Feb. 20, 1962 B. A. SARAFINAS 3,021,975

CLOSURE MEMBER

Filed April 7, 1960

Fig. 1.

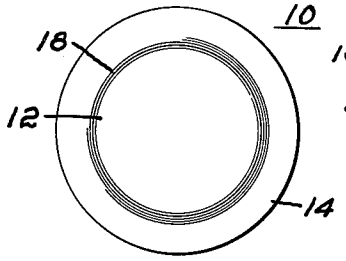


Fig. 2.

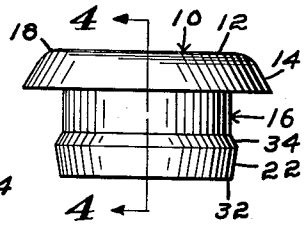


Fig. 3.

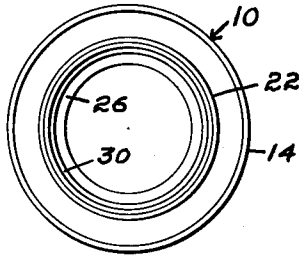


Fig. 4.

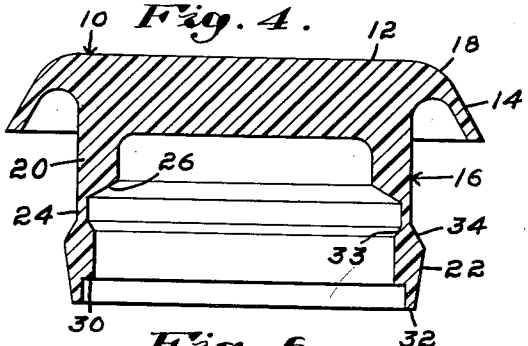


Fig. 5.

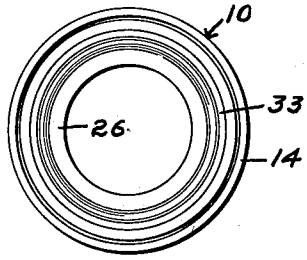


Fig. 6.

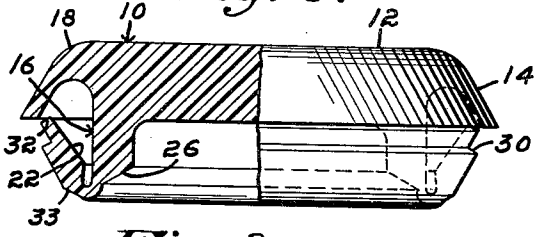


Fig. 7.

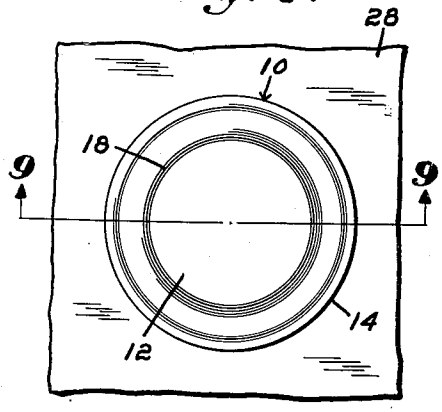


Fig. 8.

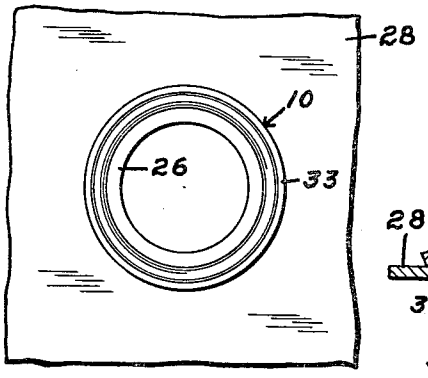
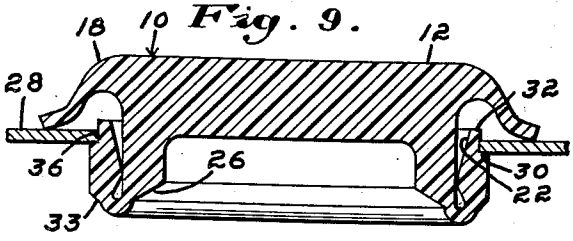


Fig. 9.



Inventor:
Bruno A. Sarafinas,
by Walter S. Jones
Atty.

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3,021,975

CLOSURE MEMBER

Bruno A. Sarafinas, Saugus, Mass., assignor to United-Carr Fastener Corporation, Cambridge, Mass., a corporation of Delaware

Filed Apr. 7, 1960, Ser. No. 20,634
5 Claims. (Cl. 220—60)

This invention relates generally to closure members and more specifically to the form of closure member known in the trade as a "plug button."

An object of the invention is to provide a closure member which will prevent water or other liquids from entering the application hole at the edge engaged by the member.

A further object of the invention is to provide an insulating closure member formed of plastic material.

A still further object of the invention is to provide a closure member having an easy on, hard off action.

Other objects of the invention will, in part, be obvious, and will, in part, appear hereinafter.

In the drawing:

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

FIG. 2 is a side elevation of the closure member;

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

FIG. 4 is an enlarged section taken on the line 4—4 of FIG. 2;

FIG. 5 is a bottom plan view of the closure member with the terminal portion set for engagement;

FIG. 6 is an enlarged side elevation partly in section with the terminal portion set for engagement;

FIG. 7 is a top plan view of the closure member assembled in an apertured support;

FIG. 8 is a bottom plan view of the closure member assembled in an apertured support; and

FIG. 9 is an enlarged section taken on the line 9—9 of FIG. 7.

Referring to the drawings, there is illustrated a one piece plastic closure member **10** comprising a base element **12**, a flange **14** and a tubular engaging portion **16**. The base element **12** may comprise a solid cap which closes one terminal opening of the tubular engaging element as shown in FIG. 4. However, the base element **12** may consist in a peripheral rim allowing the tubular engaging element **16** to remain open at both ends.

The flange **14** is integral with said base element **12** forming an arcuate bight portion **18** at their point of juncture. The flange **14** is in spaced relation with the support portion **20** of the tubular engaging portion **16** whereby it circumscribes a portion of said support portion **20** forming a circular rim having an axis coincident with the axis of said tubular engaging portion **16**. The flange **14** extends in a direction away from said base element **12** in the same general direction as the said tubular engaging portion **16**. The said tubular engaging portion **16** is integral with the said base element **12**. The axis of said tubular engaging portion **16** is coincident with the axis of said base element **12** whereby the support portion **20** of the tubular engaging portion **16** is in substantially right angle relationship with said base element **12** as best shown in FIG. 4. Said tubular engaging portion **16** comprises said support portion **20** and a terminal portion **22** with a neck **24** connecting said support portion **20** and said terminal portion **22**. The inner edge **26** of said support portion **20** adjacent the neck **24** is sloped to form a chamfer. The support portion **20** is formed in a comparatively thick section making it rigid and capable of withstanding forces which might collapse it on engagement with an apertured support **28**. The terminal portion **22** is of thinner cross section than the said support portion **20** but it is of thicker cross section than the said neck

24. It is necessary to have the terminal portion **22** of thicker cross section than the neck **24**, to prevent the said terminal portion **22** from "unwinding" after it has been set in the secondary position as will be explained hereinafter. A locking shoulder **30** is formed on the inside circumferential surface of the terminal portion **22** a predetermined distance from the lip **32** of the said terminal portion **22** and the part of the inside circumferential surface of the terminal portion **22** lying between the said shoulder **30** and the said neck **24** is formed into an angular engaging surface **33**. An obtuse angular protuberance **34** is formed on the outside circumferential surface of the said terminal portion **22** as illustrated in FIG. 4.

To engage the closure member **10** with an apertured support **28**, the diameter of the flange **14** must be greater than the diameter of the aperture **36** in the said support **28** with which engagement is to be made. The terminal portion **22** is bent using the neck **24** as a swivel point whereby the terminal portion **22** is in circumscribed spaced relation with the support portion **20** and in acute angular spaced relationship with the axis of the tubular engaging portion **16**, as illustrated in FIG. 6. Thus a portion of the tubular engaging element **16** is reversed in direction from its original position in any suitable manner. The fastener is now in its secondary position ready for engagement in the said aperture **36**. In this position the circumferential diameter of the said lip **32** is greater than the diameter of the said aperture **36**. The part of the angular engaging surface **33** nearest the neck **24** is pressed against the edge of a wall surrounding the aperture **36** flexing the terminal portion **22** toward the support portion **20** until the edge of the wall at the aperture **36** passes the point adjacent and below the locking shoulder **30**, at which time, a further axial pressure will snap the edge of the aperture **36** into engagement with the shoulder **30** since some stress will be relieved from the terminal portion **22**. At the same time, the flange **14** is pressed against the surface of the said support **28** adjacent the edge of the aperture **36** and flexed away from the axis of said base element **12** placing further locking force on the engagement of the shoulder **30** and the portion of the support adjacent the edge of the aperture **36** and also providing a means for efficient engagement of different thicknesses of the support **28**.

Since certain other obvious modifications may be made in this device without departing from the scope of the invention, it is intended that all matter contained herein be interpreted in an illustrative and not in a limiting sense.

I claim:

1. A member for engagement with the edge of the wall of an aperture in a support, said member comprising a base element, a flange in acute angular relationship with said base element, and a tubular engaging element integral with said base element and extending away from said base element, said flange in spaced relation with said tubular engaging element, said tubular engaging element having a reversible terminal portion.

2. The combination of a thin apertured support and a member for engagement with the edge of a wall of a thin aperture in said support, said member comprising a base element, a flange integral with said base element and a tubular engaging element in substantially right angle integral relationship with said base element and having a reversible terminal portion with an internal shoulder formed therein, said shoulder engaging said edge externally.

3. The combination of a thin apertured support and a member for engagement with the edge of a wall of an aperture in said support, said member comprising a base element, a flange integral with said base element and extending away from said base element, and a reversible tubular engaging element having an internal locking

shoulder, said shoulder engaging said edge externally and a portion of said support adjacent said wall, and said flange bearing against the opposite side of said support from that engaged by said shoulder.

4. A member for engagement with the edge of the wall of an aperture in a thin support, said member comprising a base element, a flange in acute angular relationship with said base element and a tubular engaging element integral with said base element and extending away from said base element, said flange in spaced relation with and a portion of said tubular engaging element, said tubular engaging element having a support portion and a terminal portion, said support portion and said terminal portion

connected by a neck, said terminal portion bent back toward said flange into spaced circumscribed relationship with said support portion.

5. A closure member as set forth in claim 4 wherein said terminal portion has an internal locking shoulder formed therein for locking engagement with said aperture edge.

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