Aug. 13, 1935. E. K. A. BERGLUND 2,011,140

CLOSURE MEANS FOR VACUUM FLASKS AND THE LIKE

Filed March 30, 1933

Fig. 1

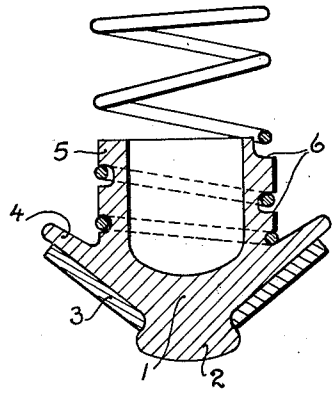


Fig. 2

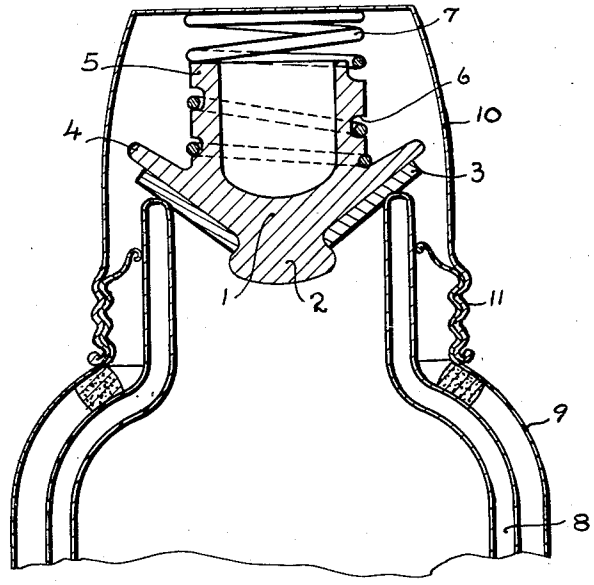


Fig. 3

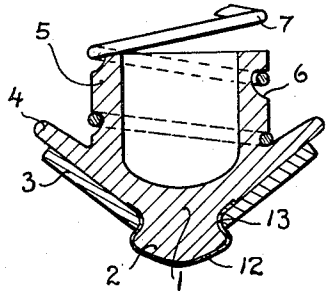
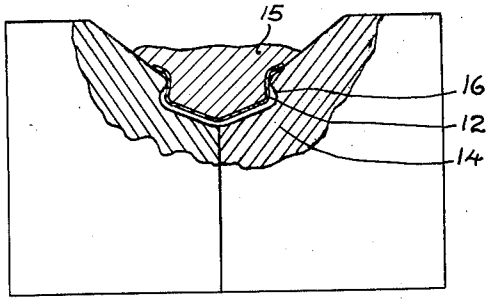


Fig. 4



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Patented Aug. 13, 1935 2,011,140

UNITED STATES PATENT OFFICE

2,011,140

CLOSURE MEANS FOR VACUUM FLASKS AND THE LIKE

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Application March 30, 1933, Serial No. 663,600
In Sweden April 4, 1932

9 Claims. (Cl. 215—83)

The present invention is for improvements in and relating to closure means for vacuum flasks and the like of the type in which the mouth of the flask is closed by a stopper of some sort and a protecting cap is screwed down or in some other way fastened over the stopper. In such contrivances the stopper is nearly always of cork. It is, however, difficult to properly clean a cork stopper and it is therefore preferable to use some other and more hygienic material than cork. At the same time the stopper should effectively seal the mouth of the flask and should further consist of a material resistant to the liquid with which it is likely to come into contact. In addition it should preferably be substantially non-conducting to heat so as to prevent heat losses.

The object of my invention is to provide a stopper for flasks of the aforesaid type which fulfills these conditions and which is free from the disadvantages of the ordinary cork stopper. With this object in view I make the stopper of porcelain or the like material which is resistant to the liquids with which the stopper in ordinary circumstances is likely to come into contact, or, if some other and less resistant material is used, I provide the stopper with a protective lining or capsule. The stopper is preferably of conical shape so as to conform with the mouth of the flask and may be provided on that part of the stopper which is to rest against the mouth of the flask with sealing means in the form of a disc of rubber or the like. In order to hold the stopper against the mouth of the flask I provide the stopper with a preferably detachable coil spring so arranged that the free end thereof is acted upon by the protecting cap or other lid when secured to the body of the flask and the stopper is pressed against the mouth of the flask with the necessary pressure.

By making the spring detachable I facilitate the cleaning of the whole stopper.

Other features of the invention will appear from the following description in which the invention is described in detail with reference to the accompanying drawing. In this Fig. 1 is a section through a preferred embodiment of the invention. Fig. 2 is a section through the upper part of a vacuum flask showing the stopper of Fig. 1 in position and held down by the cap of the flask. Fig. 3 shows a slightly modified form of stopper and Fig. 4 illustrates one method of producing the stopper of Fig. 3.

Like reference characters indicate like parts in all figures.

As shown in Fig. 1 the body 1 of the stopper is preferably of porcelain or similar material and substantially has the shape of a cone. The cone at its apex is enlarged to form a boss 2 so as to securely hold a disc 3 of rubber or the like. The upper end of the stopper body is provided with an annular recess 4 and extended to form a cylinder 5, preferably hollowed out and provided on its outside with a screw thread 6 receiving one end of the coil spring 7. The lower end of the thread groove is made so as to exactly fit the spring. At the upper end of the thread, however, the groove is wider in the axial direction of the thread, than the diameter of the spring so as to permit the spring when compressed to move in the groove, more or less, in an axial direction. Compression of the spring slightly increases the diameter thereof and by reason of this increase and the fact that the upper part of the thread groove is overlarge the spring is free to move relatively to the body of the stopper within certain limits. The advantage of this is that the spring when the cap is screwed down may slightly deviate from its central position without thereby affecting the position of the stopper in the mouth of the flask. This movement may be further facilitated by tapering off the holder 5 towards the free end thereof or making the inner diameter of the thread groove somewhat smaller at the upper end of the thread than at the lower end, as shown in the figure.

Fig. 2 shows the same stopper inserted in the mouth of a vacuum flask. 8 is the vacuum flask, 9 the cover thereof and 10 the cap which is held on the flask by means of the thread 11. It will be seen that the spring under the compression has changed its position in the upper part of the groove 6.

The thread 6 in the stopper may further be made so that at the lower end thereof of the pitch of the thread is smaller than at the upper end. By thus designing the thread the advantage is gained that by unscrewing the spring, if this is required in order to increase the pressure on the stopper or if the spring is too short to provide any pressure at all when screwed down to the bottom of the thread, a longer part of the spring is released and projected above the upper face of the holder 5 than would be the case if the pitch of the thread was the same from end to end, or vice versa, by screwing down the spring on the stopper it may be shortened by a larger amount than would normally be the case. This variation of the pitch from one end of the thread to the other, which is preferably continuous, is clearly shown in Figures 1 and 2.

It may be desirable to substitute for the porcelain of the stopper some other material such as bakelite which is light, easy to mould and comparatively cheap. Bakelite is, however, not resistant to the liquids for which vacuum flasks are ordinarily used and I may therefore, if such a material is used, provide the stopper on that part thereof which is exposed to contact with the liquid with a protective lining or capsule of some suitable material, for example a metal, such as aluminium or stainless steel. A stopper of this type is shown in Fig. 3; the boss or knob 2 is provided with a capsule or ferrule 12 of aluminium or stainless steel held in place by having its diameter reduced at 13 so as to grip the knob at the reduced part thereof. As will be seen from the figure the rubber ring 3 prevents the liquid from coming into contact with the other part of the stopper.

The lining 12 may of course be extended over the whole underside of the stopper, if desired.

Fig. 4 shows how the capsule may be moulded on to the stopper. 14 is the die. A capsule 12 of aluminium or other soft metal of the form shown is inserted in the die and the stopper material 15, for example bakelite, is introduced into the die above the capsule. The moulding pressure forces the capsule into contact with the die surface so as to conform with the shape of the die. The die must of course be made in parts so as to allow of removal of the stopper.

If a stronger material, such as stainless steel, is used for the capsule, this may prior to the moulding operation be given the form shown in Fig. 3 and the annular enlargement of the die at 16 may then be dispensed with. In this case the capsule is sufficiently strong to withstand the moulding pressure and the die may be simplified and the operation of removing the mould from the die facilitated.

It is of course also possible to provide the stopper with an internal thread instead of the external thread described above.

What I claim is:—

1. Stopper for vacuum flasks and the like of the type provided with a protecting cap arranged to be secured to the body of the flask, comprising a stopper body of a shape generally conforming with the mouth of the flask, and a coil spring one end of which is screwed on to the said stopper body in such manner that the free end thereof when the cap is secured to the flask is engaged by the inner wall of the cap and the stopper is pressed against the mouth of the flask.

2. Stopper for vacuum flasks and the like of the type provided with a protecting cap arranged to be secured to the body of the flask, comprising a stopper body of a shape generally conforming with the mouth of the flask having an extension in the form of a substantially cylindrical holder provided on its outside with a thread, and a detachable coil spring screwed on to the said holder with one end thereof, the other end being adapted to be engaged by the inner wall of the cap and press the stopper against the mouth of the flask.

3. Stopper as claimed in claim 2, characterized in that the groove of the said thread in the said holder is wider toward the upper free end of the holder than at the lower end thereof.

4. Stopper as claimed in claim 2, characterized in that the pitch of the said thread in the said holder is larger at the upper free end of the holder than at the lower end thereof.

5. Stopper as claimed in claim 2, characterized in that the inner diameter of the said thread in the said holder is smaller at the upper free end of the holder than at the lower end thereof.

6. Stopper for vacuum flasks and the like of the type provided with a protecting cap arranged to be secured to the body of the flask, comprising a stopper body of a shape generally conforming with the mouth of the flask provided opposite to the sealing face of the stopper with a thread the width and pitch of which increase in a direction away from the stopper body, and a coil spring one end of which is screwed into the said thread and the free end of which is adapted to be engaged by the inner wall of the cap when secured to the body of the flask so as to press the stopper against the mouth of the flask.

7. Stopper for vacuum flasks and the like of the type provided with a protecting cap arranged to be secured to the body of the flask, comprising a substantially cone-shaped stopper body provided at the apex of the cone with a boss to hold a sealing disc of a resilient material and at the base of the cone with an extension in the form of a substantially cylindrical holder provided on its outside with a screw thread having a larger pitch and a wider groove towards the free end of the holder, and a coil spring one end of which is screwed into the said thread and the other end of which is adapted to be engaged by the cap when secured to the body of the flask and press the stopper against the mouth of the flask.

8. Stopper as claimed in claim 1 provided on the sealing face thereof with a protective lining.

9. A stopper for vacuum flasks and containers of the type having a protecting cap to be secured to the body of the flask, said stopper comprising a body having one end shaped to conform to the mouth of the flask, and cushioning means secured to and projecting beyond the other end of said body for engagement by the cap of the flask, said body and cushioning means including cooperating parts permitting adjustment of said cushioning means axially of said body, thereby to determine the pressure with which said body will be seated on the mouth of the flask when the cap is secured to the flask.

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