Nov. 18, 1924. 1,516,454

S. A. NORTON

AMPUL

Filed April 4, 1924

Fig. 1.

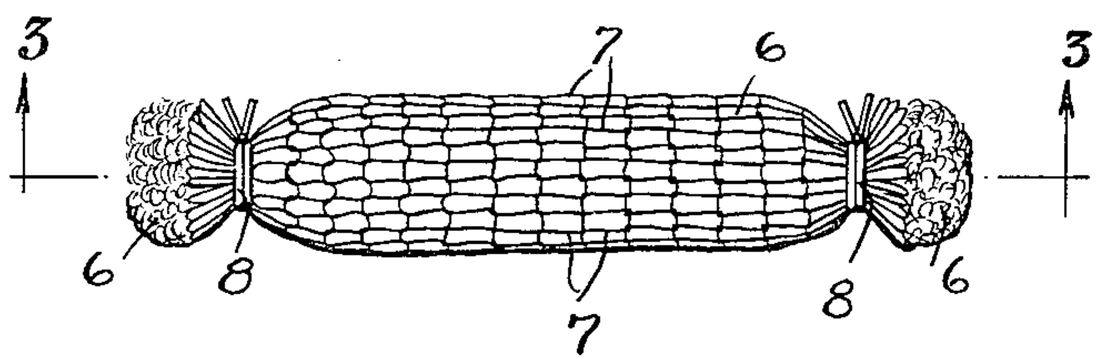


Fig. 2.

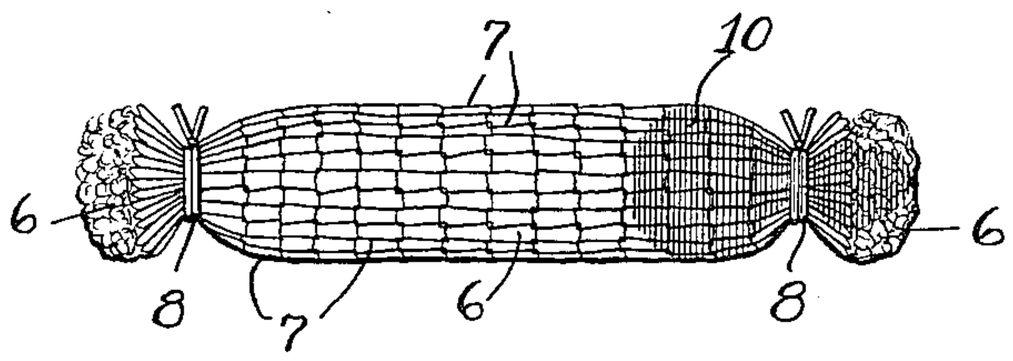
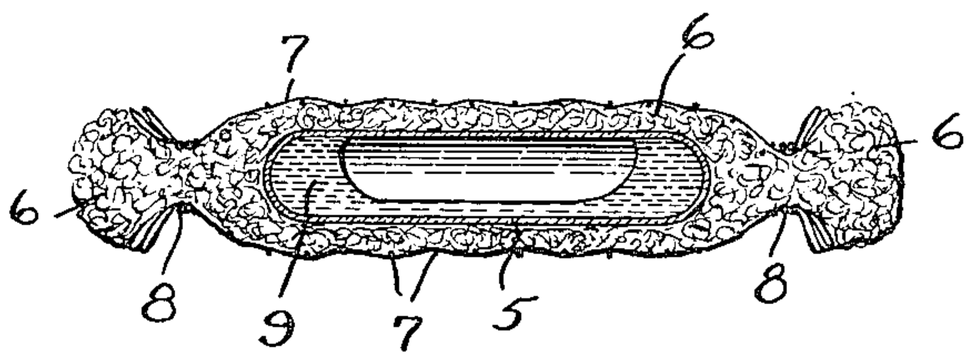


Fig. 3.



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UNITED STATES PATENT OFFICE.

STEPHEN ADAMS NORTON, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO FIRST AID SPECIALTY COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

AMPUL.

Application filed April 4, 1924. Serial No. 704,147.

To all whom it may concern:

Be it known that I, STEPHEN ADAMS NORTON, a citizen of the United States, and a resident of East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Ampuls, of which the following is a specification.

This invention relates particularly to ampuls of the ammonia inhalant type in which the liquid is held in fragile containers confined in protective covers. These covers necessarily encase the containers completely so as to prevent scattering of the fragments and cutting of the fingers when the container is broken to release its contents. This complete concealment prevents the detection of faulty or broken containers, which defects may not be discovered until use is attempted to be made of the articles.

The objects of the invention are to provide simple, effective and certain means for detecting and indicating the so-called "leakers" or broken ampuls.

Pure aromatic ammonia is a substantially colorless liquid and to be acceptable to the trade should be so or nearly so. This requirement is met and provision is made for indicating the presence of a leaky condition, in this invention by introducing in the aromatic ammonia, or other liquid, which of itself will not give notice of the leak, a coloring agent inert and substantially colorless in the liquid, but adapted upon exposure to the air to announce its presence by a warning coloring or staining of the ampul cover.

In the drawing accompanying and forming part of this specification, an embodiment of the invention is illustrated, wherein:

Figure 1 is a side view of the ampul as it appears when unbroken and in perfect condition.

Figure 2 is a side view of the same as it would appear after a leak had developed.

Figure 3 is a longitudinal sectional view on substantially the plane of line 3—3 of Figure 1.

The container which appears at 5 in Figure 3 is usually made of glass tubing cut in the proper lengths and sealed at both ends. The covering for this fragile tube usually consists of a soft resilient envelope 6 of coiler cotton enclosed in silk mesh 7 which is suitably tied over the ends of the tube at 8.

The liquid contents 9, in the case of aromatic ammonia, is substantially colorless so that in the event of an imperfect seal, this liquid simply leaks off without giving any visual indication of the fact. The tube is of relatively small diameter and the surface tension of the liquid is such as to ordinarily cause the liquid to rise over both ends of the tube so that with the tube lying down as in Figure 3, a defective seal at either end of the tube will cause loss of the liquid. This means that under ordinary circumstances, even with the most careful inspection, imperfect ampuls will be packed with the perfect ones, making it necessary at times of emergency to break a number of the inhalants before an effective one is found—if they be not all defective.

To prevent such a possibility and provide for the positive detection of the "leakers" there is introduced into the liquid at some time prior to the sealing and usually at the time of compounding the various essentials, a dye or coloring agent which is inert and which will remain substantially colorless in the liquid so as not to change its accepted appearance, but which upon exposure to the air will reassert its color characteristic and leave a mark or stain, thus indicating the leaky condition. Basic fuchsine has been found to answer these requirements, particularly for aromatic ammonia. This dye element is inert to the aromatic ammonia, except possible for some minor reaction taking place when the dye dissolves in the liquid—because in dissolving, the quantity of dye which is used does not perceptibly color the liquid. Upon exposure to the air, however, with the evaporation of the aromatic ammonia, the dye becomes apparent and in the instance described, stains the covering a reddish color, as indicated at 10 in Figure 2—the depth of the color varying with the proportion of dye used.

With this invention, therefore, the quality of the ampul contents is not affected in any material way and the existence of any leak in the ampul is automatically indicated by the appearance of the warning stains on

the ampul covers. After the ampuls are made up, they will be preferably laid on one side, as in Figure 3, for a time before packing so that any slow leaks will be given time to show themselves. This enables imperfect ampuls to be separated before packing and after packing, if any ampuls are broken in handling, the same will appear instantly upon inspection of the container in which the ampuls are ordinarily packed. As the coloring does not appear instantly, but rather as the ammonia evaporates, there is no appearance of the reddish coloring when an ampul is purposely broken for inhalant purposes and hence nothing to alarm the user, either as to the character of the ammonia or as to belief of a cut finger caused by the breaking of the glass container.

The invention without adding very appreciably to the cost of the ampul, safeguards both the manufacturer and the user, making it possible to rely on the inhalants as being effective where heretofore that has been a matter of actual trial to find if the inhalants were effective.

What is claimed is:

1. An ampul comprising a fragile capsule containing a substantially colorless liquid carrying a coloring element invisible in the liquid but visible upon evaporation of the liquid and an absorbent protective cover on said capsule whereby leakage of the capsule and absorption of the liquid by the cover will cause the coloring element to stain the cover and give indication of such leak.

2. An ampul comprising a fragile capsule, an absorbent protective cover on said capsule, a substantially colorless liquid in the capsule and a coloring element dissolved in said liquid, said coloring element being substantially inert in the liquid but adapted to betray the presence of a leak in the capsule by effecting a coloring of the cover.

3. An ampul comprising a fragile capsule, a protective covering on said capsule, a liquid in the capsule and a dye having the characteristics of basic fuchsine soluble in the liquid.

4. An ammonia inhalant comprising a covered fragile capsule containing aromatic ammonia having a small quantity of coloring matter dissolved therein, said coloring matter having no perceptible effect upon the ammonia but adapted to effect a coloring of the cover upon leakage of the ammonia.

5. The method of indicating a leaky ampul of the covered type which comprises dissolving in the liquid sealed within the capsule, an inert substantially invisible coloring agent soluble in the liquid and which upon penetration of the cover by the liquid will leave a stain indicating the leakage of the liquid.

6. The method of visually indicating the presence of a leak in a covered ampul containing a substantially colorless liquid which comprises including with the liquid in the capsule, a coloring agent which will not appreciably color the liquid but upon contact of the liquid with the cover and evaporation of the liquid will leave a stain on the cover indicating the leakage of the liquid.

7. An ampul comprising a covered glass capsule containing a substantially colorless liquid having a small quantity of coloring matter dissolved therein and which coloring matter is substantially inert to the liquid but adapted to leave a stain on the cover upon leakage of the liquid.

In witness whereof, I have hereunto set my hand this 29th day of March, 1924.

STEPHEN ADAMS NORTON.