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FIRE EXTINGUISHER HEAD COUPLING ASSEMBLY
AND ASSOCIATED PLUNGER UNIT
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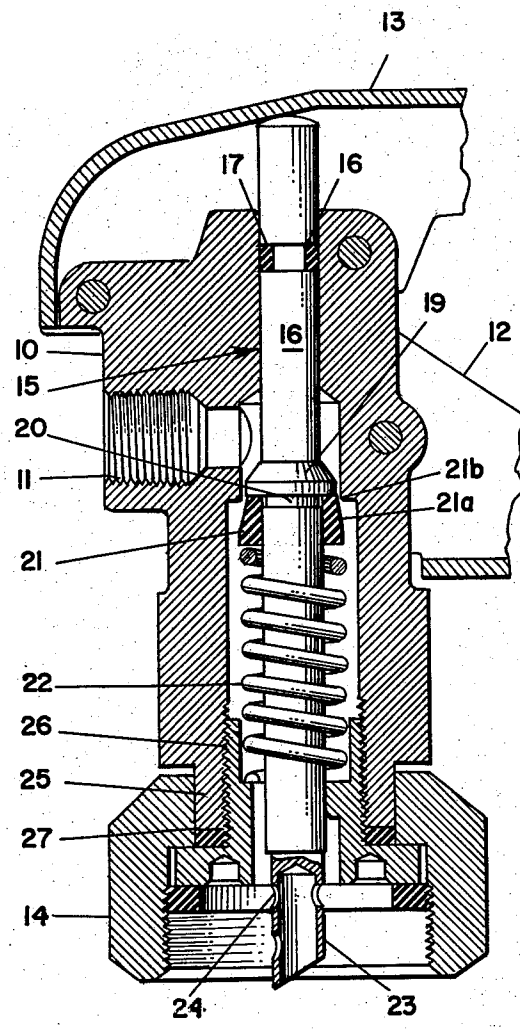


Fig. 1.

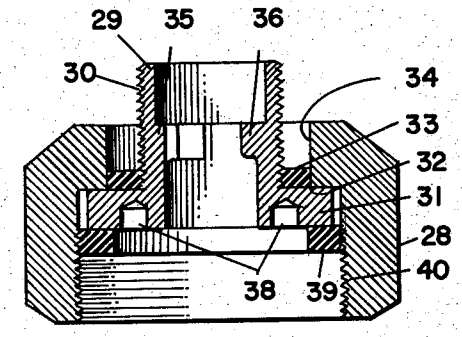


Fig. 2.

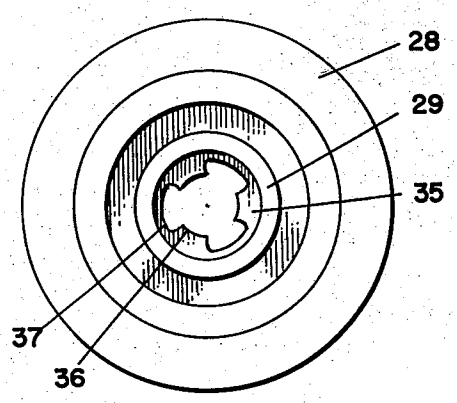


Fig. 3.

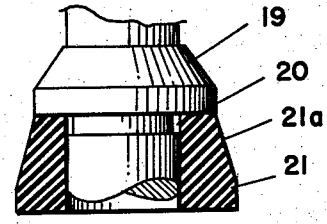


Fig. 4.

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FIRE EXTINGUISHER HEAD COUPLING ASSEMBLY AND ASSOCIATED PLUNGER UNIT

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This invention generally relates to an improved fire extinguisher head assembly, and more particularly relates to a novel coupling assembly for connecting the head assembly to an extinguisher tank or other equivalent receptacle, as well as a plunger unit or assembly for use therewith.

A primary object of the present invention is to provide a coupling assembly for connecting a fire extinguisher head assembly to a tank or equivalent receptacle, in which the coupling will enable swiveling movement of the head assembly relative to the tank and yet maintain an effective fluid seal to prevent the escape of the fluid extinguishing agent during operation of the extinguisher.

Another object of the present invention is to provide a coupling unit for connecting a fire extinguisher head assembly to a tank or equivalent receptacle in which the coupling unit not only functions for the aforegoing object, but also functions to guide axial movement of the plunger assembly mounted within the fire extinguisher head unit.

Another object of the present invention is to provide a novel plunger assembly for cooperation with the coupling unit of the present invention in its inter-relation to the fire extinguisher head assembly.

A further object of the present invention is to provide a coupling unit for connecting a fire extinguisher head assembly to a tank or equivalent receptacle in which the coupling assembly further functions as a means of forming a rugged, relatively rotatable connection between the head assembly structure and the tank.

A still further object of the present invention is to provide a coupling unit for connecting a fire extinguisher head assembly to the tank or equivalent receptacle, in which the coupling unit also functions as a means of retaining spring means biasing the valve of the head assembly towards its closed, seated position and yet which enables the passage of fluid fire extinguishing agents therethrough (that is, through the coupling unit as such) during operation of the extinguisher.

These and other objects of the present invention are generally attained by providing in a fire extinguisher head assembly a plunger unit designed for axial sliding movement therein, the plunger unit carrying valve means designed to open or close in response to given movement of said plunger assembly.

An annular member extends from and is integrally formed with the lower end of the head assembly and has coupled thereto annular spring retaining means. In accordance with a feature of the present invention, the spring retaining means includes an inner decreased diameter portion designed to carry spring means adapted to bias the valve means of the head assembly towards its seated position. As another feature of the present invention, a nut member is coupled to the spring retainer means

designed to enable a swivelable connection of the head assembly to the fire extinguisher tank or equivalent receptacle to which it is to be connected.

Another feature of the present invention resides in providing the valve member on the plunger assembly, and more particularly the rod thereof, with a cooperating construction such that seating of the valve will tend to lock the valve into a given axial position on the rod.

These and other features and elements of the present invention may be more readily understood by referring to the drawings, showing merely illustrative embodiments, and in which:

FIGURE 1 is a sectional view of a fire extinguisher head assembly embodying the novel tank coupling means and plunger assembly of the present invention;

FIGURE 2 is a sectional view of the coupling unit as such;

FIGURE 3 is a top view of the coupling unit as shown in FIGURE 2; and,

FIGURE 4 is an enlarged sectional view of the valve member mounted on the plunger rod for the purpose of illustrating its cooperative relationship therewith.

Referring now to the drawings, there is shown in FIGURE 1 a fire extinguisher head assembly generally including a valve body **10** having a discharge passage **11**, and having coupled thereto a carrying handle **12** and an operating lever **13**. These components form no part of the present invention except to the extent that they may cooperate with the coupling assembly and plunging unit to be described hereafter. The aforementioned elements are described in somewhat greater detail in applicant's co-pending application of same date entitled "Improved Fire Extinguisher Valve Assembly" and are, therefore, not deemed necessary of further description in this application.

In accordance with the present invention, a novel coupling means **14** is connected to the lower end of the valve body **10** and an improved plunger sub-assembly **15** is mounted for vertical movement therein.

The plunger assembly **15** comprises a plunger rod **16** upon which is mounted, near its upper end, an O-ring **17** in an annular groove **18** formed therein. The plunger rod **16** is provided with increased diameter portion **19** adjacent an annular recess **20** formed in the rod for a purpose that will be made clearer as the specification proceeds.

Disposed about the rod **16** adjacent the increased diameter portion **19** is a valve member **21** having an upper truncated portion **21***a* designed to cooperate with a valve seat **21***b* defined by the valve body **10**. A spring means **22** encircles the rod **16** below the valve member **21**. The plunger rod **16** terminates at its lower end in a puncture pin **23** provided with a plurality of circular apertures **24** in the sidewalls thereof.

In accordance with a feature of the present invention, the valve body **10** terminates at its lower end in an annular extension member **25** integrally formed with the valve body **10** and provided with inner-threading **26**. The annular extension member **25** defines an end face **27** designed to form a sealable connection with the coupling unit in a manner that will become clearer as the specification proceeds.

Referring now to the view of FIGURE 2, there is shown the novel coupling unit of the present invention

which embodies a nut member 28 and a spring retaining means or member 29.

The spring retaining means 29 is provided with outer threading 30 for screwing into the threading 26 provided on the inner side walls of the annular extension member 25. The spring retainer means 29 further includes an increased diameter, stepped portion 31 defining a flange face 32, upon which is mounted an annular washer or sealing member 33. The sealing member 33 is designed to form a fluid-tight connection between the end face 27 of the annular member 25 and the increased diameter portion 31 of the spring retaining means 29.

The nut 28 is provided with inner side walls 34 of a diameter slightly larger than the diameter of the annular extension member 25 such that the annular extension member 25 may rotate within the nut 28, bearing upon the sealing means 33 as heretofore described.

The spring retaining means 29 further includes an inner decreased diameter portion 35, which has radially extending inwardly therefrom three 120° spaced projections 36 characterized by curved or arcuate side walls. The projections 36 are designed to guide movement of the plunger assembly or rod 16 and towards this end are positioned at a radius substantially equal to the radius of the rod 16 at the point it passes through the spring retaining means 29. It will be appreciated that the number of projections 36 may be varied as well as the spacing thereof. Projections 36 define with the decreased diameter portion 35 spaced grooves 37, which function to enable the passage of the fire extinguisher fluid through the spring retaining means 29 and around the plunger assembly or plunger rod 16.

It will further be appreciated that the decreased diameter portion 35 serves the function of holding the spring means 22 in its position of biasing relationship within the valve member 21.

The spring retaining means 29 is further provided in the lower end face of its increased diameter portion with a pair of tool receiving openings 38 for the purpose of threading the spring retaining means 29 into the annular extension member 25 as heretofore described. The nut means or nut member 28 carries in engagement with its inner side walls a washer or sealing member 39 adapted to engage the lower face of the increased diameter portion 31 of the spring retaining means 29. The nut member is further provided with an inner threading 40 for connecting to the neck or mouth of a fire extinguisher tank or receptacle in a conventional manner. It will be appreciated that upon tightening of the nut member 28 to the tank, the neck or mouth of the extinguisher will force the sealing member 39 into engagement with the lower face of the increased diameter portion 31 to provide an effective seal in this area.

In consequence of the foregoing construction for the coupling unit or assembly, it will be seen that the spring retaining means 29 of the coupling assembly forms the connection with the valve body 10 of the head assembly. On the other hand, the nut member 28 forms the threaded connection with the tank unit or similar receptacle. As a result, the spring retaining means 29 and nut member 28 are not threadingly connected as such, and the head assembly and tank unit may swivel one with respect to the other to enable more convenient assembly of the extinguisher.

Preferably, the sealing members 33 and 39, as well as the valve member 21, are formed of "Teflon" or an equivalent plastic material enabling movement of metallic members thereon without affecting the sealing qualities thereof.

In accordance with another feature of the present invention, the valve member 21, as more clearly shown in the view of FIGURE 4, has at least a portion of its upper truncated surface portion 21*a* disposed about the annular recess 20 formed in the plunger rod 16. As a consequence of this construction, it will be appreciated, that upon engagement of the valve 21 with the valve seat 21*b* of the valve body, any inward radial pressure will force the inner sidewalls of the upper end of the valve member 21 into the recess 20 to lock the valve member in its axial position on the plunger rod 16. Thus, assuming that "Teflon" is employed as the material of the valve member 21 (as heretofore mentioned) any cold flow of the "Teflon" material will tend to cause the valve member 21 to lock more firmly in its axial position on the plunger rod 16. In certain instances, it may be further desirable to provide the valve member 21 with a slightly decreased inner diameter in the area overlying the recess 20 such that it may be snapped into position therein.

It will be appreciated that many modifications and changes may be made in the improved coupling unit and plunger assembly of the present invention without departing from the spirit and scope thereof as set forth in the following claims.

What is claimed is:

1. In a fire extinguisher head assembly designed for coupling to a tank and including a discharge passage adapted to communicate with said tank, the combination comprising: a plunger assembly designed for sliding movement in said head assembly; valve means carried by said plunger assembly; an annular member of given diameter extending from and integrally formed with the lower end of said head assembly; annular spring retaining means including an inner upper portion threadingly coupled within said annular extension member, said inner upper portion including spring retaining means having a decreased diameter portion; spring means carried by said decreased diameter portion and positioned to bias said valve means towards its seated position in said head assembly; said spring retaining means having a lower outer portion disposed beyond the free end of said annular member, said lower outer portion having a diameter greater than said given diameter; an annular sealing member carried by said lower outer portion for sealing cooperation with the free end of said annular member; and, a nut carried by said lower outer portion, said nut having an upper axial portion thereof protruding radially inwardly over said lower outer portion of said spring retaining means such that said free end and sealing member are radially interposed between said upper axial portion of said nut and said inner upper portion of said spring retaining means.

2. In a fire extinguisher head assembly designed for coupling to a tank and including a discharge passage adapted to communicate with said tank, the combination comprising: a plunger assembly designed for sliding movement in said head assembly; valve means carried by said plunger assembly; an annular member of given diameter extending from and integrally formed with the lower end of said head assembly; annular spring retaining means including an inner upper portion threadingly coupled within said annular extension member, said inner upper portion including spring retaining means having a decreased diameter portion; spring means carried by said decreased diameter portion and positioned to bias said valve means towards its seated position in said head assembly; said spring retaining means having a lower outer portion disposed beyond the free end of said annular member, said lower outer portion having a diameter greater than said given diameter; an annular sealing member carried by said lower outer portion for sealing cooperation with the free end of said annular member; a nut carried by said lower outer portion, said nut having and upper axial portion thereof protruding radially inwardly over said lower outer portion of said spring retaining means such that said free end and sealing member are radially interposed between said upper axial portion of said nut and said inner upper portion of said spring retaining means; and, a second sealing member carried by and within said nut, said second sealing member being adapted to be interposed in sealing relationship between

the lower face of said lower outer portion of said spring retaining means and said tank.

3. The combination, according to claim 2, in which said inner decreased diameter portion of said spring retaining means embodies radially inwardly extending spaced projections designed to guide and center axial movement of said plunger assembly.

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