

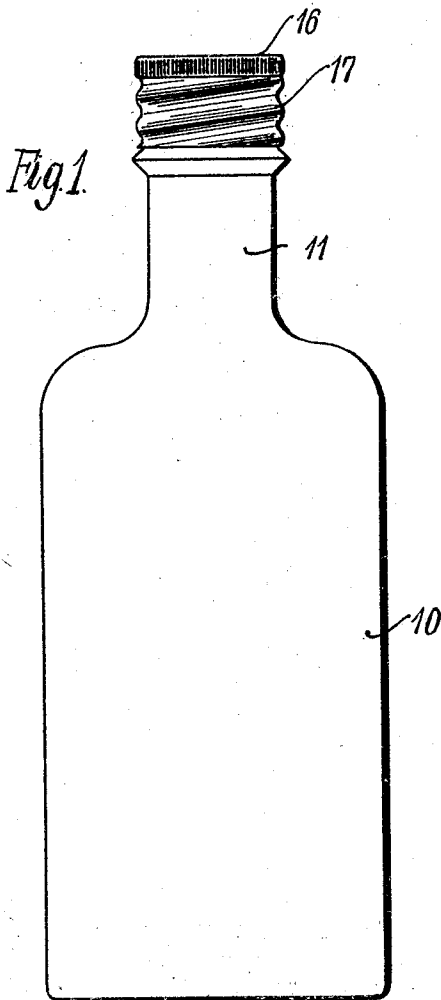
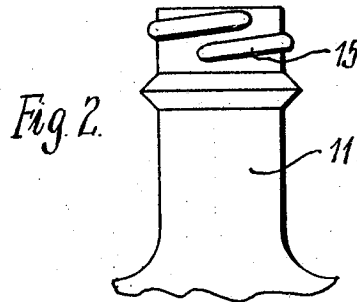
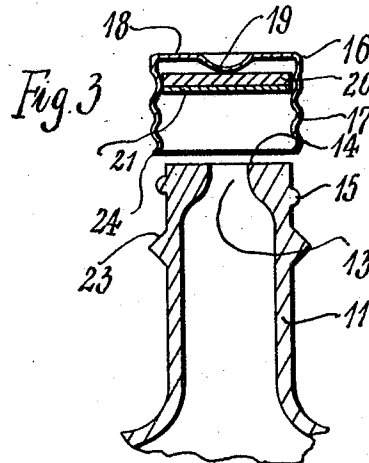
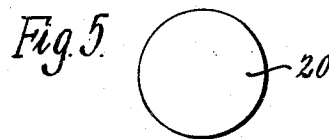
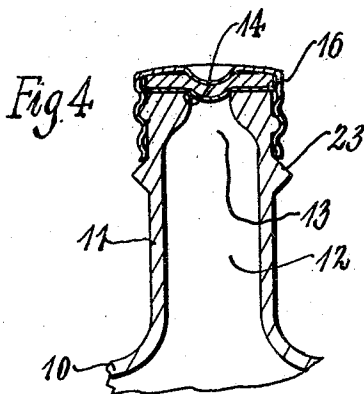
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T. B. STEPHENSON

1,788,129

COMBINATION OF BOTTLE AND CLOSURE THEREFOR

Filed July 27, 1928



INVENTOR.
Thomas B. Stephenson
BY *Chapman & Neaf*
ATTORNEYS.

UNITED STATES PATENT OFFICE

THOMAS B. STEPHENSON, OF SPRINGFIELD, MASSACHUSETTS

COMBINATION OF BOTTLE AND CLOSURE THEREFOR

Application filed July 27, 1928. Serial No. 295,801.

This invention relates to bottle closures particularly adapted for use with bottles for medicinal liquids. One object of the invention is to provide a bottle closure making a tight and permanent seal which will be unaffected by repeated opening of the bottle. A further object of the invention is to provide a closure of the screw threaded type having a large area of frictional contact serving to prevent accidental opening. A further object is to provide a closure which will form a tight seal independent of slight manufacturing variations in the dimensions of the various parts. Additional objects will appear from the following description and claims:

Referring to the drawings—

Fig. 1 is a side elevation of a bottle provided with the improved closure;

Fig. 2 is a detail of the bottle neck with the cap removed;

Fig. 3 is a section showing the bottle neck with the cap removed and slightly spaced therefrom;

Fig. 4 is a similar view showing the cap in place;

Fig. 5 is a plan view of a sealing washer; and

Fig. 6 is a transverse section through the washer.

The bottle 10, preferably of glass and of any desired shape, is provided with a neck 11 apertured at 12 for the passage of liquid. The end of this aperture adjacent the mouth of the bottle is constricted at 13 forming an outlet edge 14, the purpose of which will appear below. This edge is preferably abrupt and not beveled off and, in the case shown, is formed by the junction of the substantially cylindrical constricted portion of the aperture 12 and the flat top of the bottle. The outside of the bottle neck is provided with screw threads 15 which may be formed during the molding of the bottle in the usual manner.

Fitting over the top of the bottle is a cap 16 preferably formed of sheet metal of a flexible and elastic nature, such as brass. The generally cylindrical side walls of the cap are screw threaded at 17 to engage the screw

threads 15 on the bottle. The top 18 of the cap is substantially flat except for an indentation 19 at its center. This indentation may be of any desired shape, but is preferably rounded or conical so that it tends to project inwardly of the constricted portion 13 when the cap is screwed in place on the bottle. Within the cap is placed a washer 20 which may be faced with a sheet of foil 21.

As the cap is screwed upon the bottle the washer is pressed by the indentation 19 firmly against the edge 14 and forms therewith a fluid-tight seat. Due to the elastic nature of the bottle cap and the spacing of the indentation 19 from the cylindrical side wall of the cap, the top of the cap will be sprung upwardly a slight amount when the cap is screwed down. This bending of the cap top results in a constant yielding pressure against the washer, forming a tight seal and exerting a constant strain on the screw threads and the washer so that any tendency to unloosen is avoided.

As a further desirable refinement I prefer to form a slanting ledge or abutment 23 on the outer surface of the bottle neck positioned so that the bottom edge 24 of the cap will strike it when the cap is screwed down the desired amount. The contact between the abutment 23 and the edge 24 of the cap increases the area of frictional contact which holds the cap in place on the bottle. The abutment 23 is not designed to add substantially to the fluid tightness of the seal but acts to make more secure the retention of the cap upon the bottle during handling or shipment.

It will be observed that due to the elastic character of the seal and due to the interposition of the sealing washer between the cap and the bottle a tight seal will be obtained irrespective of slight manufacturing variations in the dimensions of the parts. The abruptness of the shoulder 14 also aids in this respect since the edge 14 presses into the material of the washer and makes a very tight contact at that point. The closure described particularly adapts itself to use with the automatic bottle filling and closing machines, since the cap can be screwed down against the abutment 23 by the usual automatic mech-

anism, and the suddenly increased resistance to rotation at this point will throw out the automatic cap screwing mechanism without danger of variation in the degree of sealing. The sealing, it will be understood, is already complete before the cap strikes the abutment.

Some of the advantages of the invention, in addition to those mentioned, can readily be understood from the following considerations. The species of bottle shown serves as a container and liquid shaker. The constricted mouth portion 13 serves as a shaker nozzle for the bottle. The advantage is that the bottle may be made of a single piece of glass and the use of a separate stopper with a metal nozzle is avoided. In making the type of bottle shown the practice is of course to mold it in a bottle-making machine. The molding operation, however, does not ordinarily or uniformly result in a flat bottle top. There are usually some irregularities in the top surface. So if an ordinary cap closure with a washer but without the structure and function provided by the depressed portion 19 were used, the sealing would not usually be tight around the aperture 13, particularly as the cap is repeatedly screwed on and off by the user and particularly if the surface adjacent the edge of the aperture were slightly depressed which is the tendency in the glass molding operation. And if the cap without depression 19 were screwed on tightly enough by machinery at the factory to make a good seal, then the closure would be difficult to remove by a hand operation when it reaches the ultimate user.

By the combination of the invention the depression 19 causes a tight seal but only over a small annular area immediately around the outlet of aperture 13. This seal has the nature of a spring seal. The cap is easy to remove by hand and easy to apply by hand so the user likes it, not only because it works well, but because of its sheer simplicity. The seal is made without regard to any of the usual irregularities produced in the glass molding operations. Thus, my invention may be applied to what would be an ordinary metal cap closure by forming the depression 19 and then using the closure with the particular bottle and without troubling the bottle maker for more than his usual accuracy in the surfaces of his structure.

What I claim is:

1. A bottle closure comprising a bottle having a neck apertured for the passage of liquid, said aperture being constricted adjacent the mouth of the bottle to present a shoulder, screw threads on the outside of the bottle neck, a flexible elastic metallic cap provided with screw threads interengaging with those on the bottle neck and having an indentation at the center of its upper surface and spaced from its screw-threaded side

wall to provide an elastically deflectable area, and a sealing washer within the cap adapted to be pressed into the aperture and against the shoulder by the elasticity of the top of the cap when the cap is screwed down.

2. A bottle closure comprising a bottle having a neck apertured for the passage of liquid, said aperture being constricted adjacent the mouth of the bottle to present a shoulder, screw threads on the outside of the bottle neck, a flexible elastic metallic cap provided with screw threads interengaging with those on the bottle neck and having an indentation at the center of its upper surface and spaced from its screw threaded side wall to provide an elastically deflectable area, a sealing washer within the cap adapted to be pressed into the aperture and against the shoulder by the elasticity of the top of the cap when the cap is screwed down, and an abutment on the outside of the bottle neck positioned to resist further movement of the cap after its top has been deflected a predetermined amount.

In testimony whereof I have affixed my signature.

THOMAS B. STEPHENSON.