No. 683,522. Patented Oct. 1, 1901.

F. B. THATCHER.

BOTTLE STOPPER.

(Application filed Sept. 27, 1899.)

(No Model.)

Fig. 1

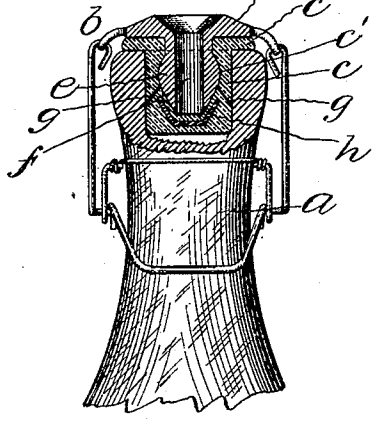


Fig. 2

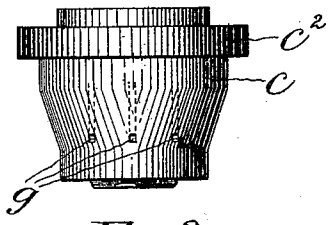


Fig. 3.

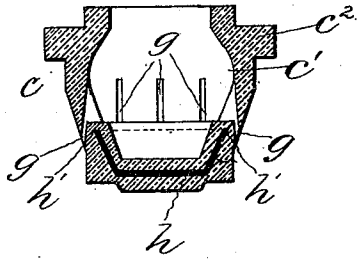


Fig. 4

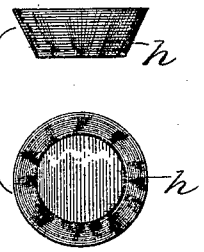
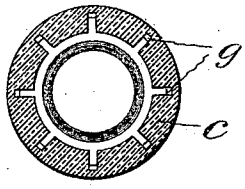


Fig. 5



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UNITED STATES PATENT OFFICE.

FREDERICK B. THATCHER, OF PROVIDENCE, RHODE ISLAND.

BOTTLE-STOPPER.

SPECIFICATION forming part of Letters Patent No. 683,522, dated October 1, 1901.

Application filed September 27, 1899. Serial No. 731,848. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK B. THATCHER, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Bottle-Stoppers, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a stopper for a bottle or like vessel, said stopper being made of india-rubber or like elastic material and reinforced at the lower end of the plug or stopple by a rigid piece so combined as to prevent the leaking of gas or fluid under pressure around or through the stopple.

To this end my invention consists in the details of the several parts making up the stopple and the combination of same with the reinforce, as hereinafter described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a view in elevation of the head and neck of a bottle fitted with my improved stopper and with parts broken away to show construction. Fig. 2 is a detail view, on enlarged scale, in side elevation, of the stopple. Fig. 3 is a detail view, in central vertical section, of the stopple. Fig. 4 is a detail view in elevation and plan of the cup-shaped reinforce. Fig. 5 is a detail view in cross-section of the stopple on a plane cutting through the ports.

In the accompanying drawings the letter *a* denotes the upper end of a bottle, to which a stopper *b* is attached by fastening means which include a lever, so that the stopple or plug *c*, which is of india-rubber or like elastic material, may be removably compressed into and on the mouth of the bottle and readily removed to uncover the same when desired. So far as these general features of construction are concerned the parts are of ordinary and well-known form; but in such a structure great difficulty has been experienced in providing a durable and secure packing device comprised in the elastic stopple and containing features of form and construction which at the same time enable the stopper to contain both a fluidway and a plug and valve which shall be certainly operative to retain fluid under high pressure without any leaking.

The metallic cap *d* is of a size and shape to cover the mouth of the bottle, and a central stem or projection *e* extends within the bottle-mouth and is of a diameter and shape suitable for the attachment of a stopple *c*, preferably of india-rubber. Through the center of this cap and projection a hole *f* extends and serves as a socket for the reception of a filling-tube as well as for a passage for the fluid.

The stopple *c* is formed with a socket or recess *c'*, opening upward and shaped to fit and to be automatically held on the shouldered projection on the cap.

A flange c^2 near the top of the stopple *c* projects laterally from the edge of the bottle-mouth and underlies the edge of the cap, beneath which it is compressed when the stopper is closed tightly, and the bottom of the stopple fits snugly upon and closes at its lower end the hole *f* through the cap.

In the side walls of the stopple *c* and at a distance from the bottom are located ports *g*, which provide a part of the course along which any fluid must pass in flowing into or out of the bottle when the stopper is partly opened or the plug extended, as by thrusting an implement into the central hole *f* in the cap and pushing the bottom of the stopple away from the lower end of the hole *f*.

The main feature of my improvement resides in the cup-shaped reinforce *h*, which is embedded within and completely covered by the material in the lower part of the stopple. This cup-shaped piece is preferably of metal with thin walls, flat, or substantially so, as to the bottom and with the said walls slightly flaring outward, so as to conform to the general shape, size, and outline of the bottom of the projection on the body part of the cap, onto which the elastic stopple or plug is tightly fitted. As is shown in the sectional view of the stopple, the upper edge *h'* of this reinforce *h* is located just below the ports *g* in the side walls of the stopple.

It has been shown by thorough test in actual use that any material which is located within a rubber part intended to act as a valve must be wholly embedded and covered against the access of air under pressure at any point, as otherwise the air will extend into the mass of the rubber at the exposed

edge along the surface of the material on both its sides and then break through the covering-layer of rubber on the other side of the material—that is, if the edge of this reinforce *h* should be exposed where the ports through the walls of the stopple are formed the air would pass down along the surface of the reinforce until it reached the part opposite the hole and would then forcibly push through the covering-layer of the rubber and form a leak.

The upturned side walls of the reinforce by conforming to the general shape of the bottom of the projection on the cover give firm support to the lower end of the stopple and prevent it from being distorted in use or collapsing under pressure. This form of reinforce enables the rubber stopple to be formed and molded entirely about and to completely inclose the cup-shaped reinforce.

I claim as my invention—

1. In combination in a bottle-stopper having a cap with a central projection and provided with a passage therethrough, a stopple of flexible material secured to the projection, a dish-shaped metallic reinforce conforming in shape to the lower end of the projection, said reinforce being wholly embedded within the walls of the stopple and surrounding said projection and underlying the opening therethrough.

2. In combination in a bottle-stopper having a cap with a central projection and provided with a passage therethrough, a stopple of flexible material secured to the cap, a metallic reinforce having an unbroken surface and conforming in shape to the shape of the lower end of the projection, said reinforce being wholly embedded within the walls of the stopple and underlying the opening through the cap.

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Witnesses:
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