Sept. 1, 1964 J. H. KRONHEIM 3,146,916

VALVE CONTROL HEAD

Filed Sept. 12, 1961

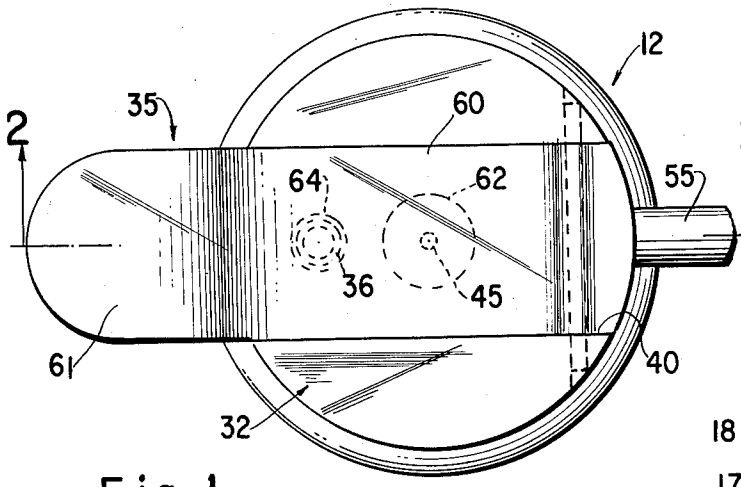

Fig. 1

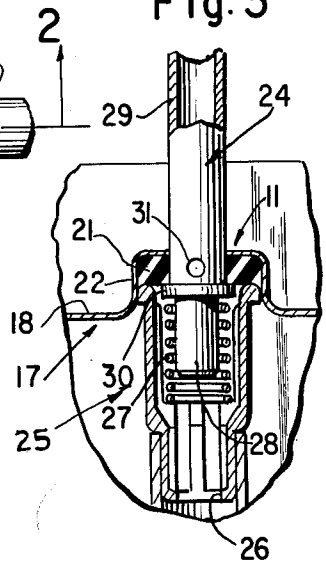

Fig. 3

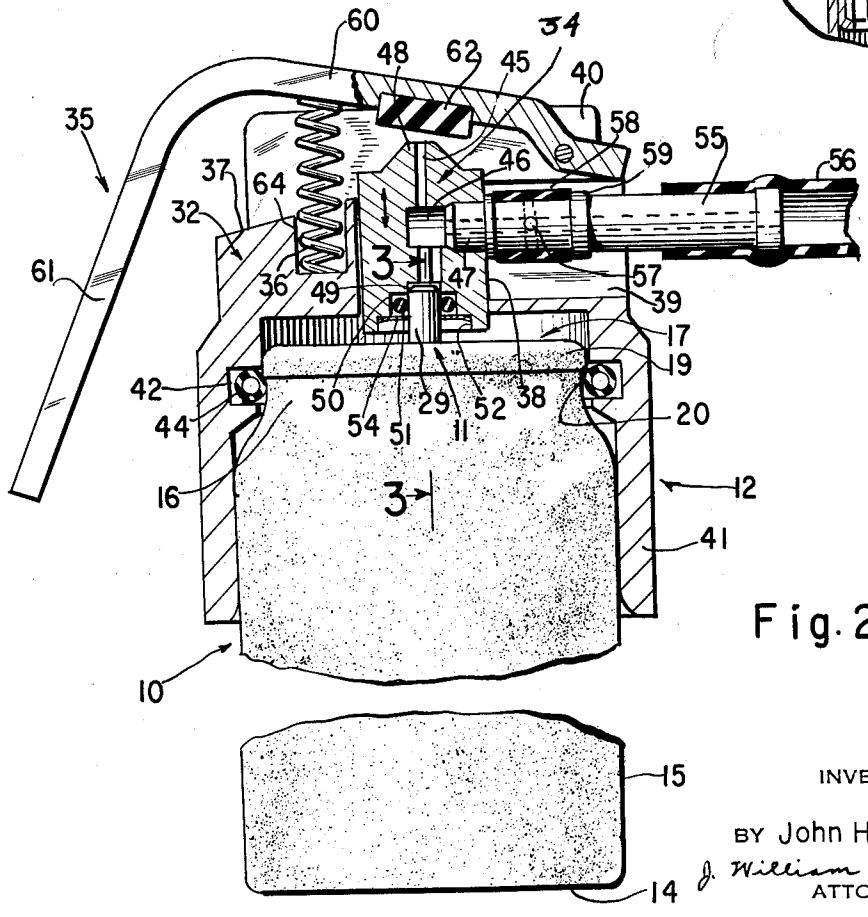

Fig. 2

INVENTOR

BY John H. Kronheim

J. William Carson

ATTORNEY

United States Patent Office 3,146,916 Patented Sept. 1, 1964

3,146,916

VALVE CONTROL HEAD

John H. Kronheim, East Orange, N.J., assignor, by mesne assignments, to Walter Kidde & Company, Inc., Belleville, N.J., a corporation of New York

Filed Sept. 12, 1961, Ser. No. 137,694
5 Claims. (Cl. 222—182)

The present invention relates to fluid handling, and, more particularly, to a control head for a valve on a container adapted to confine fluid under pressure in the container and direct the fluid to its point of use, and for releasing the used fluid to atmosphere when it has served its purpose.

The present invention aims to provide such a control head which is particularly adapted for use on standard aerosol containers equipped with a spring seated valve for releasing the aerosol by pressing on a valve control member, whereby the fluid under pressure in the container can be utilized for inflating various devices, such as blood pressure cuffs and other devices which are ordinarily inflated by a manually operable bulb or other types of hand operated pumps.

Accordingly, an object of the present invention is to provide such a valve control head which is simple and economical in construction and can be operated with a minimum of effort.

Another object is to provide such a valve control head which is readily attached to and detached from a conventional aerosol can.

Another object is to provide such a valve control head which prevents the inflatable device from being subjected to excessive pressure.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawing, forming a part of the specification, wherein:

FIG. 1 is a plan view of a valve control head in accordance with the present invention.

FIG. 2 is a view taken along the line 2—2 on FIG. 1 illustrating the valve control head in section and illustrating in elevation a portion of a valved container for confining fluid medium under pressure and having the control head attached thereto.

FIG. 3 is an enlarged sectional view taken along the line 3—3 on FIG. 2 illustrating the container valve in detail.

Referring now to the drawing in detail, there is shown a container **10** having a valve **11**, and a valve control head **12** for the valve of the container.

The container **10** is illustrated as a conventional aerosol can comprising a body having a bottom wall **14** and a side wall **15** provided with a neck **16** at its open upper end; and a closure **17** having a cover portion **18** (FIG. 3) for closing the upper end of the container to which the valve **11** is secured at its center and having a skirt **19** secured over the neck **16** to provide an annular recess **20** beneath the lower edge of the skirt.

The valve **11** (FIG. 3) is conventional in construction and comprises a seat provided by an annular gasket **21** seated in an apertured inverted cup-shaped portion **22** of the cover portion **18** of the closure **17**, a valve member **24**, a valve member housing **25** formed with an opening **26** at its lower end which communicates with the interior of the container **10**, and a spring **27** in the housing **25** for biasing the valve member **24** on its seat. The valve member **24** includes a solid lower stem portion **28** disposed in the housing **25**, a tubular upper portion **29** extending outwardly of the container and serving as a valve operating element for co-operation with the control head, and an intermediate flange portion **30** having an upper surface for engaging the gasket **21** and a lower surface engaged by the upper end of the spring **27**. The tubular portion **29** has an aperture **31** in the side wall thereof just above the flange portion **30** which is sealed off by the gasket when the flange portion **30** is seated and is capable of establishing fluid flow commuunication between the interior of the container and the open upper end of the tubular portion **29** when the flange portion is unseated.

The valve control head **12** shown in FIGS. 1 and 2 generally comprises a body **32**, a control element **34** on the body, a lever **35** for effecting movement of the control element, and a return spring **36** for the lever.

The body **32** comprises a cover portion **37** formed with a central vertical bore **38** above and in alignment with the valve **11** which bore serves as guideway means for the control element **34**, a radially extending vertical slot **39** merging with the bore **38** and a diametrically extending slot defined by a pair of spaced lugs **40** at opposite sides of the bore **38** for mounting and guiding the lever **35**; a depending skirt **41** for receiving the upper end of the side wall **15** of the container and having an annular recess **42** at the inner wall thereof; and an normally constricted yieldable annular element **44** in the recess **42**, such as a spring which is adapted to extend into the recess **20** and serve as means for effecting removable securement of the body **32** to the container **10**.

The control element **34** is slidably fitted into the bore **38** of the body; and has a longitudinal bore **45** extending therethrough provided at its lower end with an inlet facing and in registry with the upper end of the hollow valve operating element **29** and an outlet at its upper end in communication with the atmosphere, and has a transverse bore **46** in communication with the longitudinal bore **45** between the ends thereof provided with an outlet **47**. The upper end of the control element has a valve seat **48** surrounding the outlet of the bore **45**. The lower end of the control element has an enlarged stepped bore providing a portion **49** for receiving the upper end of the valve operating element **29**, a portion **50** for receiving an annular gasket **51** adapted to effect a seal about the valve operating element **29** below its upper or free end, and a portion **52** for securing a washer **54** adapted to retain the gasket **51** within the portion **50**.

The outlet **47** of the transverse bore **46** has one end of a tube **55** secured therein which rides in the slot **39** as the control element **34** moves up and down, and a flexible tube **56** is attached to the other end of the tube **55** for conducting fluid under pressure to the point of use (not shown).

In order to prevent a device which is to be inflated by the fluid of the container from being subjected to excessive pressures, a relief valve is provided which includes a hole **57** in the side wall of the tube **55**, and a flexible sleeve **58** on the tube which overlies the hole **57** to normally close the same and is adapted to yield in response to excessive pressure within the tube **55** to at least partially open the hole **57** and thereby relieve the excessive pressure. Preferably, the tube **55** has a pair of radially outwardly extending annular ribs **59** thereon for engaging the ends of the sleeve **58** to maintain the sleeve in position about the hole **57**.

The lever **35** is generally L-shaped and includes an upper arm **60** which has its free end pivotally mounted between the lugs **40** and extends across the control ele-

ment 34, and a depending arm 61 at the side of the body 32 which is adapted for manual engagement to operate the lever. Preferably, the lever arm 60 has a pad 62 on the underside thereof for engaging the valve seat 48 of the control element and closing the outlet of the bore 45 at its upper end when the lever is depressed to move the control element downwardly. The lower end of the spring 36 is seated in a well 64 formed in the cover portion 37 of the body 32, and the upper end of the spring 36 is biased against the underside of the lever arm 60 to move the pad 62 out of engagement with the valve seat 48 when the lever is released.

In operation, with the elements in position as shown in FIG. 1 and the tube 56 connected to an inflatable device, fluid under pressure is released from the container 10 by pushing the lever arm 61 towards the control head body, whereby the lever arm 60 moves downwardly, the pad 62 engages the seat 48 to close the upper end of the bore 45 and the control element 34 is moved downwardly to cause the valve member 24 to unseat. Fluid under pressure now flows from the container, through the housing opening 26, through the aperture 31, through the tube 29, through the bores 45 and 46, and through the tubes 55 and 56 for delivery to the point of use.

When the device has been sufficiently inflated, the lever 35 is released sufficiently to allow the spring 27 to seat the valve member 24 and close the valve 11 but with the pad 62 in engagement with the seat 48 to maintain the upper end of the bore 45 closed, whereby the device remains inflated.

When the inflated device has served its purpose, it is allowed to deflate by fully releasing the lever 35, whereby the spring 36 moves the lever arm 60 upwardly so that the pad 62 disengages the valve seat 48 and opens the upper end of the bore 45. The fluid under pressure now flows from the device through the tubes 56 and 55, through the bore 46 and the upper portion of the bore 45, and to atmosphere by way of the outlet at the upper end of the bore 45.

In assembling the valve control head and the container, the element 44 locks the control head on the container, and the gasket 51 effects frictional securement of the valve member tube 29 to the control element 34 so that the control element 34 is moved upwardly under the influence of the valve spring 27 when the lever 35 is released. The gasket 51 also effects a seal about the tube 29 so that fluid under pressure which flows through the tube is directed into the inlet of the control element bore 45 without loss of any fluid.

When the fluid under pressure in the container 10 has been expended, the container is detached from the control head 12 and a full container is replaced.

From the foregoing description, it will be seen that the present invention provides a novel and useful control head for a valved container which controls the release of fluid from the container in a reliable and effective manner.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

I claim:

1. A valve control head comprising a body having means for effecting removable securement of said body to a container for confining fluid under pressure, the container being provided with a valve operating element formed with an upwardly facing discharge outlet, said body having guideway means therein; a control element slidably mounted in said guideway means and structurally independent of the valve operating element, said control element having a longitudinal bore extending therethrough from end to end and being provided with an inlet at its lower end for facing the valve operating element and being provided with an outlet at its upper end in communication with the atmosphere and having a transverse bore in communication with said longitudinal bore between the ends thereof provided with an outlet; sealing means at the lower end of said longitudinal bore for releasably connecting the same in fluid flow communication with the discharge outlet of the valve operating element; a tube secured to said control element for movement therewith having one end in fluid flow communication with the outlet of said transverse bore and its other end being adapted for connection to a point of use; a manually operable lever extending across said control element and pivotally mounted on said body, said lever having means for engaging said control element and closing the outlet of said longitudinal bore at its upper end and for effecting movement of said control element to actuate said valve operating element; and spring means mounted between said body and said lever for moving said last mentioned means out of engagement with said control element to open the outlet of said longitudinal bore when said lever is released.

2. A valve control head according to claim 1, wherein said tube has aperture means adapted for communication to the atmosphere, and yieldable means overlie said aperture means normally adapted to close said aperture means and adapted to yield in response to an excessive positive pressure with said tube to unclose said aperture means.

3. A valve control head according to claim 2, wherein said aperture means is a hole in the side wall of said tube, and said yieldable means is a flexible sleeve surrounding said tube.

4. A valve control head according to claim 3, wherein said tube has radially outwardly extending means thereon for engaging the ends of said sleeve to maintain said sleeve in position about said hole.

5. A valve control head according to claim 1, wherein said sealing means at the lower end of said longitudinal bore includes enlarged bore means for receiving the free end of the valve operating element, an annular gasket in said enlarged bore means for effecting a seal about the valve operating element below its free end, and means for retaining said gasket in said enlarged bore means.

References Cited in the file of this patent

UNITED STATES PATENTS

347,018	Ware	Aug. 10, 1886
2,793,653	Payne	May 28, 1957

FOREIGN PATENTS

456,893	Italy	Apr. 26, 1950