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Patented July 11, 1899.

L. GOYBET.

CLOSING DEVICE FOR VESSELS CONTAINING VOLATILE LIQUIDS.

(Application filed Apr. 4, 1899.)

(No Model.)

Fig. 1.

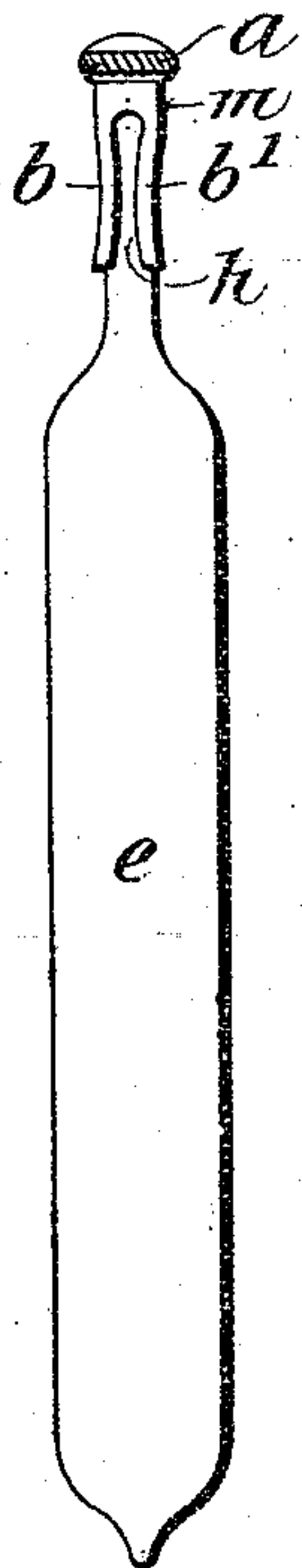


Fig. 2.

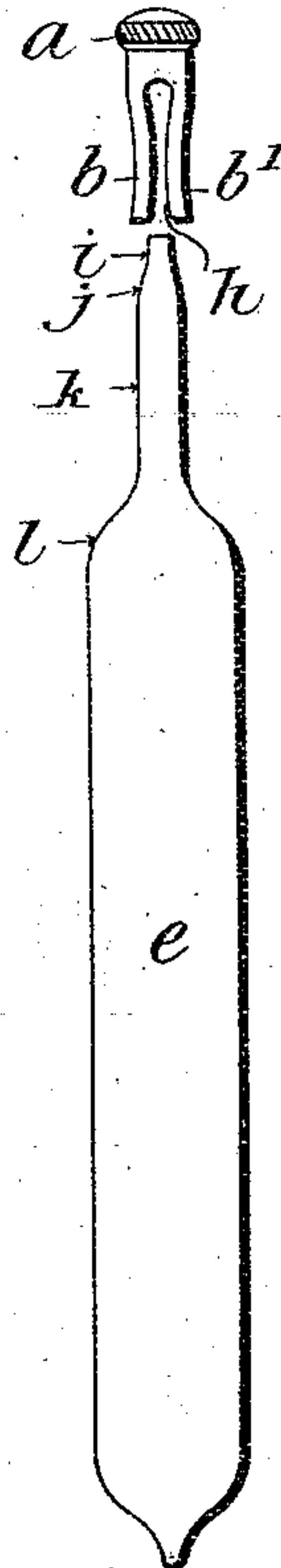
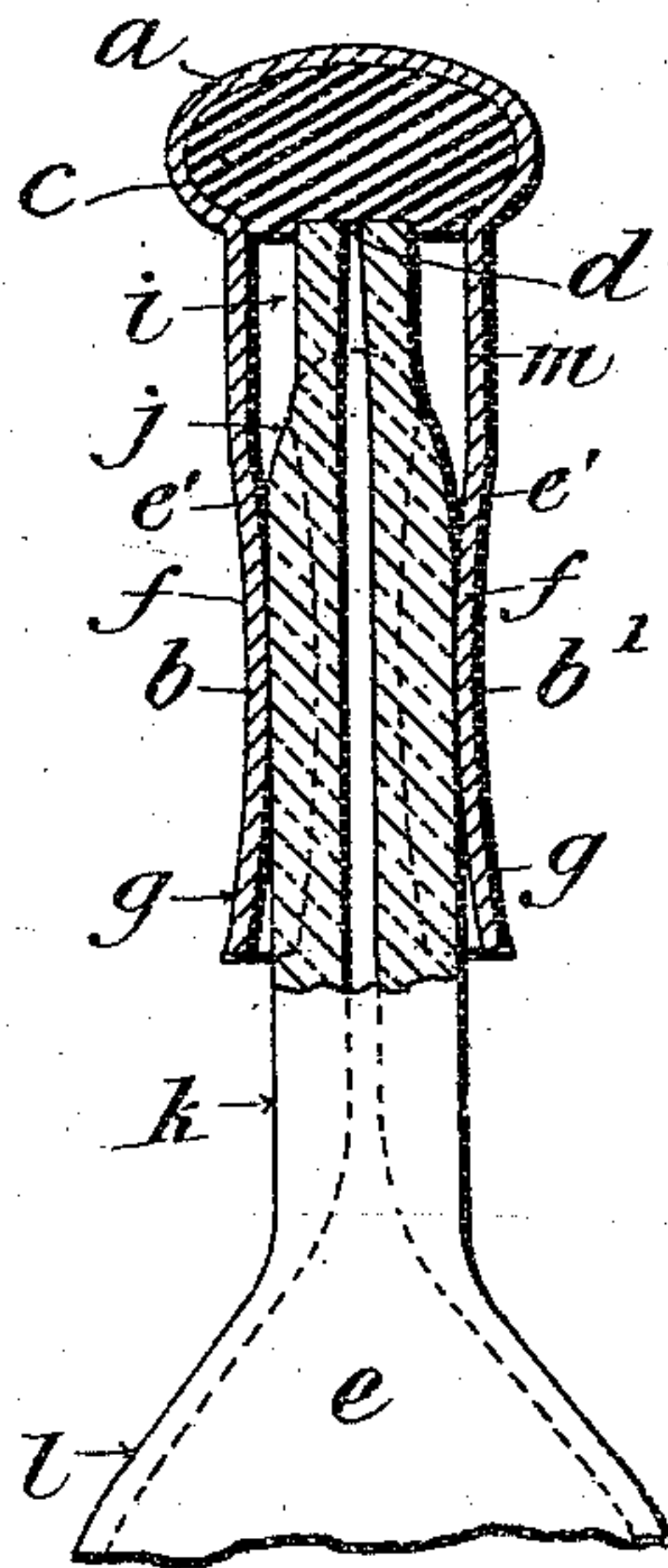


Fig. 3.



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CLOSING DEVICE FOR VESSELS CONTAINING VOLATILE LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 628,460, dated July 11, 1899.

Application filed April 4, 1899. Serial No. 711,656. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GOYBET, of La Plaine, near Geneva, Switzerland, have invented certain new and useful Improvements in Closing Devices for Vessels Containing Volatile Liquids, of which the following is a specification.

This invention relates to devices for closing vessels containing ethyl chlorid and other highly-volatile liquids, and is more particularly adapted to vessels formed with a capillary outflow-aperture to allow of directly producing a fine jet. Smaller-sized vessels of this kind (which are made chiefly of glass) have hitherto been closed by means of a metal mount, which is cemented over the capillary outflow portion or tube, and of a metal cap which is adapted to be screwed or otherwise fastened on the said mount. Now this mode of closure is complicated and troublesome, but is also open to other objections. As the length of the mount is fixed and the capillary tube must necessarily be broken off at the end of the mount, many vessels have had to be subsequently thrown away because the cross-sectional area of the capillary aperture at this place was not of the proper size. It has therefore become necessary to make the vessels intended for this kind of closing device according to a complicated process, in which the capillary tube is not produced by simply drawing out in a heating-flame in the usual way, but in which a capillary tube of uniform diameter is melted onto the vessel. It has also been common to form bottles with large mouths or discharge-openings with an external receding shoulder between the mouth and neck and to construct a cap having an internal rubber washer and having elastic claws bent inwardly to snap behind this shoulder when the cap is applied to the neck, so that the elasticity of the claws causing them to wedge behind the shoulder will draw the cap downwardly, and thus compress the packing against the mouth of the bottle. Such constructions have required much accuracy in order to insure a perfect closure and have necessitated the use of considerable force to apply or remove the cap. By the present in-

vention these drawbacks are entirely obviated and the necessity for the expensive and complicated method of forming the vessels just referred to is done away with. The vessels may be drawn out to a capillary jet in the ordinary way, and the closure is independent of the metal mount before described.

My invention will be understood from the annexed drawings, which represent a vessel of the kind in question fitted with my improved closure.

In the drawings, Figure 1 is a view of the tube closed; Fig. 2, a corresponding view of the same with the closing device removed. Fig. 3 is an enlarged section of the upper part of the tube and closing device in position thereon.

The improved closing device comprises a metal cap or stopper *a*, the cylindrical lower portion of which is slotted or slit in such a manner as to form elastic limbs or extensions *b b'*. The cap *a* is provided inside its upper end with a small washer *c*, of caoutchouc or other suitable material, which effects the tight closure of the capillary outflow-aperture *d* of the vessel *e*. This cap is held in position by means of the grip of the elastic limbs or extensions *b b'* upon the glass capillary tube, and thus the usual metal mount previously used is dispensed with and the drawbacks connected therewith are obviated.

The improved bottle is preferably constructed with a reduced tip *i*, a swell or tapering shoulder *j* inwardly thereof, an elongated smooth cylindrical neck *k* beginning at said swell *j* and meeting the body-shoulder *l* on the bottle *e*. The neck *k* is of considerable thickness to afford strength and is preferably of uniform diameter. The neck-shoulder *j* is smooth and tapering and serves as a wedge for separating the limbs of the cap. The tip *i* is of relatively small diameter, so as to afford at its end a limited area of surface to be pressed against the washer *c*, and also it is preferably of less diameter than the minimum distance between the limbs of the cap when the latter is removed, so that this tip easily passes between the limbs for guiding the cap during its application to the bottle, so that

the swell *j* can gradually separate the limbs after the cap has partly enveloped the tip. The orifice *d* is a capillary orifice of extremely small dimensions, so that no matter what the internal pressure of the volatile substance within the bottle the area of the orifice through which this pressure is transmitted to the cap is so slight that no pressure which the bottle could carry would be sufficient over this small area to displace the cap.

The cap has a cylindrical part *m* between the washer and its bifurcated legs, from which part the cap has one or more slits *h* extending to its end, which separate the limbs *b b'*. These limbs have inwardly-curving portions *e'* extending downwardly from the cylindrical part *d* of the cap, outwardly-flaring lower ends *g*, and intermediate curved inwardly-convexed gripping faces or portions *f*. The limbs have an elastic tendency to approach each other, and their outwardly-flaring lower ends are sufficiently separated when the cap is removed from the bottle to permit these ends to pass partially or wholly over the shoulder *j* of the bottle before separation of the limbs begins. The gripping portions *f* are in sufficient proximity to necessitate a considerable separation of the limbs against their elastic tendency as these portions are slid over the shoulder *j* and onto the cylindrical part *k*.

In operation the cap is pushed over the tip of the bottle until its progress is arrested by the compression of the packing against the end of the tip, at which time the gripping portions *f* will be well located on the cylindrical neck *k* and will make a tight elastic frictional grip thereon sufficient to resist the elastic tendency of the small portion of the packing-washer, which is compressed by the tip, as well as the internal pressure in the capillary orifice, from displacing the cap. There is sufficient room for axial adjustment of the cap along the neck before this gripping ceases to provide for different lengths of tip or different thicknesses or compressions of the packing-washer. The user can remove and apply the cap quickly without special care, and both the bottle and cap can be made without particular attention to exactness of construction and with great economy.

It will be seen that by using a capillary orifice and a contracted tip I am enabled to obtain a tight closure by a frictional engagement between the cap and neck without having to resort to claws, bayonet-joints, or screw connections and without having to make the neck with undercut threads or shoulders, and that the use of a metal mount cemented to the neck is made unnecessary.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with a vessel for containing volatile liquids, having a capillary orifice, a tip and a neck, of a cap, having a yielding packing for engaging said tip and closing said orifice, and having elastic portions sliding axially on, and elastically embracing and frictionally engaging, said neck.

2. In vessels for containing volatile liquids, the combination with a vessel, having a capillary orifice, a contracted tip and a larger cylindrical neck, of a cap, having a yielding packing for closing said orifice, and having a slitted body for passing over said neck, elastically and frictionally embracing the latter for holding the cap in place, said bottle having a tapering shoulder between said tip and neck for expanding the end of said cap.

3. A closure for vessels for containing volatile liquids, consisting of a cap *a* having a yielding packing, and having a bifurcated elastic end, having elastic limbs, having internal frictional gripping-faces *f*, and outwardly-flaring ends *g*.

4. For vessels for containing volatile liquids, the combination with a bottle having a small tip *i*, a swelling shoulder *j*, a cylindrical neck *k*, and a capillary orifice *d*, of a cap *a*, having a cylindrical portion *m*, longitudinal slits *h*, elastic legs *b b'*, and internal frictional gripping-faces *f* for embracing the cylindrical part of said neck, and a packing *c* in said cap.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LOUIS GOYBET.

Witnesses:

E. F. BARRY,
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