion of the cylinder and having a plurality of hook receiving slots formed in the lower edge thereof and adapted to receive therein a respective hook from an associated latch member, each latch member being pivotally mounted to the cap such that rotation of the latch member about its axis serves to engage each eccentrically pivotally mounted hook member tightly in its associated hook receiving slot in a manner to retain the cap snugly received on the top end of the cyllinder, the latch being detachably secured to its hook member when in the locking position by the spring wire latch retainer member. A handle is provided on the side of the cap for use in assisting in the carrying of a pressurized cylinder to which the cap is attached. The cap is adapted to be inverted when used as a stand for the tank such that the top closed end forms a base resting on a horizontal surface with the bottom end of the tank resting in the bottom end of the cap.

5 Claims, 6 Drawing Figures

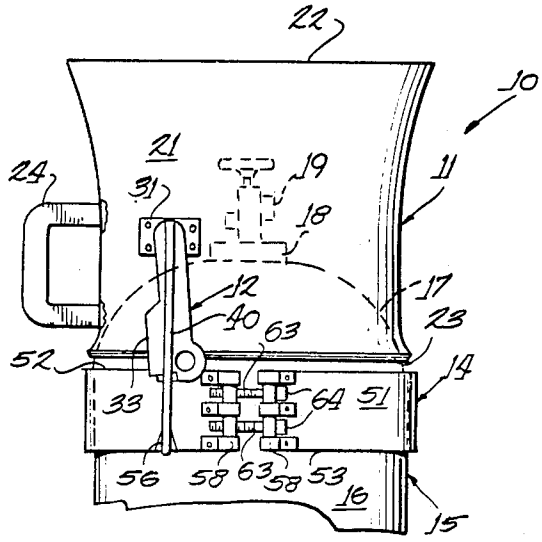


Fig. 1

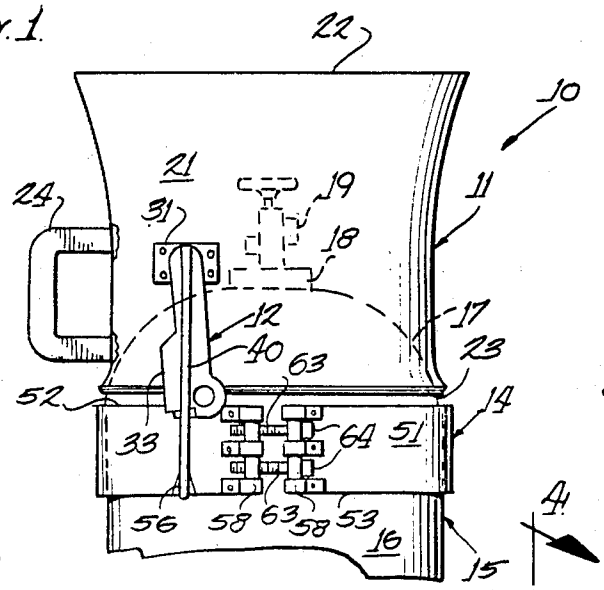


Fig. 3

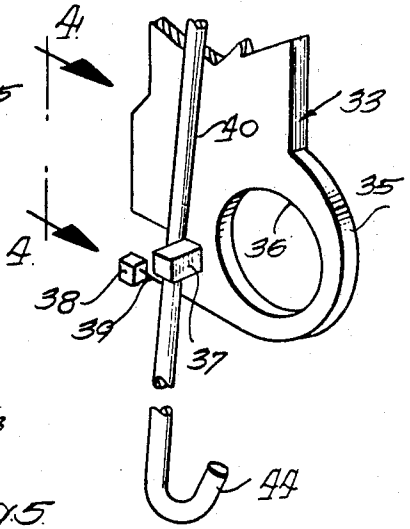


Fig. 2

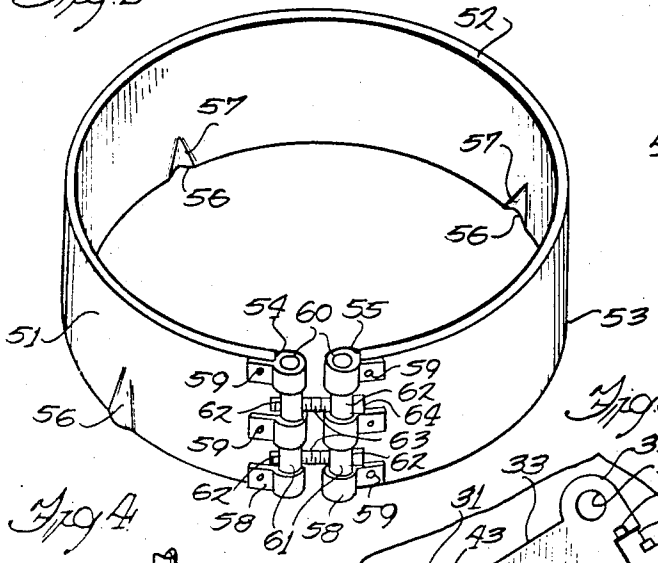


Fig. 5

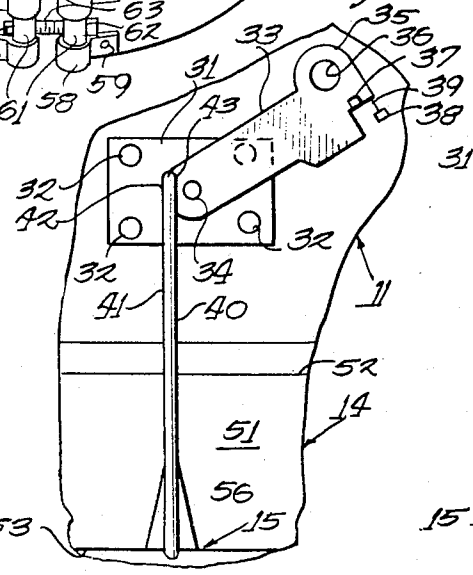


Fig. 6

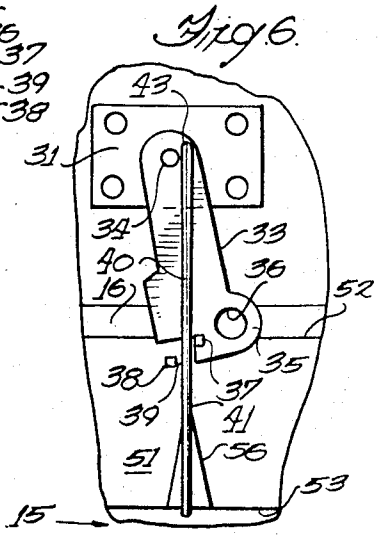
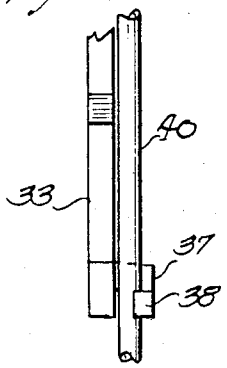


Fig. 4



COMBINATION PROTECTIVE CAP AND STAND FOR A PRESSURIZED GAS CYLINDER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to pressurized gas cylinders for the carrying of compressed or liquified gases and more particularly to a combination protective cap and stand for such a cylinder intended to be mounted thereon in a manner to protect the valve from abuses and possible damage.

2. Description of the Prior Art

In the transportation and storage of compressed or liquified gases, such as compressed oxygen, air and the like, the most common type of portable container in use today is an elongated metal cylinder having substantially hemispherical ends on each end of the cylindrical center section, the top end being formed with a raised boss on its central portion which is provided with a threaded opening to receive a valve assembly for controlling and regulating the discharge of gas from the cylinder. The valve assembly normally provides the greatest danger to those individuals both using and being about the cylinder as the valve receives a major portion of the abuse given the cylinder as it is repeatedly being coupled and uncoupled to and from various hoses and pipe assemblies, as well as the valve assembly being exposed to potential abuses since it projects axially outwardly of the top end of the tank and is thus subject to be struck on passing surfaces as the tank is moved between different locations.

Pressurized gas cylinders of high pressure are potentially a lethal instrument in that should the valve assembly become free of the cylinder there will be provided a jet propulsion type action of a force to propell the tank in a dangerous manner through the surrounding area. For example, and as a matter of record, two cylinders charged with 2,000 pounds of air cause property damage and great danger to personnel handling them. In both cases, the cylinder valve was broken off by accident. One cylinder was jetted through a four-inch concrete wall and in the other case the cylinder was jetted through the cylinder charging room wall, then through the air for three city blocks, plowed a hole in a front lawn, and was jetted through the side of a house before its energy was expended.

While caps for protecting the valve assemblies have been known in the prior art, they are normally of the conventional type which is in the form of a hollow cap having a base portion adapted to threadedly engage the boss assembly of the tank into which the valve assembly is threaded, there being a close tolerance of spacing between the valve assembly and the interior surfaces of such cap so that in many cases while the cap encounters an obstacle in a manner to protect the valve assembly, such shock is still transmitted to the boss of the tank and, in some occasions is sufficient to distort the cap in a manner to encounter the valve assembly therein. This may eventually lead to weakening of the valve assembly and/or cylinder boss to provide a potential hazard as to the eventual freeing of the valve from the cylinder when pressurized and the resulting jetting action of the cylinder.

SUMMARY OF THE INVENTION

The present invention recognizes the severe dangers

associated with pressurized gas cylinders containing high pressure gases and recognizes that the weakest point of such a cylinder is the valve assembly and associated cylinder boss portion, and thus provides a novel solution thereto in the form of a protective cap and associated collar ring which is adapted to be fitted over the top end portion of a cylinder to protect the valve and boss assembly thereof.

It is a feature of the present invention to provide a protective cap for a pressurized gas cylinder which rests on the top end of the cylinder in a manner substantially spaced apart from both the valve assembly and cylinder boss member to provide a high level of protection therefor.

Still a further feature of the present invention provides a protective cap for a pressurized gas cylinder which has a top end portion of a greater diameter than the cylinder tank and is adapted to be inverted for use as a base for the bottom end of the tank after the tank has been transported to the desired location and the protective cap removed for use of the tank by providing access to the valve assembly.

Still a further feature of the present invention provides a protective cap for a pressurized gas cylinder which has a closed top portion of a greater diameter than the cylinder tank and thereby when secured in its normal valve protective position may be used as a storage base as well as a protective cap by inverting the complete tank and protective cap assembly thereby eliminating the need for special storage racks within stationary storage areas.

Still a further feature of the present invention provides a protective cap for a pressurized tank which may be manufactured in appropriate varying sizes to accomodate all cylindrically shaped pressurized cylinders not presently fitted for or manufactured with appropriate protective hardware, such as the S.C.U.B.A. Tank, (Self Contained Underwater Breathing Apparatus), and the Scott Air Pack tank used by firemen, and the like.

Still a further feature of the present invention provides a protective cap for a pressurized gas cylinder which is relatively simple in its construction and which therefore may be readily manufactured at a relatively low cost and by simple manufacturing methods.

Among further features and advantages of the present invention is the provision of a combination protective cap and stand for a pressurized gas cylinder which is possessed of few parts and which therefore is unlikely to get out of order; one which is rugged and durable and which therefore may be guaranteed by the manufacturer to withstand rough usage and protect the cylinder boss and valve assemblies from abuses; one which is easy to use and reliable and efficient in operation; one which is readily adaptable to cylinder tanks of various brands and manufacturers; and one which, otherwise, is well adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

Other features and advantages of this invention will be apparent during the course of the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings forming a part of this specification, and in which like reference characters

are employed to designate like parts throughout the same;

FIG. 1 is a front elevational view of the protective cap of the present invention as mounted on the top end of a typical cylinder in a manner to protect the boss and valve assembly thereof;

FIG. 2 is a perspective view of the collar ring;

FIG. 3 is an enlarged fragmentary perspective view of the latch member as detachably attached to its associated hook member;

FIG. 4 is a view taken along Line 4—4 of FIG. 3;

FIG. 5 is an enlarged fragmentary front elevational view of a latch member having its associated hook in initial engagement with the collar member preparatory to locking the cap to the collar member on the cylinder; and

FIG. 6 is a view similar to FIG. 5 but with the latch rotated to its position locking the cap to the collar member and associated cylinder and with the latch detachably attached to its associated hook member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail there is illustrated a preferred form of a combination protective cap and stand intended for use with a pressurized gas cylinder and which is designated generally in its entirety by the reference numeral **10** and which is comprised of a cap **11**, a plurality of latches **12**, and a collar ring **14**. The protective cap **10** is intended for use with a pressurized gas cylinder **15** having an elongated cylindrical body portion **16** terminating at the top end **17** and bottom end thereof in semispherical shapes, the top end having a boss **18** welded or formed integrally with the top end centrally thereof and projecting outwardly therefrom and adapted to mount therein a valve assembly **19** for use in the filling and dispensing of the gas from the cylinder **15**, the valve being protected by the protective cap **10** as seen in the drawings.

The cap **11** is of an elongated hollow cylindrical shape having side walls **21** of a longitudinal concave shape terminating in closed top end **22** and open bottom end **23**, the top end **22** being of a diameter larger than the diameter of the cylinder **16** with the bottom end **23** being of a diameter larger than the central portion of the cap and less than the diameter of the cylinder such that the bottom edge defines a contoured skirting which is adapted to seat on the lower curved surface of the top end **17** of the cylinder **15**. A U-shaped handle **24** is provided affixed to side walls **21** and projecting outwardly therefrom intended for use in the carrying of the cylinder **15** after the protective cap **10** has been affixed thereto.

The latches **12** total three in number and are spaced equally about the circumference of the side walls **21** with each latch including a mounting plate **31** affixed to the side walls **21** by rivets **32**. A lever arm **33** is pivotally attached at its top end to plate **31** by pivot **34**, the bottom end of the lever defining a gripping portion **35** having a finger engaging hole **36** provided therethrough, and having adjacent thereto a stop member **37** with a latch retaining member **38** projecting outwardly therefrom and supported by a spring wire **39**, the spacing between stop **37** and retaining member **38** being slightly greater than the diameter of an associated J-shaped rod defining hook member **40** which is adapted to be received threbetween as will be later described.

The hook member **40** is of a J-shape having a base forming rod **41** having its top end **42** pivotally received in eccentrically positioned opening **43** formed in lever arm **33** in a position above the axis of pivot **34**, the hook member projecting downwardly therefrom and terminating in an upward and inward projecting member **44** for use in engaging a selected portion of the collar ring **14** as will be later described. As seen in the drawings, the end **42** of hook **40** is pivotally mounted in the opening **43** which is disposed eccentric relative to the pivot **34** such that pivotal movement of lever **33** about pivot **34** effects the eccentric movement of the hook member **40** relative thereto.

The collar ring **14** is of a metallic construction and is in the form of a circumferally extending band **51** having a top circumferal edge **52**, a bottom circumferal edge **53**, and opposed confronting ends **54** and **55**. Circumferally spaced about bottom edge **53** and projecting outwardly therefrom are three spaced apart tapered semi-cone shaped projections **56** defining recesses **57** inwardly thereof and of a size and configuration adapted to receive therein member **44** of hook **40**. Riveted to each end **54** and **55** are a pair of hinge forming retaining members **58** secured to the band **51** by rivets **59** and each defining a cylindrical bore **60** extending vertically therethrough and rotatably receiving therein a pair of cylindrical members **61** each having a plurality of vertically spaced apart horizontally extending openings **62** extending therethrough with a pair of bolts **63** associated therewith. Each bolt **63** is associated with a pair of axially aligned openings **62** with each bolt having an enlarged head portion **64** with a hexagonal socket drive recess formed therein of a diameter larger than the diameter of an associated opening **62**, each bolt adapted to be axially inserted through one of the openings **62** and threadedly received in the opposed axially aligned opening **62** such that the collar ring **14** may be fitted about the top end **17** of cylinder **15** and engage the top portion of the cylinder body **16** and be secured thereto by tightening the band **51** thereabout by the tightening operation of the bolts **63** to draw band ends **54** and **55** circumferally together until the collar ring is tightly secured about the cylinder.

The cap **11** is then fitted on top end **17** of cylinder **15** with bottom edge **23** seated on the outer circumference of the cylinder top end surface **17** and with the latch member **12** disposed vertically above associated projections **56** in the collar ring **14**. As seen in FIG. **5**, each lever arm **33** is then pivoted about pivot **34** in a counter-clockwise direction to effect the vertical lowering of eccentrically positioned hook member **40** until member **44** engages cavity **57** of projection **56**, after which lever arm **33** is rotated in a clockwise direction to the position as seen in FIG. **6** which effects the vertical elevating of hook member **40** to tightly engage the member **44** in cavity **57** to retain the cap **11** firmly secured to the cylinder **15**, the latch being detachably attached to the hook member to retain the locked position of the cap on the cylinder by the hook member being received between stop member **37** and retaining member **38**. It is to be appreciated that retaining member **38** is spring biased by spring wire **39** supporting the same in a manner permitting the depressing of retaining member **38** relative to the plane of the lever arm **33** when it is wished to detach the lever arm from the hook member for the freeing of the cap from the cylinder.

To detach the cap **11** from the collar ring **14** the retaining member **38** is depressed relative to the plane of the lever arm **33** after which an individual inserts one or more fingers in opening **36** in a manner to rotate lever arm **33** counter-clockwise to effect the disengagement of hook **44** from projection **56** and thus permit the removal of the cap from the cylinder for access for valve **19.**

When using the cap **11** as a stand for the cylinder, the cap is placed on a horizontal surface in an inverted position with top edge **22** in seated engagement with the horizontal surface and with bottom edge **23** projecting upwardly therefrom in a manner forming a seat to receive the semi-spherical bottom end surface of cylinder **15** to support the same.

Further, it is to be understood that upon lever arm **33** being rotated in a manner to lock hook member **40** to associated projection **56,** and as seen in the drawings, the top end **42** is rotatably mounted in opening **43** in a manner to move over dead center of the pivot axis **34** to retain the hook member firmly latched in position.

It is to be understood that the form of this invention herewith shown and described is to be taken as a preferred example of the same, and that this invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction as to shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention, the scope of the novel concepts thereof, or the scope of the sub-joined claims.

Having thus described the invention, what is claimed is:

1. A protective cap intended for use with a pressurized gas cylinder having an elongated cylinder body member and semispherical top and bottom end surfaces, the top surface having a boss provided centrally thereof with a valve assembly received therein and projecting axially therefrom, the cap intended to protect the valve assembly from damage and abuse, the protective cap comprising:

a cap of an elongated hollow cylindrical configuration having a closed top edge, an open bottom edge, and longitudinally concave shaped side wall surfaces interconnecting said top and bottom edges, said bottom edge being of a diameter greater than the diameter of the central portion of said cap and being of a lesser diameter than the diameter of said cylinder and defining a contoured skirting about the cap adapted to seat on the circumference of the semispherical curved top end surface of the cylinder;

a plurality of latch means spaced circumferally about the side wall of said cap and pivotally mounted thereto for rotation relative thereto, each latch means including a lever arm having one end pivotally attached to said side wall surface with the opposite end projecting therefrom and each having a top end of a hook member pivotally mounted thereto in a position radially outwardly from and vertically above the pivot axis;

latch retaining means formed integrally with said lever arm and adapted to detachably attach said lever arm to a portion of said hook member;

a collar ring having a circumference adapted to fit snugly about the top circumferal end of said cylinder, means for detachably attaching said collar ring to said cylinder, said collar ring having a top edge, a bottom edge, and confronting end edges, and a plurality of angularly spaced apart projections defined in said bottom edge and projecting outwardly therefrom to define a cavity like recess therebehind of a size and configuration adapted to detachably receive a hook portion of said hook member therein for detachably retaining said cap to said collar ring in a position resting on said cylinder top end surface in a manner surrounding and protecting said valve assembly.

2. The protective cap as set forth in claim **1** wherein said lever arm retaining means comprises a stop member formed integrally with said lever arm and projecting outwardly therefrom in a direction to engage said hook member, a retaining member spaced outwardly of said stop member and projecting in a direction parallel thereto relative to said lever arm, a resilient wire supporting said retaining member relative to said lever arm in a manner permitting deflection of said retaining member in a direction substantially normal to the plane of said lever arm; and said hook member is of a generally J-shaped configuration having an elongated base member with a short hook forming member at the bottom end thereof with the top end of the base member being pivotally attached to the top end portion of said lever arm in a position radially spaced to and above said pivot axis when said lever arm is viewed in a position with said hook member detachably received intermediate said stop and said retaining member.

3. The protective cap as set forth in claim **2** further comprising a mounting plate associated with each lever arm and affixed to said side wall surface by suitable fastening means, each of said lever arms being pivotally mounted relative to said mounting plate.

4. The protective cap as set forth in claim **3** further comprising a U-shaped handle having its leg portions affixed to said cap side wall surface and projecting outwardly therefrom of a size and configuration adapted to be grasped by an individual's hand for use in the carrying of the cylinder to which the protective cap is attached.

5. The protective cap as set forth in claim **4** wherein said cap top edge is of a diameter greater than the diameter of said cylinder and is adapted for use as a stand for said cylinder upon inverting said cap to rest said top edge on a suitable horizontal surface at which time the semispherical cylinder bottom surface may be restingly received in said cap bottom edge to support said cylinder thereon.

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