

F. R. ELDRED.
AMPOULE.
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1,022,069.

Patented Apr. 2, 1912.

Fig. 1.

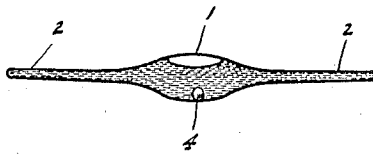
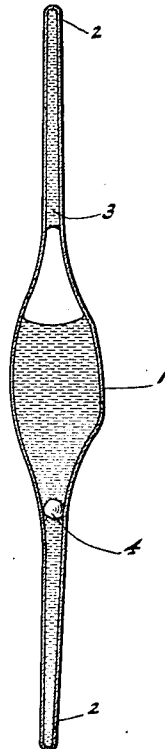


Fig. 2.



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UNITED STATES PATENT OFFICE.

FRANK R. ELDRED, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE ELI LILLY & COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

AMPOULE.

1,022,069.

Specification of Letters Patent.

Patented Apr. 2, 1912.

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To all whom it may concern:

Be it known that I, FRANK R. ELDRED, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Ampoule, of which the following is a specification.

The object of my invention is to produce an ampoule of such form that liquids contained therein may be delivered drop by drop.

My improved ampoule is more especially designed as a container for small quantities of silver nitrate solution prepared for application to the eyes of new born infants as a preventive of ophthalmia neonatorum but the device is, of course, useful as a storage container from which may be delivered any aqueous or similar liquid drop by drop.

The accompanying drawings illustrate my invention.

Figure 1 is an axial section of an ampoule constructed in accordance with my invention lying horizontally and Fig. 2 a similar section showing the ampoule in a vertical position, and about twice actual size.

In the drawings, 1 indicates the main body of the ampoule and 2—2 indicate the tubular normally sealed tips thereof. The ampoule is conveniently commercially formed of glass, the liquid being inserted through the open end of one of the tips and the tip then sealed. The hollow tips are made small enough in diameter to properly direct the flow of liquid and when either or both the tips are broken or opened some of the liquid will remain in each tip as indicated at 3 in Fig. 2. If the tip be small enough in diameter to prevent continuous flow the surface tension of this seal will be great enough to prevent any material flow of the liquid from the main body of the ampoule. If the internal diameter of the tip is large enough to so weaken the seal that, when the ampoule is up-ended, the pull on the main body of liquid is sufficient to break the seal in the uppermost tip, then the liquid will flow suddenly from the ampoule in a continuous stream and it is impractical to prevent this continuous flow. If, on the other hand, the internal diameter of only one of the tips is increased enough to prevent the maintenance of a seal therein when the tip is opened, and an attempt is made to discharge the contents of the ampoule from the smaller tip, the flow

will be continuous even from the smaller tip if the internal diameter of the tip is large enough to permit any flow at all. If any attempt be made to discharge the contents of the ampoule from the larger tip then there will be a seal formed in the smaller tip which will prevent flow from the larger tip unless the larger tip have such a large internal diameter that flow can be established when the ampoule is only slightly tilted from a horizontal but in that case the flow from the ampoule would be continuous and uncontrollable. In order to avoid these various difficulties, therefore, I form each tip of the ampoule with an internal diameter large enough to make impossible the maintenance of a liquid seal therein having sufficient strength to interfere with free flow from the main body and I mount within the main body a check valve 4 which may conveniently be a loose glass bead having a diameter exceeding the internal diameter of either tip. The bead 4, while generally spherical in form, need not be accurately formed but is adapted to seat loosely at the junction between the main body of the ampoule and either of the tubular tips. This loose or inexact seating allows the slow passage of the liquid past the check valve.

The operation is as follows: The completed article with its liquid content is, of course, sealed against contamination and against discharge of the liquid and may be carried for an indefinite period. When needed, the physician will rupture the two tips and will turn one of the broken tips downwardly; thereupon the valve will seat itself loosely at the upper end of the broken tip. Flow of the liquid will begin, this flow taking place slowly past the loosely seated check valve but, after the liquid enters the lower tip it flows freely, gathers at the end of the tip, and drops drop-by-drop therefrom.

The internal diameters of the tips should be sufficiently small to prevent outflow when the tips are opened so long as the ampoule is held horizontally. By this arrangement the physician has ample time to properly apply the entire contents of the ampoule, the discharge being at all times under full control.

I claim as my invention:

1. An ampoule for medicaments comprising a main hollow body having a pair of tu-

bular extensions, the internal diameter of said tubular extensions being large enough to avoid the formation of a liquid seal therein, a check valve arranged within said main body and adapted to seat loosely at the inner end of one of said tubular extensions, and a liquid contained within said main body.

2. An ampoule for medicaments comprising a main hollow body having a pair of tubular extensions, the internal diameter of said tubular extensions being large enough to avoid the formation of a liquid seal therein, a check valve arranged loosely within

said main body and adapted to seat loosely at the inner end of either of said tubular extensions, and a liquid contained within said main body. 15

In witness whereof, I, have hereunto set my hand and seal at Indianapolis, Indiana, this 10th day of March, A. D. one thousand nine hundred and eleven. 20

FRANK R. ELDRED. [L. s.]

Witnesses:

FRANK S. HERETH,
FRANK A. FAHLE.