P. CARPENTER.

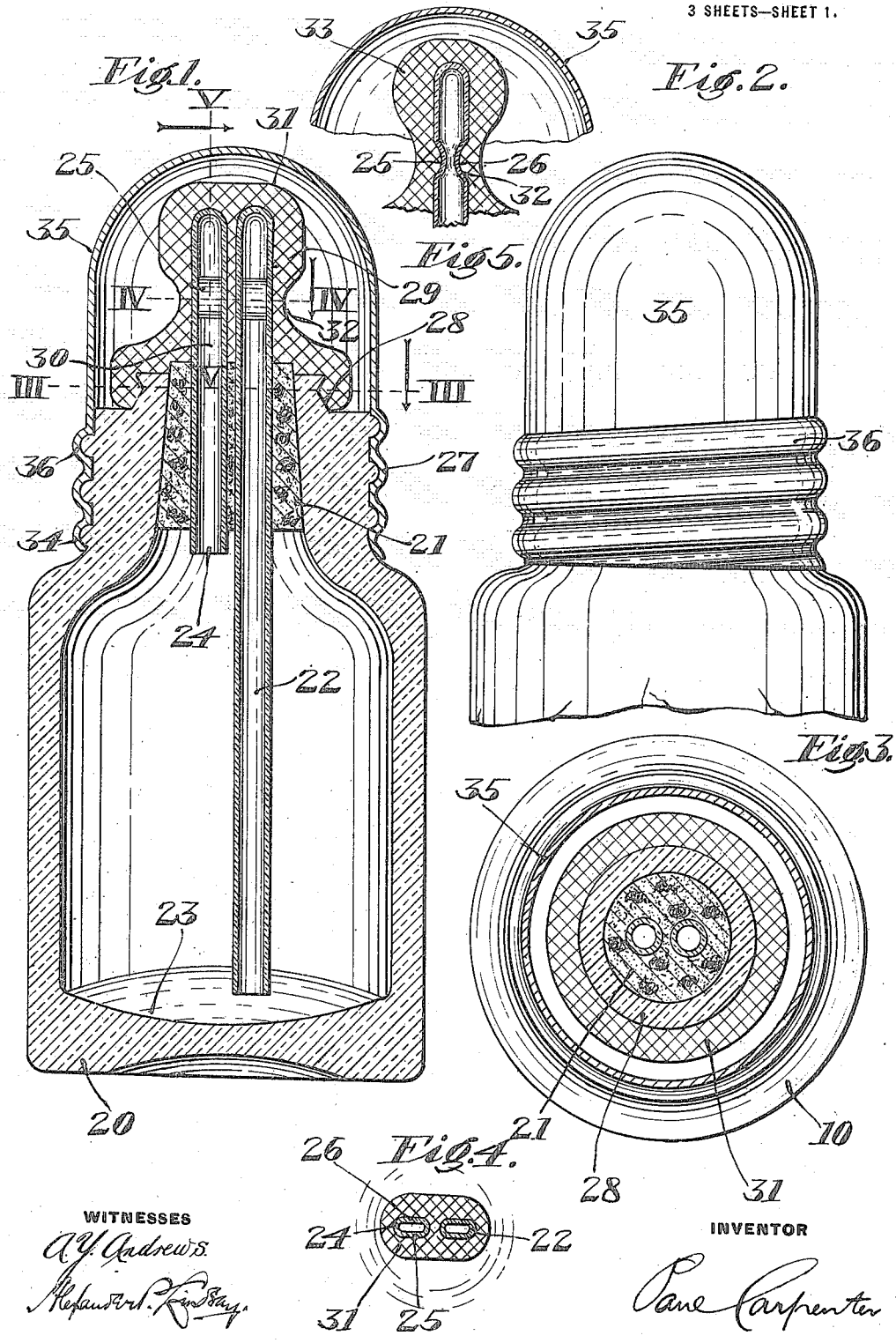
AMPUL.

APPLICATION FILED AUG. 8, 1910. RENEWED JUNE 14, 1917.

1,254,655.

Patented Jan. 29, 1918.

3 SHEETS—SHEET 1.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 6.

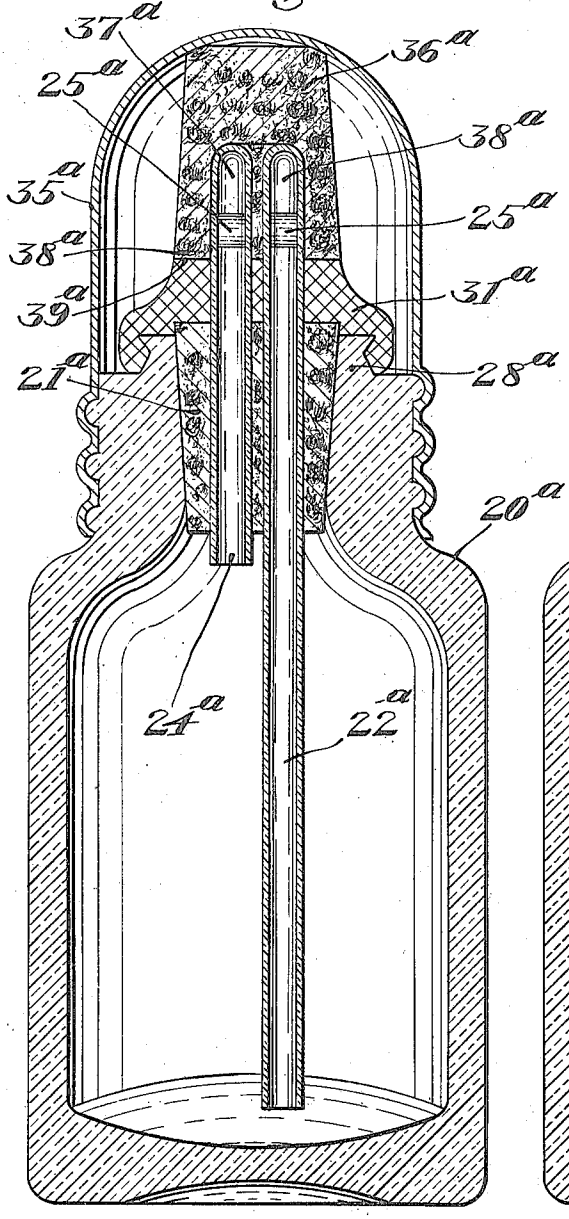
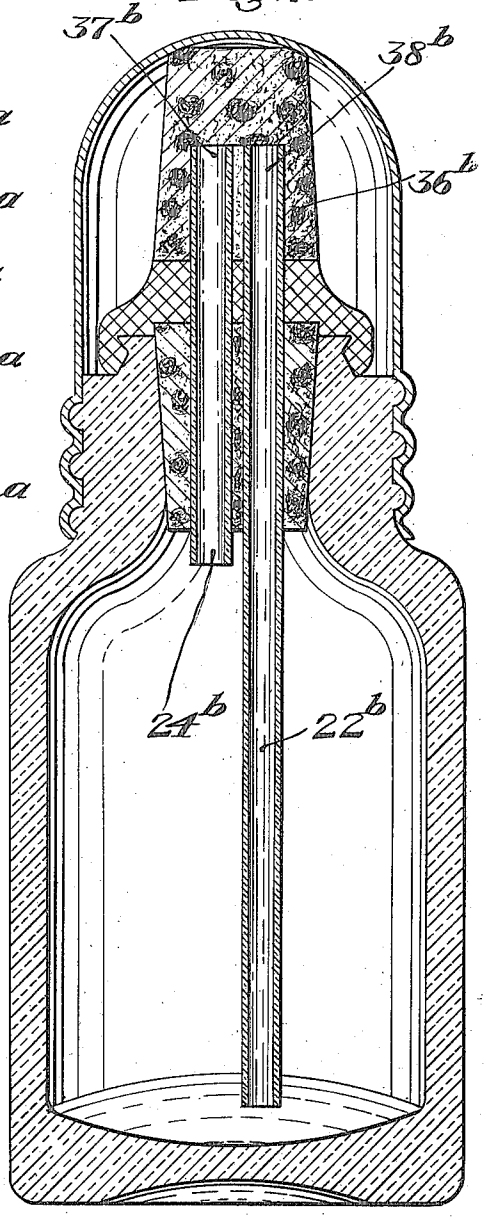


Fig. 7.



WITNESSES

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3 SHEETS—SHEET 3.

Fig. 8.

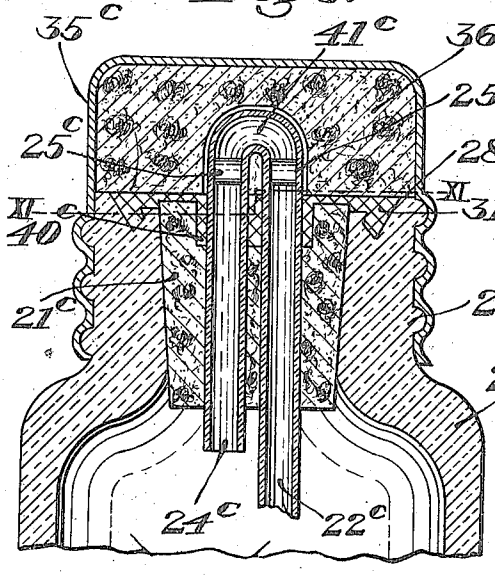


Fig. 10.

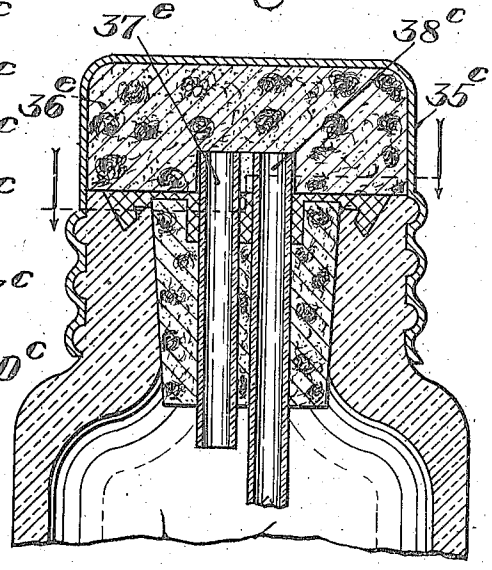


Fig. 9.

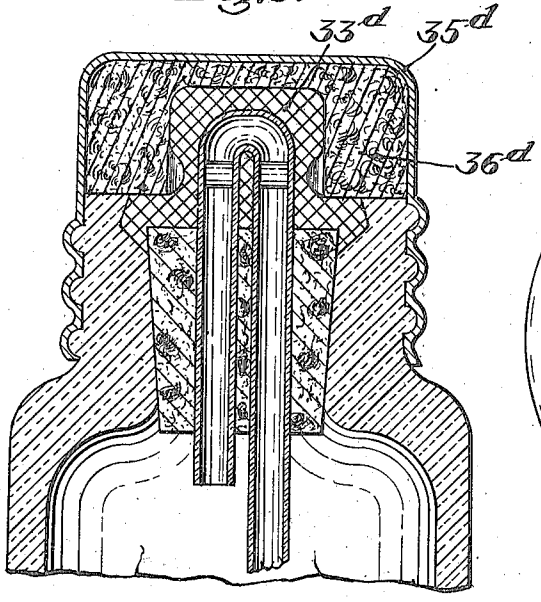
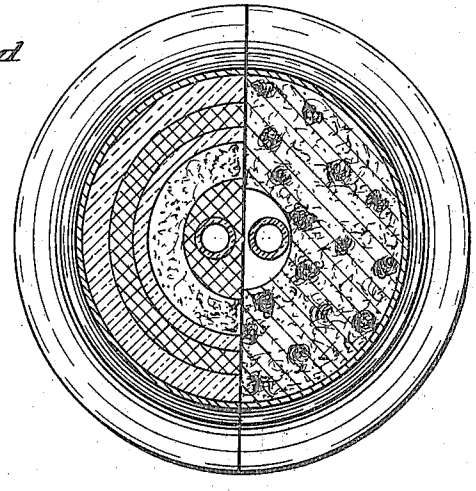


Fig. 11.



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AMPUL.

1,254,655. Specification of Letters Patent. Patented Jan. 29, 1918.

Application filed August 8, 1910, Serial No. 576,218. Renewed June 14, 1917. Serial No. 174,780.

To all whom it may concern:

Be it known that I, PAUL CARPENTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ampuls, of which the following is a specification.

My present invention relates to medical ampuls and other vessels, and more particularly to those used as containers for chemically instable liquids such as chloroform, for volatile fluids such as anesthetic ether, and for prepared alkaloids and other poisons.

The principal object of my invention is the provision of a structure of the nature referred to the use of which will add further safeguards to the administration of anesthetics and one which will prevent the accidental contamination thereof by the intromission of air within the containing chamber after the ampul has been charged, or the admixture of air with the contents of the ampul prior to the time of initial use thereof.

Another object is the provision of such structures of a character which will normally prevent the further use of any residuum remaining in the container after part of its contents have been removed.

A further object is the provision of a structure so arranged that actual breakage of certain parts thereof is required to accomplish the removal of any part of the contents thereof; and this without risk of injury to the user.

Still another object is the provision of a vessel of the kind characterized above, which will be adapted for immediate use as a dropper for measuring the liquid, or for supplying it to the cones used in producing anesthesia.

Yet further objects of my invention are the provision of improved means for facilitating the opening of the closed ampuls, of improved means for protecting them and preventing accidental breaking open thereof or discharge of the contents thereof, and of improved means for hermetically sealing them in the first instance, together with certain supplemental objects which will be hereinafter disclosed.

As is well known to obstetricians, dentists and other surgical practitioners, chloroform is largely supplied to the medical profession in small glass bottles stopped with a plain cork which may or may not be firmly tied into its seat to prevent displacement. This package is in order of time firstly inconvenient because it often necessitates delay in this that a suitable dropping device has to be prepared or obtained, or the contents of the package transferred to another ampul for efficient administration, and secondly may be dangerous, because of contamination through the entry of air before use and otherwise. Further objections lie in this that often a certain quantity remains in the ampul after the anesthesia is complete. Unless this residuum is to be used forthwith, it should be destroyed. This because chloroform is a highly volatile and instable liquid which deteriorates rapidly after contact with the air or products of combustion and becomes highly poisonous not only to the person to whom it is administered but to those who may perchance breathe the fumes, as well as to prevent accidental poisoning or use by unauthorized persons or for improper purposes.

By means of certain of my improvements, I provide safeguards against the contamination or breaking down of the contained fluid between the time of manufacture and the time of first opening for use, and against negligence in unethical use of the antiquated and very possibly corrupted remainder or carelessness in disposing thereof for the protection of others.

From an inspection of the drawings it will be obvious, however, that when these ampuls are used for purposes which justify refilling them, they may be readily refilled by means of suitable filling funnels or cones applied to the exterior ends of the air inlet tube to be below described.

In the attainment of the above stated objects as well as certain additional benefits and advantages which will be apparent to those who are skilled in the art to which my invention pertains, and to avoid the disadvantages of certain structures with which I am familiar, I have provided the embodiment of my invention illustrated in the accompanying drawings, wherein—

Figure 1 is a sectional view taken vertically on the center line of the structure illustrated in elevation in Fig. 2;

Fig. 2 is an elevational view of the structure of Fig. 1;

Figs. 3, 4, and 5 are sectional views respectively taken on the lines III—III, IV—IV and V—V;

Figs. 6 and 7 are sectional views similar

to Fig. 1 illustrative of modified forms of construction of Fig. 1;

Figs. 8, 9 and 10 are sectional views showing further embodiments of my invention, and

Fig. 11 is a sectional view taken on the line XI—XI of Fig. 8.

Referring first to Figs. 1 to 5, it will be noted that I make use of a receptacle, here shown as a glass vial 20 stoppered by a cork 21, preferably inverted in order to prevent ready withdrawal, and that I insert through such cork an air inlet tube 22 extending to a point adjacent the bottom 23 of the vial and substantially parallel to said tube 22 an outlet tube or dropper 24 which should project little, if any, beyond the bottom of the cork 21, both tubes 22 and 24 being fixed in position in the cork 21, if desired, by means of cement not subject to the action of the chloroform or other substance contained in the vial. Each of the tubes 22 and 24, which should be made of glass or other friable material is here shown as provided at a point beyond the cork with depressed portions as indicated at 25 and 26. The upper portion of the neck of the vial 27 is shown as having a portion of irregular contour 28. Around the projecting portions 29 and 30 of the tubes 22 and 24 I have provided a protecting covering of sealing wax or hard paraffin 31 engaging the portion 28 of the neck and depressed portions 25 and 26 of the tubes, and provided such covering with the annular groove 32 coincident with the position of the depressed portions 25 and 26 to facilitate breakage thereof when the enlarged portion or knob 35 of such covering is bent or twisted. To prevent accidental breakage of the covering and thence of the tubes 22 and 24, or other leakage, as through the cork, I provide the bottle with a thread 34 whereby a cap 35 may be held in position thereupon by means of corresponding threads 36 formed in such cap.

Referring now more particularly to that exemplification of my invention which I have illustrated in Fig. 6, it will be observed that this is in all substantial respects similar to that of the device of Figs. 1 to 5, save that the cork 21^a is inserted in the usual manner and that though the tubes 22^a and 24^a and the top 28^a of the vial 10^a are embraced by the covering 31^a, it does not extend to the depressed portions 25^a but that these are embraced by a cork 36^a having suitably cut out portions for their reception. The last mentioned cork serves three purposes, first, when grasped and given bending movement the upper portions 37^a and 38^a of the tubes are broken at 25^a—25^a without any concomitant disruption of the covering and formation of small particles which might choke the tubes 22^a and 24^a; that if desired the cork 27^a with the tubes 22^a and 24^a may be withdrawn and the cork 37^a substituted therefor in closing the bottle, such a construction being useful where it is desired to remove a considerable quantity from the bottle; and finally if it be desired to use any remainder in the bottle the cork may be replaced to the position shown in this figure and the cap 35^a replaced, so that by means of the contact between the cork surface 38^a and the surface 39^a of the protecting casing, spilling of the contents of the bottle is avoided.

Referring now to Fig. 7, it will be observed that the device here shown differs from that of Figs. 1 to 6 in this that the tubes 22^b and 24^b are open at their tops 37^b and 38^b and are not provided with depressed portions as at 25 and 26 in the figures above described, such open ends being closed by means of the cork 36^b. In the present device need for fracture of the tubes 22^b and 24^b is avoided and such device may be used repeatedly until the bottle is emptied.

On reference now to Fig. 8, it will be seen that the device here illustrated is similar to that of Fig. 6, save that the cork 36^c completely fills the cap 35^c, and that the covering 31^c completely covers not only the top of the cork 21^c but also extends into a portion 40^c cut into such cork and embraces the tubes 22^c and 24^c, the top of the covering being flush with the top 28^c of the neck 27^c of the vial 20^c, the several parts being so arranged that when the cap 35^c is screwed into position the cork 36^c is under compression. This not only provides a further guard against leakage but also removes any necessity of manipulation of the cork into position either before or after the tubes 22^c and 24^c are broken at 25^c—25^c and the portion 41^c by which they are joined together removed.

In the device of Fig. 9 use is made not only of the projecting knob 33^d, but also of the cork 36^d surounding it on one hand as an auxiliary member to prevent leakage, and on the other hand to restop the bottle after use, if desired.

The device of Figs. 10 and 11 differs from that of Fig. 8 in this that the upper portions 37^e and 38^e are open at the top, and stoppered by means of the cork 36^e, use of the depressed portions 25^e being thereby avoided.

On viewing Figs. 1 to 5 again it will be observed that by the removal of the cap 35, the tubes 22 and 24 may be readily broken adjacent the points 25 by grasping the knob 33 and giving it a slight bend or twist. Upon tilting the vial, air entering the now open tube 22 will allow the fluid to escape drop by drop through the now opened end of the tube 24. As there is some space between the upper portion of the knob 33 and the cap 35 no means is present for re-stop-

pering the vial, which it is intended should be discarded after first opening. In the device of Fig. 6, however, careful replacement of the cork 36^a and cap 35^a into the position shown in the drawing will permit use of the remaining contents of the vial at another time, and in the device of Fig. 7 replacement of the cork alone will accomplish the same result. The devices of Figs. 8 to 11 may be used repeatedly, if desired, owing to the fact that the corks 36^c, 36^d and 36^e completely fill the caps 35^c, 35^d and 35^e.

It will be obvious that the necessity of breaking the tops of the tubes of the devices of Figs. 1 to 5, 6, 8, and 9 will insure that the contents thereof has not theretofore been exposed, and prevent any but deliberate and intentional preservation of any remaining contents of the receptacles.

Having thus described my invention and illustrated its use, what I claim is new and desire to secure by Letters Patent is the following:—

1. In combination with a containing vessel and means for closing said vessel, frangible tubular members disposed within the vessel having independent openings and a frangible covering in which the tubular members are embedded.

2. In combination with a containing vessel and means for closing such vessel, a frangible outlet tube and a frangible covering for said tube, said tube and covering being provided with coinciding means to facilitate fracture.

3. In combination with a containing vessel and means for closing such vessel, a frangible outlet, a tube and a frangible covering for said tube, said covering being provided with a means to facilitate fracture.

4. In combination with a containing vessel and means for closing such vessel, a frangible outlet tube and a frangible covering for said tube, said tube and covering being provided with coincident depressed portions to facilitate fracture.

5. In combination with a receiving vessel, an indented inlet tube, an independent indented outlet tube, and a frangible covering in which said tubes are embedded, and engaging the top of said vessel.

6. In combination with a receiving vessel, an indented inlet tube, an indented outlet tube, a frangible covering in which said tubes including the indented portions of said tubes are embedded, and means whereby a portion of said tubes extending beyond said indentations may be grasped to facilitate fracture.

7. In combination with a receiving vessel, an indented inlet tube, an indented outlet tube, a frangible covering in which said tubes are embedded, said covering engaging the top of said vessel, means whereby a portion of said tubes extending beyond said indentations may be grasped to facilitate fracture, and a cap to prevent accidental shock to said means.

8. In combination with a receiving vessel, an indented inlet tube, an indented outlet tube, a frangible covering in which said tubes are embedded, said covering engaging the top of said vessel, means whereby a portion of said tubes extending beyond said indentations may be grasped to facilitate fracture, and a protecting cap to prevent accidental shock to the last mentioned means, said cap being in contact with said means.

9. In combination with a containing vessel and means for closing such vessel, a frangible outlet tube, a frangible covering for said tube, said frangible covering being of softer material than the outlet tube whereby injury to the hands during fracture of the tube is avoided.

10. In combination with a containing vessel and means for closing said vessel, a frangible outlet tube and a frangible covering for said tube, said tube and covering being provided with coinciding means to facilitate fracture and said frangible covering being of softer material than the outer tube whereby injury to the hands during fracture of the outlet tube is avoided.

11. In combination with a receiving vessel an indented outlet tube, an indented inlet tube, a member surrounding and engaging the ends of both the said tubes beyond said indentations adapted to be grasped in order to fracture said tubes and a cap to prevent accidental shock to the said member.

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

PAUL CARPENTER.

Witnesses:
EVELYN C. NAYLOR,
HANNA SHILLING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."