(No Model.)

F. B. THATCHER.

BOTTLE STOPPER.

No. 313,253. Patented Mar. 3, 1885.

Fig. 1

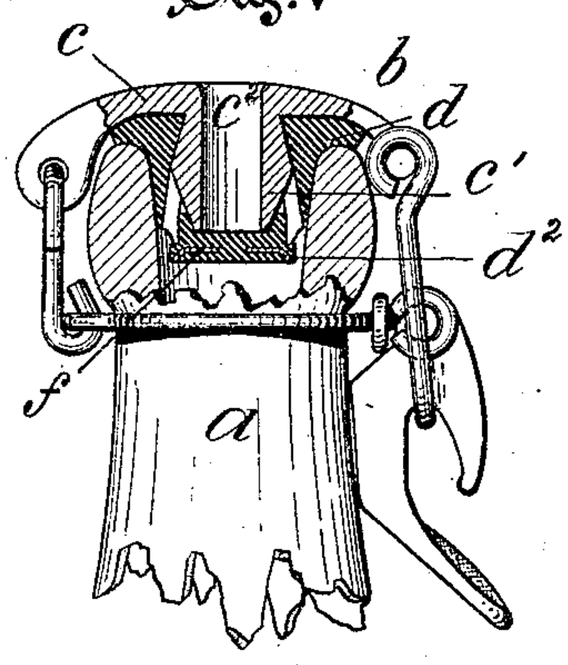


Fig. 2

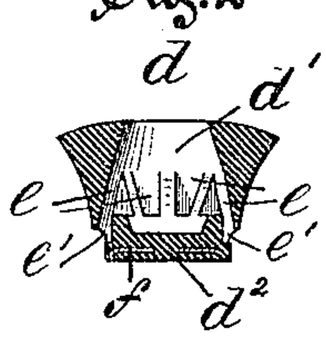


Fig. 3

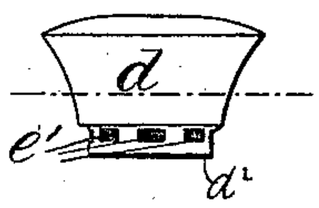


Fig. 4

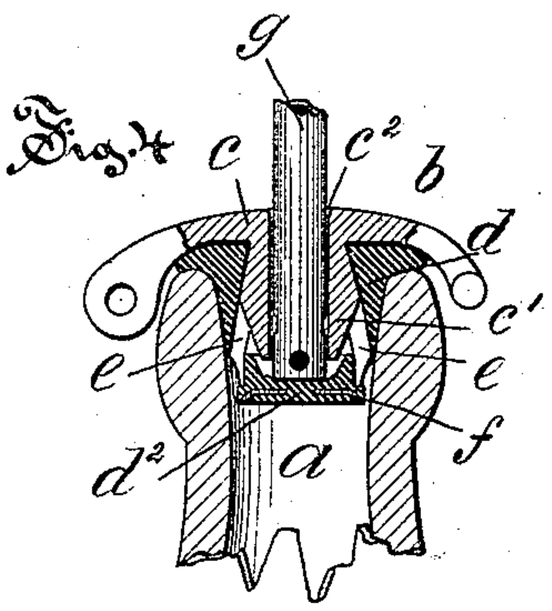
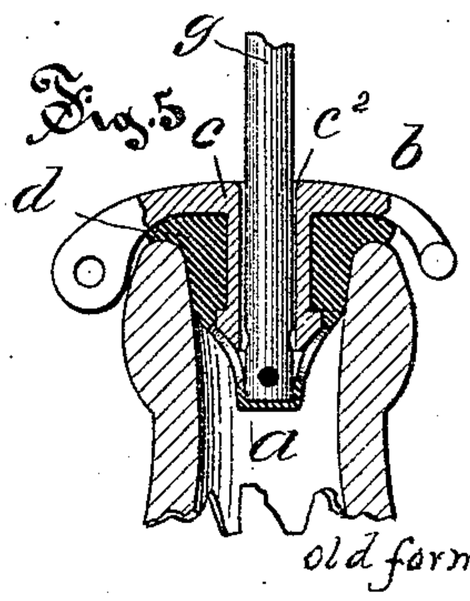


Fig. 5



old form

Fig. 6

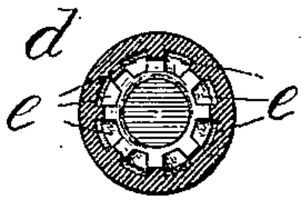


Fig. 7

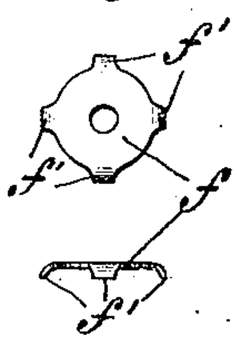
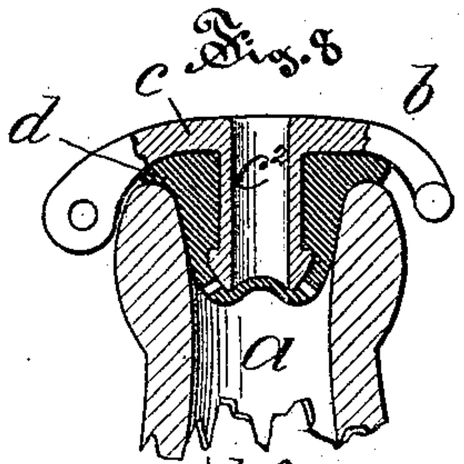


Fig. 8



old form

Witnesses

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W. H. Marsh

Inventor

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UNITED STATES PATENT OFFICE.

FREDERICK B. THATCHER, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE AETNA STOPPER COMPANY, OF PAWTUCKET, RHODE ISLAND.

BOTTLE-STOPPER.

SPECIFICATION forming part of Letters Patent No. 313,253, dated March 3, 1885.

Application filed September 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK B. THATCHER, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Bottle-Stoppers; and I do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Like letters in the figures indicate the same parts.

Figure 1 is a detail view of the upper part of a bottle, showing the mouth closed by a stopper embodying my invention. Fig. 2 is a view in central vertical section of the plug with its parts in a normal position. Fig. 3 is a detail exterior view of my improved plug. Fig. 4 is a detail view in central vertical section, showing the position of the parts of the plug when the valves are opened by means of a tubular stem, as when a bottle is being filled. Fig. 5 is a similar sectional view of a stopper and an old form of plug, showing the position of the parts in opening the valve. Fig. 6 is a detail cross-sectional view of the plug shown in Fig. 3 on plane *x x* in that figure. Fig. 7 shows in plan and section detail views of one form of metallic re-enforce used with my improved plug. Fig. 8 is a sectional view showing an old form of stopper-plug.

My invention relates to the class of bottle-stoppers that open inwardly, and particularly to those stoppers in which the plug-supporting stem has a central perforation and bears an elastic plug with ports arranged to be opened by means of an instrument introduced through the stem.

My improvement consists in providing the lower end of the plug beneath the stem with a metallic re-enforce, and also in certain details of construction of the plug and its supporting-stem, as more particularly hereinafter described.

In the accompanying drawings, the letter *a* denotes the bottle, (the upper part only being shown,) the mouth of which is provided with a fastener, *b*, of which the cap-plate *c* has a downward-projecting stem, *c'*, with a central perforation, c^2. The stem is enlarged, preferably near the center of its length, to form a shoulder by means of which the plug *d* is held upon the stem. The lower end of the stem *c'* is preferably tapered on the outside from the broadened part to the end, forming the frustum of a cone, and the elastic plug *d*, preferably of india-rubber, has a socket, *d'*, that opens upward and is contracted at its mouth, so as to grasp the neck of the stem upon which the plug is sprung by thrusting the stem into the socket. The walls of the socket in the plug conform to the general shape of the stem on which the plug fits, except where a series of longitudinal grooves, *e*, pierce the walls at an angle with the vertical axis of the plug, and open on its outside, and near the bottom, in the ports *e'*, of which there may be any convenient number. This construction leaves the bottom of the plug, which I call the "valve d^2," connected to the body part by a series of longitudinal straps of considerable strength as compared with those of prior plugs. The upper surface of the plug (see Fig. 2) has a recess into which the lower end of the stem closely fits, (see Fig. 1,) and when the bottle is closed or corked, as by means of the fastening device to which the plate *c* is attached, the ports are tightly closed, and any outward pressure of contained gas or liquid under pressure causes the valve to close still tighter.

Within the body of the valve d^2 a thin disk, *f*, of some inelastic material, preferably of metal, as silver, is placed to form a re-enforce and brace, that gives the valve sufficient rigidity to operate uniformly under the thrust of the tubular stem *g* of a filling or draw-off device. The re-enforce *f* has preferably a central opening, and the downturned feet *f'*, on which it is supported in the bottom of the mold, while the rubber is cast about it, thus bringing the re-enforce within the body of the valve. I do not limit myself to this method of placing the re-enforce in the valve, as a socket may be cast and the disk forced into place by stretching the elastic material of the valve; but I prefer the method described.

By using a re-enforce in the valve I am en-

abled to use purer gum than when, as in old devices, the valve must be made thick and rigid, as this result was gained by using a larger per cent. of adulterants in the compound. With purer gum I get greater elasticity and better packing of the whole body of the plug under stress of the fastener or pressure of the contained fluids.

My improved plug is also more durable, as the straps that support the valve are in opening the latter stretched to a less degree, and also more evenly than is the case of the prior plugs, as will be seen by comparing Figs. 4 and 5.

Where the valve is not re-enforced it is after a time forced upward into the stem, as illustrated in Fig. 8, and soon caused to leak.

I claim as my invention—

1. As an improved article of manufacture, an elastic bottle-stopper plug having a socket for a stem, valve-ports, and a valve re-enforced by a rigid material supported by the valve, all substantially as described.

2. As an improved article of manufacture, an elastic bottle-stopper plug having a socket for a cap-plate stem, also a series of grooves in the inner walls of the plug that open in ports near the lower side of the plug, and a valve supported by the straps between the grooves, all substantially as described.

3. As an improved article of manufacture, an elastic bottle-stopper plug having a central socket for a cap-plate stem, inner grooves terminating in ports, and a valve re-enforced by a disk of rigid material supported by the valve, all substantially as described.

4. In combination, an elastic bottle-stopper plug having a stem-socket and a valve, and a re-enforce of rigid material cast within the valve, all substantially as described.

5. In combination, in a bottle-stopper, a cap-plate having a stem tapered below the shoulder, an elastic plug having a socket whose wall conforms to the outline of the stem, grooves in the walls that terminate in ports, and a re-enforced valve closing the bottom of the stem, all substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK B. THATCHER.

Witnesses:
E. B. HURD,
WILLIAM F. HURD.