United States Patent

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[54] **PORT PROTECTORS**
5 Claims, 5 Drawing Figs.

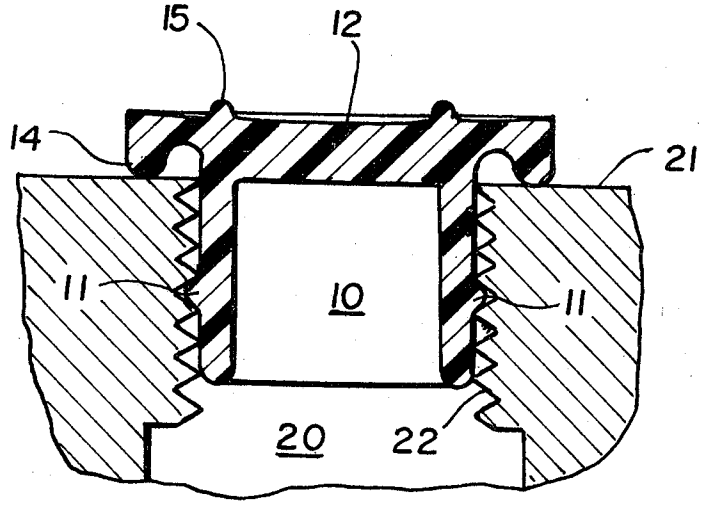
[52] **U.S. Cl.** **220/42B,** 138/96T
[51] **Int. Cl.** **B65d 39/04,** F16i 57/00, B65d 59/02
[50] **Field of Search** ..... 138/96 (R), 96 (T); 220/24 (R), 39 (R), 42 (B), 42 (C), (Dig. 19) (RP), 60

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ABSTRACT: A port closure is provided for threaded ports comprising a resilient cylindrical member adapted to slidably fit within said port and having an interrupted thread on the exterior thereof intermediate the ends engaging the threads in said port, a circular end cap covering one end of said cylindrical member and extending beyond the periphery forming an annular radial flange, a depending ring at the outer periphery of the flange spaced from the cylinder and engaging the surface surrounding the port and spacing the flange therefrom when the cylinder is in place in said port whereby the cylinder is under axial tension between the thread and end cap.



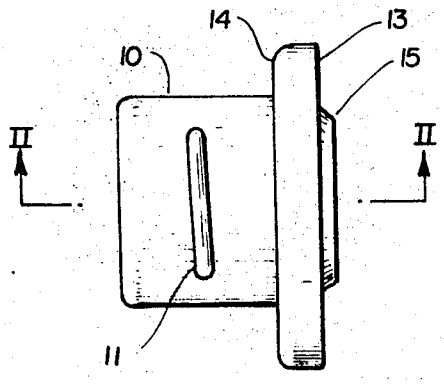


Fig.1.

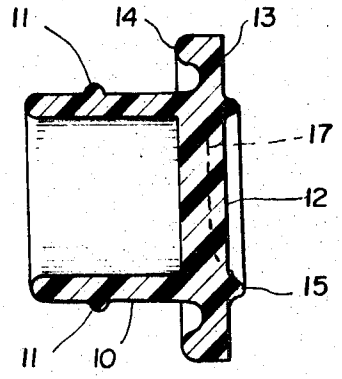


Fig.2.

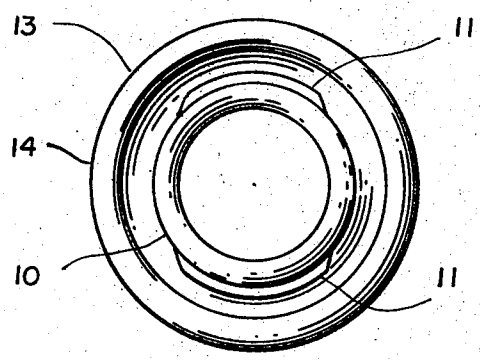


Fig.3.

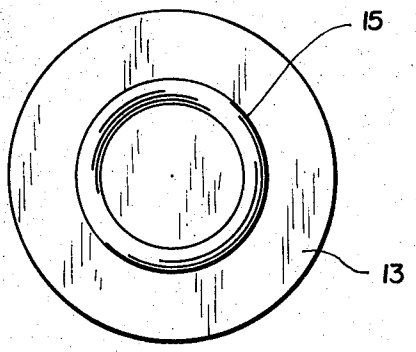


Fig.4.

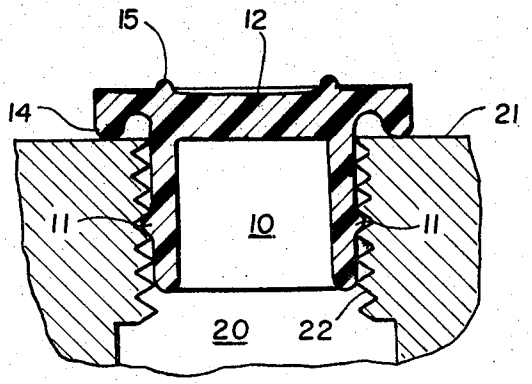


Fig.5.

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PORT PROTECTORS

This invention relates to port protectors and particularly to a simple inexpensive protector or closure for threaded ports such as are found in valve bodies, hydraulic brake cylinders, air brake cylinders and actuators and like apparatus.

The problem of protecting the threads and entry surface of a threaded port is one of long standing and many different protectors have been heretofore proposed. Such protectors have been made of plastics, metals and the like. Generally these closures are either too difficult to install and remove or are too easily dislodged as well as being less satisfactory in various other ways.

The present invention provides a port protector which is easily installed, will not come out accidentally and yet is quickly removed when desired. It not only protects the threads within the port but also the surface surrounding the entrance to the port.

Preferably I provide a closure or protector for internal threads within a port which comprises a resilient cylindrical member adapted to slidably fit within said port, an interrupted thread on the exterior of the cylindrical member engaging the threads of said port, a circular end cap closing one end of said cylindrical member and extending beyond the periphery of the cylindrical member forming an annular flange surrounding the end of said cylinder having a depending annular ring at its outer periphery engaging the surface surrounding the port and spacing the flange from said surface. When the closure of this invention is inserted into a port, it is forced inwardly on the end cap so as to provide a cantilever stress on the cylinder so that it is under tension, pulling the interrupted thread into tight engagement with the thread in the port. This stress provides a holding action against the threads which prevents the closure from being removed until the stress is relieved. This is accomplished by piercing the center of the cap which releases the cantilever action and the closure is readily removed. Preferably the closure is molded in one piece from a resilient plastic such as polyethylene.

The interrupted thread requires very little force to insert the closure in the port and no turning or spinning is required. This is a great time saving over threaded and tapered plugs of the prior art.

The tension of the closure when properly inserted provides a seal at the outer edge of the flange at the depending ring which acts as an effective mask against intrusion of paints, solvents, dirt and foreign material either into the port or on the surface immediately surrounding the port, which may be necessarily clean and free from scratches for use in sealing a fitting in the port.

In the foregoing specification I have set out certain objects, purposes and advantages of my invention. Other objects, purposes and advantages will be apparent from a consideration of the following description and the accompanying drawings in which:

FIG. 1 is a side elevation of a closure according to my invention;

FIG. 2 is a section on the line II–II of FIG. 1;

FIG. 3 is a bottom plan view of the closure of FIG. 1;

FIG. 4 is a top plan view of the closure of FIG. 1; and

FIG. 5 is a fragmentary section through a port with the closure installed.

Referring to the drawings I have illustrated a closure having a cylindrical body **10** of resilient plastic material provided with interrupted threads **11** intermediate its ends. An end cap **12** of resilient plastic is integrally formed with cylinder **10** and extends beyond the cylinder to form an annular flange **13** having a depending ring **14** at its outer extremity. An upstanding ring **15** may be formed on the top surface of the cap and the area within ring **15** may be reduced in thickness as indicated by the dotted line **17**.

The closure is inserted into a port **20** by simply forcing the cylinder into the port until ring **14** bears on surface **21** surrounding port **20** with the interrupted threads **11** engaged within the threads **22** in port **20** and the end cap slightly dished. This places the cylinder **10** under pressure from the dished end cap exerting a cantilever force from ring **14**. At this position the closure is very difficult to remove. However, if the area within ring **15** is pierced as by a screwdriver, the pressure is relieved and the closure is easily removed. While not necessary, it is possible to make the area within ring **15** of reduced thickness for ease of puncturing.

While I have illustrated and described a presently preferred embodiment of my invention in the foregoing specification, it will be understood that the invention may be otherwise embodied within the scope of the following claims.

I claim:

1. A closure for internally threaded ports comprising a resilient cylindrical member adapted to slidably fit within said port, an interrupted thread on the exterior of the cylindrical member engaging the threads in said port, a circular end cap closing one end of said cylindrical member and extending beyond the periphery thereof forming an annular flange, a depending ring at the outer periphery of said flange spaced from the cylinder member and engaging the surface surrounding the port and spacing the flange therefrom when the cylinder member is in place in said port whereby the cylinder member is in axial tension.

2. A closure as claimed in claim **1** wherein the center portion of said circular end cap is reduced in thickness.

3. A closure as claimed in claim **1** made of polyethylene.

4. A closure as claimed in claim **1** formed in one piece of a resilient plastic.

5. A closure as claimed in claim **1** wherein the interrupted thread comprises two thread segments substantially 180° apart.