United States Patent

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[54] **CLOSURE AND SEAL**
2 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **215/40**
[51] **Int. Cl.** **B65d 53/04**
[50] **Field of Search** ..... 215/40, 43 R

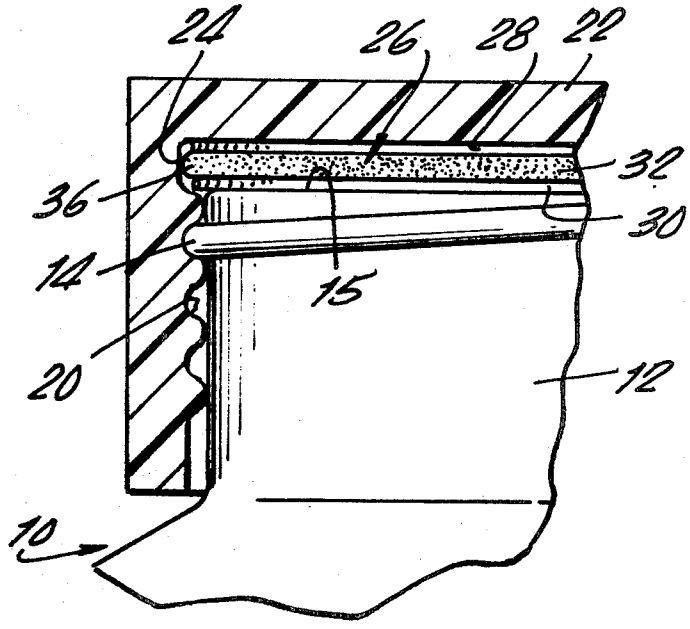
[56] **References Cited**

UNITED STATES PATENTS

2,039,757	5/1936	VonTill	215/40 X
3,463,339	8/1969	McGuckin	215/38

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ABSTRACT: A cap and liner therefor, the cap having a groove at the top thereof for rotatably receiving the liner. The liner is formed of a sandwich and so arranged that a compressible intermediate layer can be squeezed beyond the normal periphery of the liner to engage the cap and make a better seal.



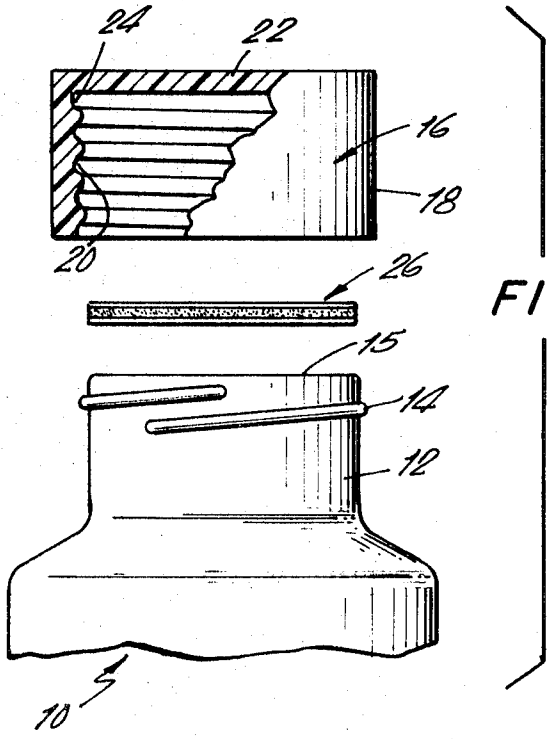


FIG. 1

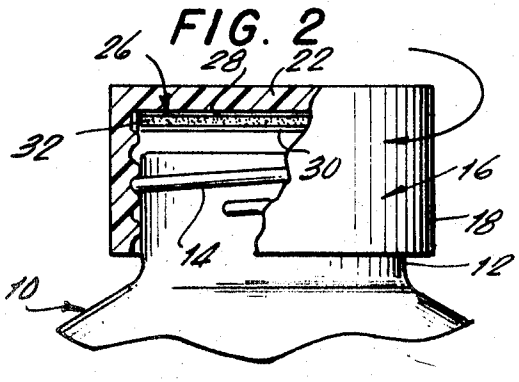


FIG. 2

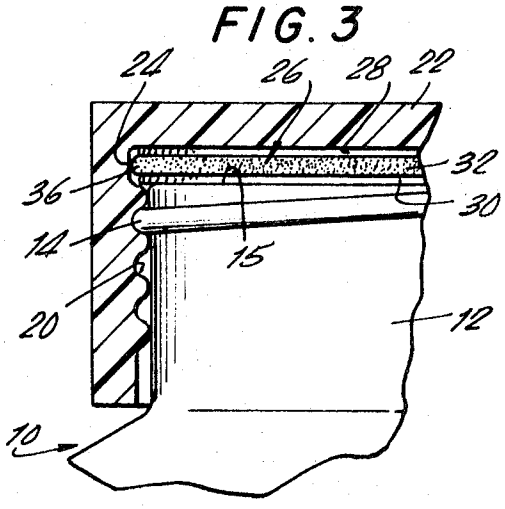


FIG. 3

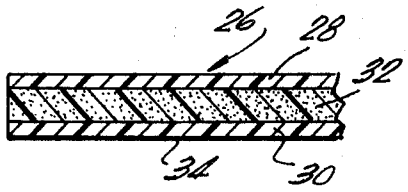


FIG. 4

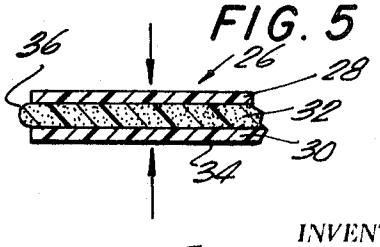


FIG. 5

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CLOSURE AND SEAL

This invention relates to a liner for a cap and to a combination cap and liner for use in providing closures for containers such as bottles, tubes, cans, and the like.

Various types of cap constructions utilizing liners have been devised in the past. These liners are employed to seal the contents of the container preventing leaking between the threaded portions of a container neck and the cap by providing for a positive seal at the mouth of the container. Such previous cap constructions and liners therefor have been a compromise between the requirement that the liner be stress and crack resistant while also being moisture impervious and impervious to chemicals and acids yet being bendable and compressible enough to provide for an effective seal. The present invention overcomes the difficulties of the prior art caps and seals and has all of the advantages of these prior devices without the corresponding disadvantages while providing for satisfactory seal. A further advantage of these liners is that they are capable of being stamped out of stock without freezing.

One of the features of the invention resides in a cap and liner combination in which the liner is freely rotatable within the cap until such time as the mouth of the container is firmly against the liner compressing the liner so that an intermediate layer of the liner is compressed and expands outwardly thereby abutting against the sidewalls of the cap for making a most effective seal.

Still further objects and features of this invention reside in the provision of a cap and liner therefor that is capable of being extruded by conventional combination discs and which can be conveniently stamped to shape thereby permitting manufacture at a relatively low cost, and which is highly effective in use.

These, together with the various ancillary objects and features of this invention, which will become apparent as the following description proceeds, are attained by this closure and seal, a preferred embodiment of which is illustrated in the accompanying drawing, by way of example only, wherein:

FIG. 1 is an exploded sectional detail view illustrating the cap and liner therefor;

FIG. 2 is a sectional detail view showing the cap liner therefor in a stage of being secured on the neck of a container;

FIG. 3 is an enlarged vertical detail view illustrating a portion of the cap and liner therefor as firmly secured on a container;

FIG. 4 is a partial sectional detail view of the liner; and

FIG. 5 is a view similar to FIG. 4 but showing the shape of the liner after it has been compressed when the cap has been tightly closed on the container.

With continuing reference to the accompanying drawing, wherein like reference numerals designate similar parts throughout the various views, reference numeral **10** is used to generally designate a conventional container such as a bottle, tube, or can having a neck **12** which is threaded at **14**. In order to provide a closure for the container **10** a cap **16** is employed which includes cylindrical sidewalls **18** which are internally threaded at **20** and a top **22**. In accordance with the concepts of the present invention a cylindrical groove **24** is formed as the uppermost of the threads **20** and is for the purpose of receiving therein a liner **26**. The cap **16** is preferably molded out of any suitable synthetic plastic material and is adapted to be threadedly secured on the neck **12** with the threads **20** engaging the threads **14**.

The liner **26**, see FIG. 4, is formed of a sandwich of outer layers **28**, and **30**, and an inner layer **32**, the liner **26** preferably being stamped in the shape of a disc. The outer layers **28** and **30** are formed of a low density polyethylene, such as that sold under the trademark Alathion **20**. This material is stress resistant, crack resistant, relatively nonresilient, impervious and is extruded in a very thin layer in the order of approximately 1 ½ one-thousandths of an inch. The intermediate layer **32** is a thermoplastic rubber like material such as butylene in polyethylene known as pliothene, or other resilient material such as ethylene vinyl acetate or the material sold under the trademark Karton, which is a thermoplastic rubber. Particularly, this material is resilient though not necessarily as resistant to stress and cracks/or as impervious to foreign substances as the material of the outer layers **28** and **30**. When the sandwich is manufactured by way of simultaneous multiple extrusion, the outer layers **28** and **30** are extruded at a temperature approximately 300° F. to 400° F. while the intermediate layer **32** is extruded at approximately 220° F. to 320° F. The various layers are brought together within a combination die and at about 300° F. for bonding within the combination die. The resultant sheet material has a much increased resistance to distortion or stress, can be stamped without freezing and is impervious to chemicals and acids as well as moisture. However, when the disc **26** is inserted in the groove **24** in a normal state it will freely rotate therein permitting for effective setting of the disc **26** within the groove **24** and effective engagement of the mouth **15** of the container **10** against the undersurface **34** of the layer **30**. Continued closure of the cap **16** will cause the resilient intermediate layer **32** to be compressed exuding a tongue **36** beyond the peripheral edges of the outer layers **28** and **30** and as shown in FIG. **3** against the inner wall of the groove **24** frictionally sealing the liner **26** with the cap **16**. Thus, there is achieved an inner effective seal and closure for the contents of the container **10** than heretofore possible to achieve while retaining all of the desirable features of the nonresilient low density polyethylene which is used for the outer layers, and which are relatively thin so as to permit for an effectively resilient liner. It has been found that it is desirable that the intermediate layer **32** be between 12 to 30 times the normal width of each of the outer layers **28** and **30**.

A latitude of modification, substitution and change is intended in the foregoing disclosure, and in some instances some features of the invention will be employed without a corresponding use of other features.

I claim:

1. A closure device comprising a cap having a top and an internally threaded cylindrical sidewall, said sidewall having a groove therein adjacent said top, a liner normally rotatably disposed in said groove and including a disc having a pair of outer layers and an intermediate layer sandwiched between said outer layers and bonded thereto, said outer layers being relatively thin and nonresilient, said intermediate layer being resilient and being compressible to form a lip extending beyond the periphery of said outer layers and into engagement with said sidewall in said groove, said intermediate layer being relatively thick.

2. A closure device according to claim **1**, wherein said intermediate layer is from 12 to 30 times the thickness of said outer layers.