

H. E. HUGHES.  
DRAINAGE TUBE.  
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1,103,967.

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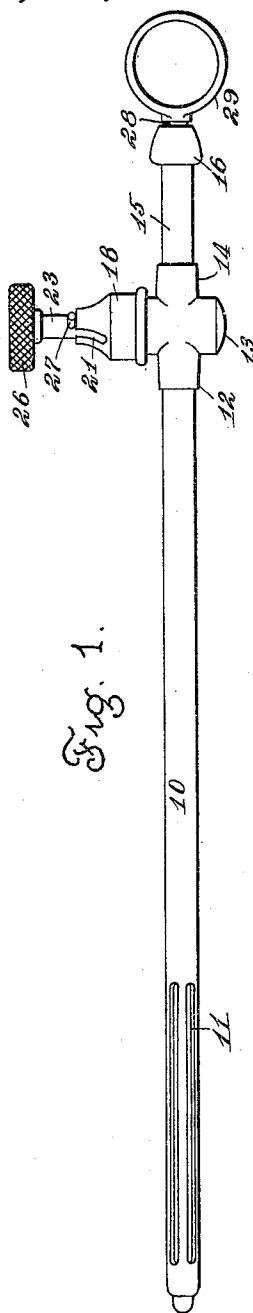


Fig. 1.

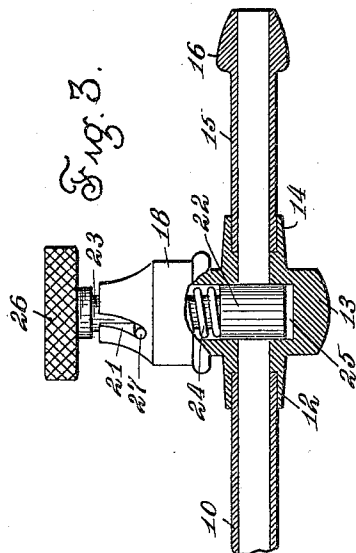


Fig. 3.

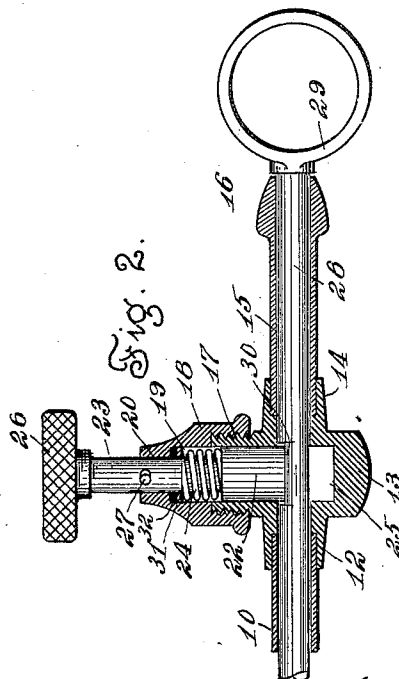


Fig. 2.

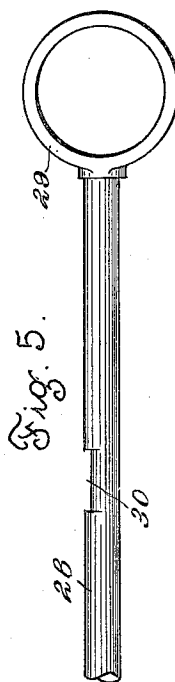


Fig. 5.

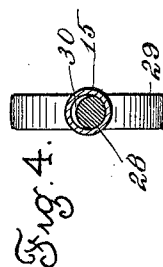


Fig. 4.

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# UNITED STATES PATENT OFFICE.

HARRY ELVERTON HUGHES, OF BALTIMORE, MARYLAND.

## DRAINAGE-TUBE.

1,103,967.

Specification of Letters Patent.

Patented July 21, 1914.

Application filed April 2, 1914. Serial No. 828,942.

*To all whom it may concern:*

Be it known that I, HARRY E. HUGHES, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented new and useful Improvements in Drainage-Tubes, of which the following is a specification.

The invention relates to embalming apparatus and more particularly to improvements in that type of apparatus known as catheters or drain tubes used for the purpose of draining the arteries and veins of the human body prior to the operation of embalming.

An object of the invention is to provide a drain tube wherein the usual plunger of such an apparatus is securely locked in projected position within the tube during the process of inserting same into the body, thus overcoming a serious difficulty which obtains in the present known apparatuses of this type, in that the pressure exerted in forcing the tube through the tissues tends to force the plunger back into the tube, and when same is permitted to slip the tube end is exposed and, by reason of its comparatively sharp end cuts and rends the tissue instead of simply pushing same to either side, as is desired.

A further object of the invention is to provide suitable means, acting to lock the plunger, as in the first instance, and at the same time simultaneously with the withdrawal of the plunger, after the artery has been properly tapped, automatically closes the tube against the outrushing of blood, thus preventing the usual spill of blood upon such withdrawal of the plunger, and the second spill of blood which follows during the attaching of the drawing hose to the free end of the drain tube.

The invention resides in a simple and compact construction and in its preferred embodiment is hereinafter more fully described, set forth in the appended claims, and illustrated in the accompanying drawings, in which drawings,

Figure 1 is a plan view of the apparatus. Fig. 2 is a longitudinal section of the apparatus showing the plunger in locked position.

Fig. 3 is a partial longitudinal sectional view of the apparatus with the plunger removed and the locked plug closing the passage through the tube. Fig. 4 is a cross-section of the tube and plunger showing the reduced

portion of the latter forming a seat for the lock plug. Fig. 5 is a plan view of the plunger showing the recess for the reception of the lock plug.

In the drawing, in which like reference characters refer to similar parts in the several views, the usual tube, which is made preferably in three sizes or as many sizes as necessary open, at both ends, is designated by the numeral 10, and is provided with longitudinally extending slots 11 at its forward end. The rear end of the tube 10 is preferably secured in the extension 12 of the coupling 13 which is provided with a second extension 14 adapted to receive a shorter tube 15 having its outer end terminating in an enlargement or head 16 adapted to retain the attached end of a drawing hose (not shown).

The coupling 13 is formed with an exteriorly threaded nipple 17 upon which is threaded a casing 18 formed with an enlarged bore 19 and a reduced bore 20. The upper end of the casing 18 is formed, preferably of a reduced diameter and is provided with a slot 21, the purpose of which will be hereinafter more fully set forth. Within the bore of the nipple 17 is a snugly fitted lock plug 22 carried by the stem 23 which is passed through the reduced bore 20 of the casing 18. A coiled spring 24 surrounding the stem 23 is retained within the bore 19 and acts upon the lock plug 22 tending to force same downward upon the seat 25 formed in the bottom wall of the coupling 13. Located within the bore 19 is a metal washer 31 contacting a compressible washer or other suitable packing material 32 and adapted to force the same firmly against the end wall of the bore 19 and the stem 23 under the tension of the spring 24 to prevent leakage of any of the fluid which might fill the bore. The outer end of the stem 23 is provided with a knurled handle 26 to facilitate the operation of the lock plug. A pin 27 is carried by the stem 23 and is adapted to engage the upper edge of the casing 18 to hold the lock plug 22 away from the seat 25 and clear of the tube opening to permit unrestricted passage therethrough. When it is desired to release the lock plug 22 the stem 23 is turned to bring the pin 27 into engagement with the slot 21 which permits sufficient movement of the plug 22 to contact its seat

25 to close the passage through the tube. A plunger 28, of a diameter insuring a snug sliding fit with the tube 10, is provided, and is of length slightly exceeding the combined  
 5 length of the tube 10, coupling 13 and tube 15, to permit its forward end, which is preferably rounded as illustrated, but may be pointed if desired, to project beyond the forward end of the tube 10. The rear end of the  
 10 plunger 28 is provided with the usual finger hold 29 for the proper manipulation of the same. A recess 30 is formed upon the plunger 28 and is adapted to be engaged by the lock plug 22, when the plunger has been  
 15 passed through the tube, the same is held securely against accidental slippage during the tapping operation.

The operation of the apparatus is as follows: Preparatory to the tapping operation,  
 20 the lock plug 22 is raised from the seat 25 by pulling on the handle 26 against the tension of the spring 24 until the pin 27 is free from the slot 21, the stem is then turned to bring the pin out of alinement with the slot  
 25 and is allowed to rest upon the upper edge of the casing 18. The plunger is now passed through the tube for its length and the stem 23 is turned until the pin 27 again engages the slot 21 permitting the spring 24 to force  
 30 the lock plug 22 into engagement with the recess 30. The apparatus is now ready to be forced into the body as usual, and when proper connection with the desired artery is established, the finger hold 29 is grasped  
 35 and a turning movement is imparted thereto to disengage the recess 30 from the lock plug 22 after which the plunger is withdrawn. Simultaneously with the passing of the forward end of the plunger 28 beyond the lock  
 40 plug 22 and into the extension 14 the spring 24 forces the lock plug 22 quickly into engagement with the seat 25 thereby closing the passage through the tube and preventing the exit of the rush of blood which fol-  
 45 lows. A suitable drawing hose is now attached to the head 16 of the short tube 15 and the lock plug 22 is withdrawn until the pin 27 is again out of engagement with the slot 21 and by imparting a slight turn to the  
 50 stem 23 the pin engages the upper edge of the casing 18 and serves to retain the plug in this position until it is desired to cut off the flow of blood, whether or not the operation be entirely completed.  
 55 Should it be desired to reinsert the plunger at any time during the operation, as in event of clogging with coagulated blood, the lock plug may be released to close the passage, and upon detaching the drawing  
 60 hose the plunger is pushed into the tube sufficiently to prevent a flow therefrom when the lock plunger is again raised.

While the invention has been particularly described as adapted for embalming it will,  
 65 of course, be understood that it may be used

as a catheter for any kind of drawing purpose to which such apparatuses are applicable.

What I claim and desire to secure by Letters Patent is,—

1. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube, and means for closing the passage through said tube prior to the complete withdrawal  
 75 of the plunger therefrom.

2. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube, and means for locking said plunger in operative position within said tube, said means  
 80 being adapted for closing the passage through said tube when said plunger has been partially withdrawn therefrom.

3. In a catheter for draining and embalming purposes, the combination with a drainage tube open at both ends, of a plunger movable in said tube and having a cam-like recess, and means coöperative with said recess to retain said plunger in operative position within said tube, said means being  
 90 adapted for closing the passage through said tube when said plunger has been partially withdrawn therefrom.

4. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube, and locking means normally holding said plunger in operative position, said means automatically closing the passage through  
 100 said tube simultaneously with the withdrawal of said plunger from the latter.

5. In a catheter for draining and embalming purposes, the combination with a tube open at both ends, of a plunger movable in said tube adapted to be withdrawn entirely from the tube to permit unrestricted passage therethrough, and locking means normally holding said plunger in operative position, said means automatically closing the passage  
 110 through the tube simultaneously with the withdrawal of said plunger from the latter.

6. In a catheter for draining and embalming purposes, the combination with a tube open at both ends, of a plunger movable in said tube, said plunger being provided with a recess, and locking means engaging said recess to hold said plunger in operative position, said means automatically closing the passage through the tube simultaneously with the withdrawal of said plunger from the latter.  
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7. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube, said plunger being formed with an eccentric reduced portion to provide a recess, and locking means engaging the recess to hold said plunger in operative position, said plunger being released from said locking  
 125 130

means by a turning movement imparted to the plunger within the tube, said means automatically closing the passage through the tube simultaneously with the withdrawal of said plunger from said tube.

8. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube and provided with a recess, locking means engaging said recess to hold the plunger in operative position, said plunger being released from said locking means by a turning movement of the former within the tube, said means automatically closing the passage through the tube simultaneously with the withdrawal of the plunger from said tube, and means for holding said locking means clear of the passage through the tube.

9. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a casing interposed between the ends of the tube, a plunger movable in said tube and provided with a recess, and locking means carried by the casing and engaging said recess to normally hold the plunger in operative position, said means automatically closing the passage through the tube simultaneously with the withdrawal of the plunger from said tube, and means for holding said locking means clear of said passage during the drawing operation.

10. In a catheter for draining and embalming purposes, the combination with a drainage tube formed in two sections, of a coupling connecting the sections and provided with a nipple at right angles to the tube, a casing carried by said nipple, a lock plug operable within the nipple and casing, means for actuating the lock plug, a plunger movable in said tube and provided with a recess adapted to be engaged by said lock plug, said coupling being provided with a

seat adapted to receive the lock plug when same is released from engagement with said plunger, and means for holding said lock plug free from the passage through said tube.

11. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube and having a cam-like recess, and locking means coöperative with said recess to retain said plunger in operative position within said tube, said locking means being released from said recess by a partial turning of said plunger.

12. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube and having a cam-like recess, and spring actuated locking means coöperative with said recess to retain said plunger in operative position within said tube, said locking means being released from said recess by a partial turning of said plunger and adapted to close the passage through said tube when said plunger has been partially withdrawn therefrom.

13. In a catheter for draining and embalming purposes, the combination with a drainage tube, of a plunger movable in said tube and having a locking recess formed therein, and means actuated by rotation of said plunger engaging said locking recess, said means serving also on withdrawal of the plunger to close the passage through the tube.

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

HARRY ELVERTON HUGHES.

Witnesses:

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CHARLES C. HUGHES.