

Feb. 4, 1958

A. MOELLER

2,822,108

PLUG WITH ADJUSTABLE LOCK

Filed Sept. 28, 1956

Fig. 1.

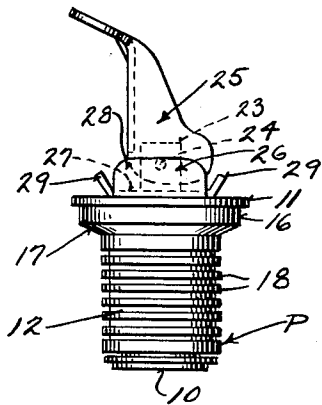


Fig. 2.

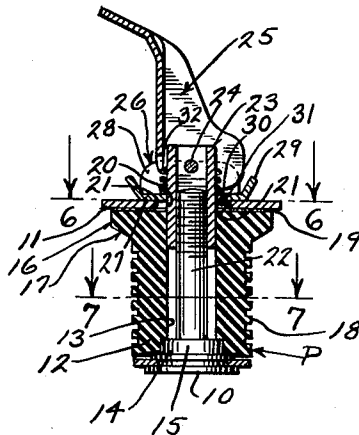


Fig. 3.

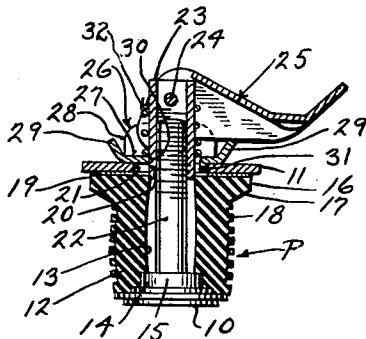


Fig. 4.

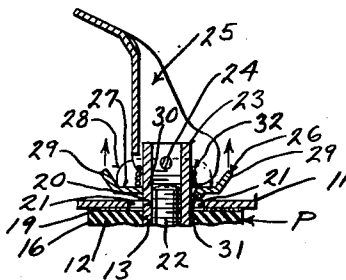
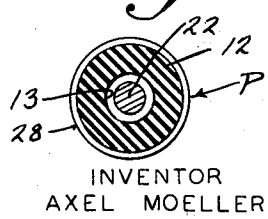
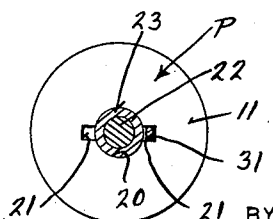
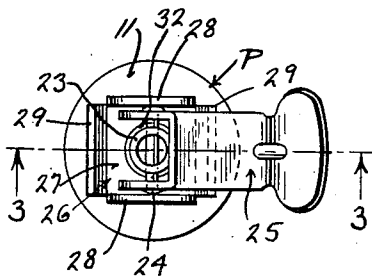


Fig. 5. Fig. 6. Fig. 7.



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1

2,822,108

PLUG WITH ADJUSTABLE LOCK

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4 Claims. (Cl. 220—24.5)

This invention appertains to plugs and stoppers of the general type shown in my prior Patents Numbers 2,292,149; 2,315,538; 2,347,835 and 2,729,353 issued respectively on August 4, 1942; April 6, 1943; May 2, 1944 and January 3, 1956, and more particularly to a novel plug especially adapted for closing and sealing drain openings or ports in small boats, the plug, however, being suitable for other uses.

One of the primary objects of my present invention is to provide a simple and effective means for preventing the accidental movement of the plug parts incident to vibration, whereby the plug will be maintained in its predetermined, adjusted, set position.

Another salient object of the invention is to provide a positive means for locking the parts of the plug together so that inadvertent or accidental separation of the parts will be eliminated and whereby loss of plug parts will be prevented.

A further object of my invention is the provision of a lock plate for holding plug parts in a predetermined set position irrespective of the movement of the operating lever to a plug-expanded or holding position or to a plug-contracted or released position.

A still further object of the invention is the provision of a slidable lock plate movable longitudinally of the stem of the stopper to a locked or released position, the lock plate in its released position being rotatable with the lock lever and sleeve nut for permitting a desired change or set in the diameter of the resilient plug body.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described and claimed, and illustrated in the accompanying drawing, in which drawing,

Figure 1 is a side elevational view of my improved plug showing the lever in its raised, released position for permitting the insertion or removal of the plug into or out of an opening;

Figure 2 is a central longitudinal sectional view through the stopper in its released position;

Figure 3 is a view similar to Figure 2, but showing the lever in its lowered position for expanding the body of the stopper, the section being taken on the line 3—3 of Figure 5, looking in the direction of the arrows;

Figure 4 is a view similar to Figure 2, but showing the lock plate in its raised released position for permitting the turning of the lever and the sleeve nut to bring about a desired change in plug adjustment;

Figure 5 is a top plan view of the plug showing the lever in its lowered, locked position;

Figure 6 is a transverse sectional view taken on the line 6—6 of Figure 2, looking in the direction of the arrows, the view illustrating the means employed for latching the lock plate against accidental rotation, and

Figure 7 is a transverse sectional view through the stopper body taken on the line 7—7 of Figure 2, looking in the direction of the arrows.

2

Referring to the drawing in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter P generally indicates my improved plug and the same embodies a lower or inner plate construction 10 and a top or outer compression plate 11. Confined between the inner and outer plates 10 and 11 is the compressible body 12. This body 12 is formed from rubber or some other similar resilient compressible material.

The body 12 is of a general cylindrical shape and is provided with an axially disposed longitudinally extending way or bore 13 which opens out through the opposite ends of the body. The bottom or inner plate construction 10 is provided with stepped shoulders 14 so as to provide a reduced portion 15 which extends into the bore of the body.

Referring back to the body 12, it is to be noted that its outer or upper end is provided with an outstanding annular flange 16, the lower face of which is tapered inwardly, as at 17. This flange is adapted to engage the outer edge or lip of an opening, when the body of the plug is inserted in the opening. The outer surface of the plug 12, at least for a portion of its length, is provided with equidistantly spaced annular compressible ribs 18.

The upper or outer plate 11 is preferably, but not necessarily, formed from sheet metal, such as stainless steel and this plate is of a slightly greater diameter than the diameter of the annular flange 16. The plate is bonded to the outer end of the body 12 by the use of a suitable adhesive 19, and hence in effect, the body 12 and the plate 11 are of a unitary construction. The plate itself is provided with an axially disposed opening 20 and the plate is provided with one or more keeper notches 21 for a purpose, which will later appear.

The lower or inner plate 10 has rigidly secured thereto an axially disposed threaded stem 22 and this stem slidably extends through the bore 13 of the body 12. Received within the opening 20 of the plate 11 for turning and sliding movement is an elongated sleeve nut 23 and this sleeve nut is threaded on the stem 22 and this nut also is mounted for sliding and turning movement within the bore. This sleeve nut 23 extends appreciably beyond the plate 11.

Pivoted to the upper end of the sleeve nut 23, as at 24, is the operating cam lever 25. As best shown in Figures 1, 2 and 3, the throws of the cam lever are adapted to press against the plate 11 when the throw lever is in its lowered, locked position for effectively bringing the plates 10 and 11 toward one another to bring about the longitudinal compression of the body 12 and the radial expansion of this body, as shown in Figure 3.

The cam lever 12 is of a construction shown in my mentioned prior patents, and this lever straddles the upper end of the sleeve nut. Obviously, by moving the lever 25 to its raised released position and then turning this lever and the sleeve nut, the body 12 can be initially compressed longitudinally and expanded radially to fit a desired sized opening and again when the lever is swung to its lowered locked position the body will be further radially expanded so that the body will firmly grip and seal the wall of an opening.

One of the important features of the present invention, is the provision of a lock plate 26 and this lock plate is interposed between the cam lever 25 and the plate 11. The lock plate 26 can be in the nature of a metal stamping and includes a flat bottom wall 27 and upstanding side confining walls 28. The lower wall 27 has also formed thereon outwardly flared limiting lips 29. The wall 27 is provided with a central opening 30 which receives the sleeve nut 23. Hence, the lock plate 26 can rotate on the sleeve nut. This lock plate has formed thereon and

struck out therefrom a depending latch tongue 31, which is adapted to be received in a selected keeper notch 21. A light expansion spring 32 is coiled about the sleeve nut 23 and is confined between the pivot 24 and the lock plate and this spring functions to normally urge and hold the lock plate against the outer compression plate 11 at all times and when the latch tongue is in alignment with a keeper notch 21 this tongue will be held in the notch by the spring. With the parts properly assembled, the side walls 28 of the lock plate receive and confine the operating cam lever 25 and when the lock plate 26 is latched to the compression plate 11, turning movement of the operating lever 12 is prevented by the engagement of the side walls 28 with the lever. This prevents the inadvertent turning of the operating lever and hence the sleeve nut irrespective of whether the operating lever is in its lowered compression position or in its raised released position.

In use of the stopper, the lever 25 is swung to its raised released position and to initially adjust the stopper the lock plate is grasped and pulled outwardly against the tension of the coil spring 32, so as to move the latch tongue 31 from out of its keeper opening. At this time, the lever 25, the lock plate 26 and the sleeve nut 23 can be rotated as a unit. When the body 12 has been adjusted to the desired diameter, the lock plate is released and upon the turning thereof the latch tongue 31 will ride into a keeper notch 21. The parts are all now locked together in their predetermined, set position, leaving the lever 25 free for rocking movement on its pivot 24 to bring about the expansion and contraction of the body 12.

Various changes in details may be made without departing from the spirit or the scope of this invention but what I claim as new is:

1. A plug comprising an elongated hollow compressible body, an inner compression plate engaging the inner end of the body, an outer compression plate engaging and holding the outer end of the body, a threaded stem secured to the inner compression plate and extending through the body, an elongated sleeve nut slidably and rotatably extending through the outer compression plate and into the body and threaded on the stem, a cam lever pivoted to the upper end of the sleeve nut for movement toward and away from the outer compression plate, said lever and sleeve nut being rotatable relative to the outer compression plate to initially adjust the position of the nut relative to the stem and to position the inner and outer compression plates toward and away from one another, and releasable means for holding the lever and the sleeve nut in a desired set position against accidental rotation including a lock plate interposed be-

tween the lever and the outer compression plate rotatable with the lever, and interengaging latch means between the lock plate and the outer compression plate normally holding the lock plate against rotation relative to the outer compression plate.

2. A plug comprising an elongated hollow compressible body, an inner compression plate engaging the inner end of the body, an outer compression plate engaging and holding the outer end of the body, a threaded stem secured to the inner compression plate and extending through the body, an elongated sleeve nut slidably and rotatably extending through the outer compression plate and into the body and threaded on the stem, a cam lever pivoted to the upper end of the sleeve nut for movement toward and away from the outer compression plate, said lever and sleeve nut being rotatable relative to the outer compression plate to initially adjust the position of the nut relative to the stem and to position the inner and outer compression plates toward and away from one another, and releasable means for holding the lever and the sleeve nut in a desired set position against accidental rotation including a lock plate slidably longitudinally of the sleeve nut and interposed between the outer compression plate and the lever, spring means normally urging the lock plate toward the outer compression plate, said outer compression plate having keeper recesses, said lock plate having a keeper tongue movable into and out of a keeper recess for normally holding the lock plate against rotation relative to the outer compression plate, and said lock plate being rotatable with the lever and the sleeve nut when the lock plate is moved toward the lever away from the outer compression plate with the latch tongue out of a keeper recess.

3. A plug as defined in claim 2, and said lock plate having retaining side walls straddling the lever at all times.

4. A plug as defined in claim 2, and said lock plate, having retaining side walls straddling the lock lever at all times, and limiting end walls in the path of the swinging movement of the lever.

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