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A. MOELLER

2,760,667

ADJUSTABLE PRE-SET PLUG

Filed July 21, 1954

Fig. 1.

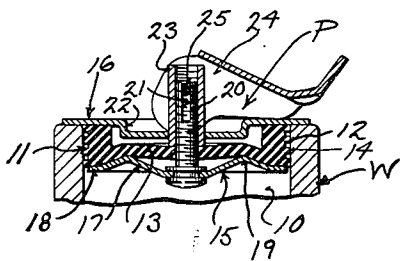


Fig. 2.

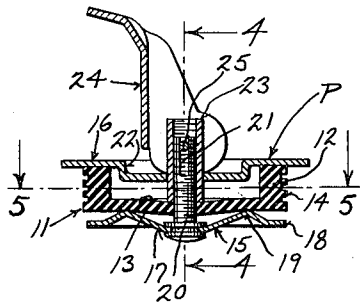


Fig. 3.

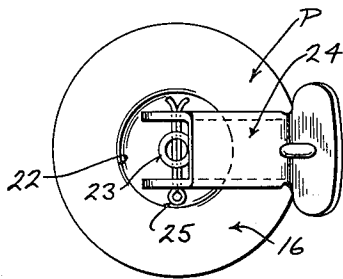


Fig. 4.

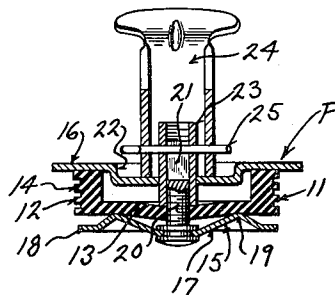


Fig. 5.

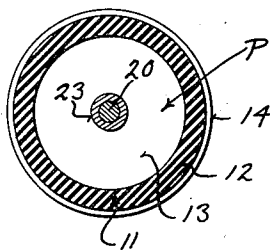
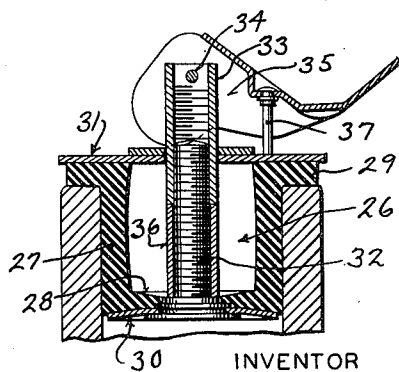


Fig. 6.



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2,760,667

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2 Claims. (Cl. 215—53)

This invention appertains to adjustable plugs or stoppers of the general type shown in my following prior patents: No. 2,292,149 issued August 4, 1942; No. 2,315,538 issued April 6, 1943 and No. 2,347,835 issued May 2, 1944.

In these patents two adjustments are had for the stoppers; namely, a first adjustment for initially regulating the active diameter of the compressible resilient body according to the variations in interior diameter of bottles or jar necks, and a final adjustment for spreading the body into intimate sealing and gripping contact with a neck. The first adjustment is had by rotating a nut on a threaded stem down against a top compression plate. The final adjustment is had by swinging down a cam lever pivotally carried by the nut against the top compression plate.

In certain lines of industry, it is desirable to have a plug for fitting in an accurate sized opening of a certain piece of work and for firmly gripping the wall of the opening to facilitate the handling of the work by the plug. In this type of work, the continuous use of the first adjustment is objectionable, and it is desirable to hold the compressible body at a desired initial set and to use only the second adjustment for releasing and locking the plug in the opening. However, it is highly desirable to change the initial set from time to time as the compressible and resilient body wears or loses its initial set, so that the necessity of discarding worn stoppers will be eliminated.

It is, therefore, one of the primary objects of my present invention to provide an adjustable plug embodying a resilient compressible body which can be set and held at a certain desired diameter with means including a cam lever for releasing and locking the plug from and into the work.

Another salient object of my invention is to provide means whereby the initial set of the diameter of the resilient compressible body can be quickly varied from time to time as conditions warrant such change.

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 central sectional view through my improved plug showing the same locked in an opening of a piece of work, the work being shown in section;

Figure 2 is a diametric sectional view through the plug alone showing the same in its released position;

Figure 3 is a top plan view of the improved stopper with the locking cam in its lowered operative position;

Figure 4 is a view similar to Figure 2, but taken at right angles thereto and on the line 4—4 of Figure 2, looking in the direction of the arrows;

Figure 5 is a horizontal sectional view taken on the line 5—5 of Figure 2, looking in the direction of the arrows, and

Figure 6 is a central sectional view through a modi-

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fied form of the plug, the plug being shown in its locked position and inserted in a piece of work, the work being also shown in section.

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 for fitting in an opening 10 of a piece of work W. The piece of work W can be any object being manufactured, and that requires handling and the opening 10 therein can be considered as having a predetermined accurate diameter.

The plug P comprises a compressible resilient body 11 preferably formed from rubber and the same includes an annular side wall 12 and a bottom relatively thin wall 13. The outer periphery of the side wall 12 is provided with spaced annular ribs 14 for a purpose set forth in my prior Patent No. 2,315,538. This body 11 is confined and clamped between a lower compression plate 15 and an upper compression plate 16.

The lower compression plate 15 embodies a centrally disposed upwardly flared inverted conical shaped portion 17 and an outwardly extending peripheral straight flange portion 18 which extends under the side wall 12 of the body. The central conical portion 17 and the flange 18 define an annular rib 19 at their juncture which fits under the bottom flexible wall 13 of the body and adjacent to the side wall 12 thereof. The purpose of this particular construction will later appear. Rigidly secured to the axial center of the bottom plate 15 is an upstanding threaded stem 20, and in accordance with this invention the upper end of the stem is provided with a longitudinally extending slot 21.

The upper compression plate 16 is preferably of a greater diameter than the lower compression plate 15, so that the upper plate will over-hang the compressible body and engage the outer surface of the work W around the opening 10. This upper plate is provided with a centrally depressed portion 22.

Threaded upon the stem 20 is an elongated nut 23 and rockably mounted upon the nut is a cam lever 24. This lever fits in the central depressed portion 22 of the upper plate 16, and when the lever is in its lowered position, as shown in Figure 1, the lobes or high points of the cam lever press down against the upper plate and function to bring the upper and lower plates toward one another to longitudinally compress the body, and thus radially expand the same for gripping contact with the wall of the opening 11. The cam lever 24 is united with the nut 23 in a novel manner for swinging movement and this includes a pivot pin 25 of a character which can be quickly removed from its operative position through the cam lever and the nut. As shown in the drawing, this pivot pin 25 can be in the nature of a common cotter pin and the pivot not only extends through the cam lever and the nut but also through the slot 21 in the stem, and hence the pivot functions to also unite the stem with the nut so that these parts cannot be separately turned.

In use of my improved plug, the pivot 25 is initially removed from the lever 24 and the nut 23 and the nut is threaded on the stem 20 to a desired selected position so that the compressible resilient body 11 will have a certain predetermined set. The pivot is now associated with the lever, the nut and the stem and this predetermined set will be maintained. By manipulating the cam lever the plug can be expanded and contracted at will and the plug when in its contracted position will at all times be snugly received in openings of a predetermined accurate size. Upon wear of the compressible resilient body 11 or upon the taking of an undesirable set, the compressible body can again be re-set to a desired size by removing the pivot 25 and against adjusting the nut

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23. By referring to Figure 1, it can be seen that upon the compression of the body 11 that the annular rib 19 of the bottom plate 15 presses upwardly against the bottom wall 13 of the body 11 and this insures the outward bulging of the side wall 12.

The construction just described can be effectively used on relatively thin plugs and other means can be employed for obtaining a predetermined set of a compressible body and in Figure 6 I have shown another form. This form is particularly useful for relatively long plugs. Now referring to Figure 6, this plug includes a compressible resilient body 26 and the same includes a cylindrical side wall 27 and a bottom wall 28. The upper edge of the side wall 27 can be provided with an annular outstanding flange 29 for engaging the work. The compressible body 26 is confined between lower and upper compression plates 30 and 31. The lower compression plate has rigidly secured thereto an axially disposed threaded stem 32, which extends through the bottom wall 28 of the body 26. Slidably extending through the upper plate 31 is an elongated nut 33, which is threaded on the stem and this nut has pivotally connected therewith by means of a pivot pin 34, a cam lever 35. By rotating the nut 33, the cam lever can be brought further or closer to the bottom plate 30, as the case may be according to the rotation of the nut. To initially obtain a desired and accurate diameter of the compressible body at all times, I provide a removable spacer sleeve 36. This sleeve 36 is of a known height and is interposed between the nut 33 and the plate 30 so that rotation of the nut 33 inward beyond a predetermined point is prevented. When it is desired to change this set, a spacer sleeve 36 of a different length can be substituted for the first spacer sleeve.

If desired a stop 37 can be carried by the cam lever 35

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35 for engaging the top plate 31 to limit the downward swinging movement of the cam lever.

From the foregoing description it can be seen that I have provided an improved form of plug in which the compressible body thereof can be given an initial predetermined set.

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. An adjustable plug comprising a compressible resilient body, upper and lower plates engaging the opposite ends of the body, an axially disposed threaded stem carried by the lower plate and extending through the body toward the upper plate, said upper plate having an axially disposed opening, an elongated nut threaded on the stem extending through the opening, the upper end of said stem having a longitudinally extending slot, a cam lever, and a removable pivot uniting the lever and the nut together, said pivot extending through the slot whereby turning movement of the nut and stem relative to one another is prevented to obtain an initial predetermined set of the compressible body.

2. An expansion plug as defined in claim 1, and said pivot being a cotter key.

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