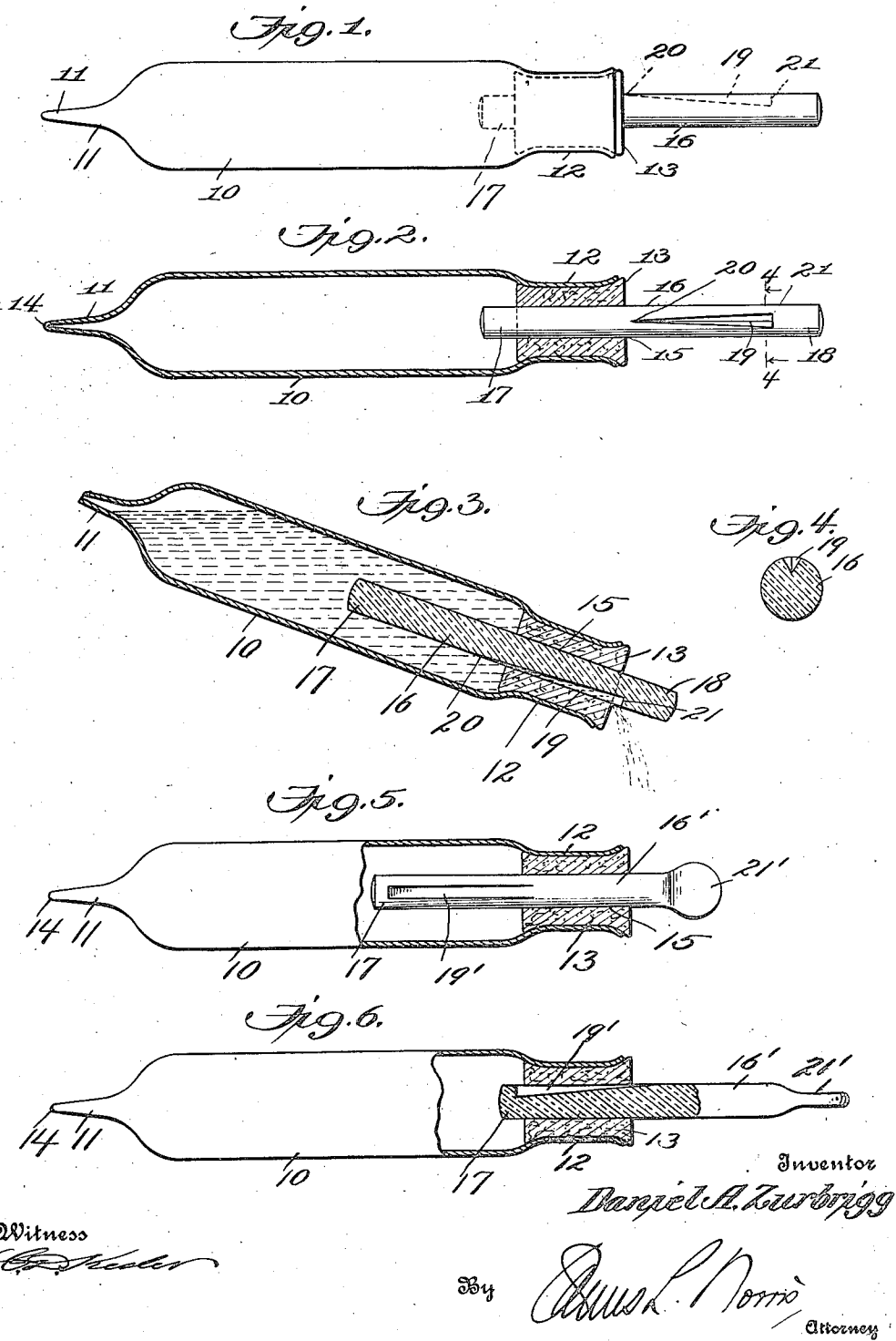


D. A. ZURBRIGG.
DISPENSING APPARATUS FOR LIQUIDS.
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UNITED STATES PATENT OFFICE.

DANIEL A. ZURBRIGG, OF MILFORD, DELAWARE, ASSIGNOR TO L. D. CAULK COMPANY,
OF MILFORD, DELAWARE, A CORPORATION OF DELAWARE.

DISPENSING APPARATUS FOR LIQUIDS.

Application filed August 6, 1920. Serial No. 401,726.

To all whom it may concern:

Be it known that I, DANIEL A. ZURBRIGG, a citizen of the United States, residing at Milford, in the county of Kent and State of Delaware, have invented new and useful Improvements in Dispensing Apparatus for Liquids, of which the following is a specification.

This invention relates to a new appliance or dispensing apparatus having an adjustable feature adapted to automatically control the delivery of liquids at a uniform rate and has more particular reference to the delivery of a liquid anesthetic under proper flow regulation.

This invention enables a person administering the anesthetic to adjust the delivery of the same with absolute regularity, the quantity and amount being variable with each separate and individual patient. It is a well known fact that in the manner of anesthetizing as generally practiced, (ether or chloroform being here taken as examples) liquid anesthetic agents are poured from comparatively large containers in intermittent, haphazard, unmeasured quantities, onto a porous absorbent material. This latter may or may not be confined in a cribbing, cone or mask of some impervious compound. The patient breathes through the meshes of the porous absorbent material, the air so inhaled being perforce surcharged with the vapors of the anesthetizing agent.

It is apparent that the method of administering intermittent charges of relatively large unmeasured quantities of the anesthetizing agent to the patient is unscientific, and results in a very uneven anesthesia, detrimental if not hazardous, alike to the patient operated on and the operating surgeon, whose skill is largely interfered with and sometimes nullified by the unstable anesthesia induced by the careless method of administration which is too frequently employed in work of this character.

The device constituting an embodiment of my invention, which accomplishes the desideratum of furnishing a means for administering a liquid anesthetic at the desired rate with perfect unvarying regularity, is

described in the following specification in connection with the accompanying drawing.

In the drawing:—

Figure 1 is a side elevation of my improved dispensing apparatus in closed position;

Figure 2 is a section taken through the container and stopper showing a plan view of the stem and the tapered recess therein;

Figure 3 is a sectional view of the apparatus with a portion broken away to permit the entrance of air and showing the stem in operative position;

Figure 4 is a sectional view of the stem taken on the line 4—4, Figure 2, looking in the direction of the arrows;

Figure 5 is a plan view of a modified form of my invention showing a different form of recess in the stem; and

Figure 6 is a partial sectional view of the modification shown in Figure 5.

The numeral 10 designates a container which is preferably in the form of a glass tube having a reduced extension 11 at one end and a neck portion 12 at the other end provided with an opening adapted to tightly receive a stopper 13. The extension 11 is preferably reduced to almost a point at the terminal 14 so that this terminal may be readily broken off and thus provide a capillary opening through which air may have access into the interior of the container. The stopper 13 is preferably of cork and is formed with a central aperture 15 adapted to receive a stem 16 with a tight sliding fit. As shown in Figures 1, 2, 3 and 4 the stem is in the form of a cylindrical piece of glass having plain cylindrical ends 17 and 18 and provided intermediate these ends with a recess 19 which preferably tapers in depth and width from the point 20 to the surface 21 where said recess has its largest cross sectional area. It is apparent that either end of the glass stopper 17 or 18 may be used in conjunction with the stopper 13 in order to close the aperture therein, but when in operative position the recess 19 communicates with the interior of the container and affords an outlet passage for the liquid within the container inasmuch as the recess 19 is of

greater longitudinal dimension than the stopper 13. By adjusting the stem 18 within the stopper the effective sectional area of this outlet passage may be regulated and any desired section maintained for the desired period.

In Figures 5 and 6 a rectangular recess 19' is shown which has a tapering bottom adapted to provide a varying cross section in a manner similar to the V-slot 19 described above. The outer end of the stem 16' is provided with the handle 21' for convenience in operating the stem, but it will be evident that this arrangement will not permit the reversal of the stem for closure purposes.

In operation the container 10, having the closed end 11, is filled with the liquid anesthetic and the stopper 13 and stem 17 are placed in position, the latter being so located that a plain cylindrical surface is presented to the interior of the stopper 13. The container is thus completely closed and the liquid may be transferred to a distance in this condition if desired. In order to prepare for the administration of the anesthetic the reduced terminal 14 of the container is broken off so as to provide a passage for the air to the interior of the container and stem 16 is forced through the aperture of the stopper 13 until the recess therein provides an outlet passage for the liquid. The container is turned until the recess 19 is located on the bottom of the stem and the stem is adjusted until the desired flow of the liquid anesthetic, on the absorbent material through which the patient breathes, is obtained. If a larger flow of liquid is desired the stem may be adjusted so as to provide a larger cross sectional area for the flow of the liquid and if a smaller flow is desired, the stem may be adjusted in the opposite direction. Thus a uniform flow of the desired volume may be obtained which will produce anesthesia gradually and without discomfort to the patient, and the patient may be maintained in a proper state of anesthesia for an indefinite time giving better working conditions to the operating surgeon. Also the recovery of consciousness by the patient is accomplished without nausea or any other untoward after effects which frequently result from the irregular administration of anesthetic agents.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A dispensing apparatus for liquids comprising a container having an opening at one end and a breakable closure of reduced dimensions at the other end, an apertured stopper fitting within said opening, and a stem slidably engaging the aperture of said stopper, said stem having a recess of tapered sectional area formed therein whereby said

opening may be completely closed or an outlet passage of variable area afforded by said recess for the contents of said container.

2. In a dispensing apparatus for liquids, a container having an extension of reduced dimensions breakable to afford communication between the air and the interior of said container, and means for normally closing the container adapted to be adjusted in position so as to provide an outlet of variable cross section for the liquid.

3. In a dispensing apparatus for liquids of the class described, a container having an opening at one end, an apertured stopper fitting tightly within said opening, a stem movable relatively to said stopper having a tapered recess formed therein intermediate the ends thereof whereby the container may be closed or opened to various extents depending upon the longitudinal position of said stem within the aperture of said stopper.

4. In a dispensing apparatus for liquids, a container normally completely closed for holding a liquid, said container having a portion which is readily breakable to afford communication between the air and the interior of the container, a stopper associated with an opening in said container and means slidably engaging said stopper to regulate the flow of liquid from said container.

5. In a dispensing apparatus for liquids, a container having an opening therein, a stopper fitting within said opening, said stopper being formed with an aperture, a stem having a tight sliding fit within said aperture and provided intermediate its ends with a longitudinally extending recess whereby either of the end portions of said stem may act as a complete closure for said aperture and the intermediate portion as a partial closure for the same.

6. In a dispensing apparatus for liquids, a container having an opening and a reduced extension, breakable to provide a capillary entrance for air, and an adjustable closure for said opening to regulate the flow of liquid from the container after said breaking operation.

7. In a dispensing apparatus for liquids, a container having an outlet passage and a breakable portion adapted to provide an entrance for air and means for completely closing or regulating the effective area of said outlet passage.

8. In a dispensing apparatus for liquids, a container having an outlet for the liquid contents and a normally closed inlet adapted to be opened to permit the entrance of air during the dispensing operation, and means for completely closing or regulating the effective area of said outlet.

9. In a dispensing apparatus for liquids, a container having an outlet for the liquid contents, a normally closed inlet adapted to

be opened to permit the entrance of air during the dispensing operation, and means for completely closing or regulating the effective area of said outlet comprising an apertured stopper fitting tightly within said outlet, and a stem movable relatively to said stopper and having a tapered recess formed therein.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

DANIEL A. ZURBRIGG.

Witnesses:

H. C. MITTEN,

W. S. DAUGHERTY.