

Feb. 16, 1932.

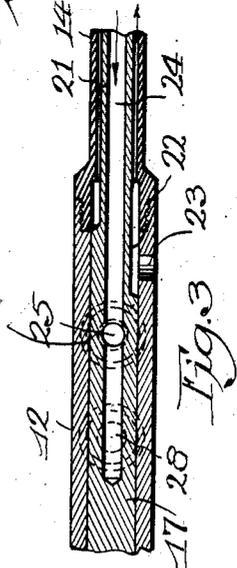
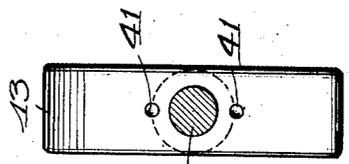
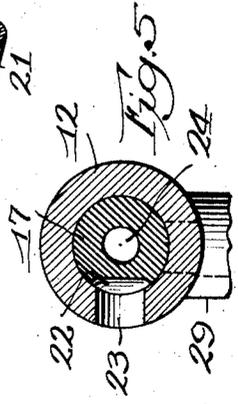
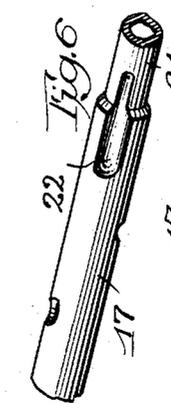
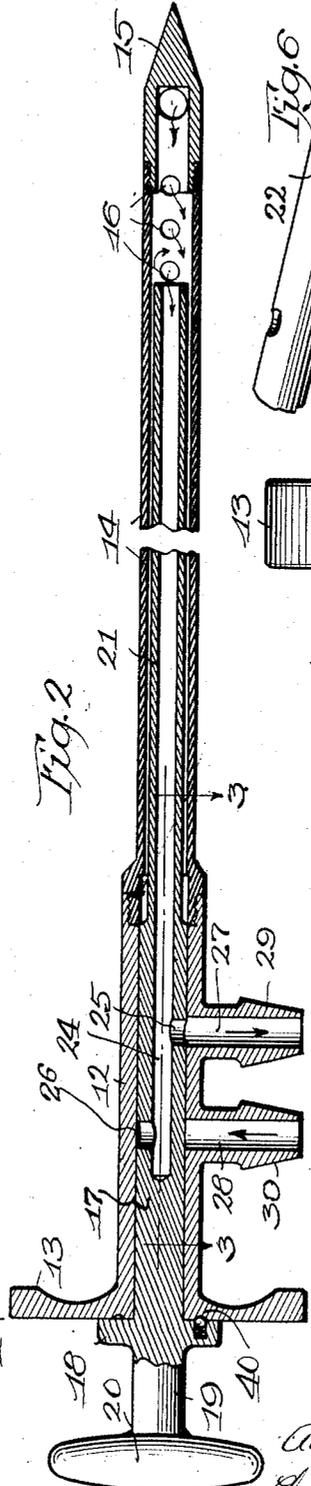
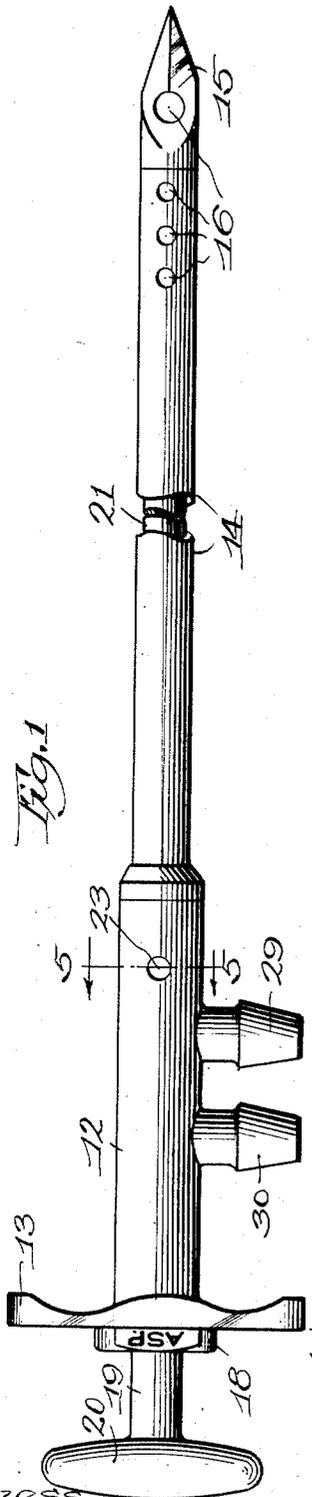
G. H. SLAUGHTER

1,845,727

TROCAR

Filed Oct. 4, 1930

2 Sheets-Sheet 1



Witness  
Charles H. Koursh.

Inventor,  
George H. Slaughter,  
by Charles A. Sherry, Atty.

Feb. 16, 1932.

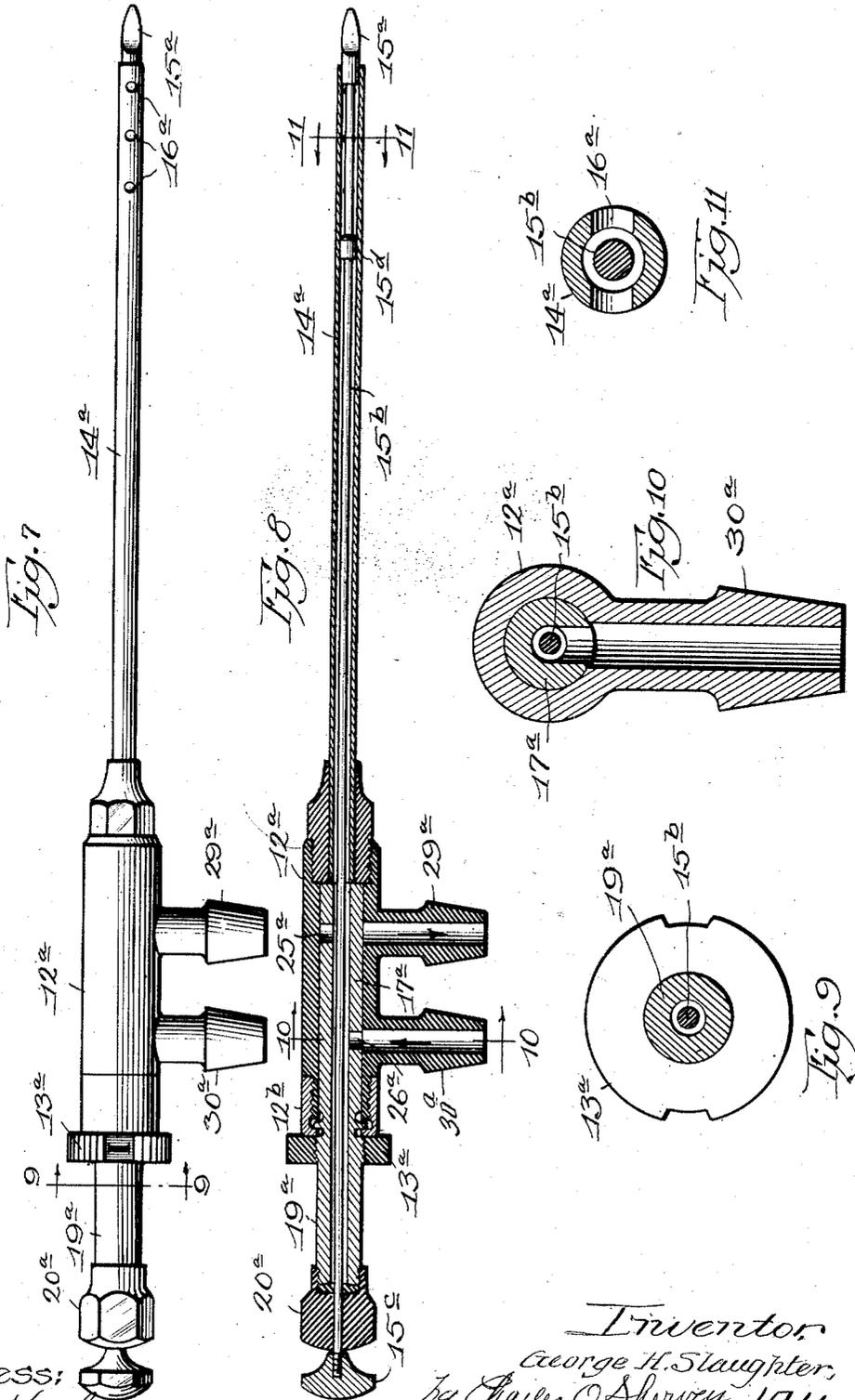
G. H. SLAUGHTER

1,845,727

TROCAR

Filed Oct. 4, 1930

2 Sheets-Sheet 2



Witness:  
Chas. A. Kousch.

Inventor:  
George H. Slaughter,  
by Charles O. Skerrey, Atty.

# UNITED STATES PATENT OFFICE

GEORGE H. SLAUGHTER, OF BENTON HARBOR, MICHIGAN

## TROCAR

Application filed October 4, 1930. Serial No. 486,304.

This invention relates to trocars, drainage tubes, and the like, and its principal object is the provision of simple means, whereby the instrument may be connected to a source of vacuum supply and to a source of fluid under pressure at the same time and having control means, whereby the tube of the instrument may be placed into communication with either of said sources of supply. Another object is to provide means for venting the tube while being used in connection with the vacuum supply.

Trocars are employed by embalmers for the purpose of extracting gases and other fluids from a body, and it frequently happens that the viscera or other tissues are drawn into the inlet openings of the instrument, thereby clogging the same and preventing the fluids from being drawn out, and one of the objects of the invention is to provide means for preventing the tissues from being drawn into the inlet openings of the tube during the draining operation. Another object is to provide an instrument of this character with a retractible point or piercing member.

Other objects and advantages will appear in the course of this specification, and with all of said objects and advantages in view, this invention consists in the several novel features of construction, arrangement and combination of parts hereinafter fully described and more particularly pointed out in the claims.

The invention is clearly illustrated in the drawings accompanying this specification in which—

Figure 1 is a side elevation of a trocar embodying a simple form of the present invention and showing the tube portion partly broken away;

Fig. 2 is a central longitudinal section thereof;

Fig. 3 is a detail longitudinal section taken on the line 3—3 of Fig. 2;

Fig. 4 is a detail cross section taken on the line 4—4 of Fig. 2;

Fig. 5 is an enlarged detail cross section taken on the line 5—5 of Fig. 1;

Fig. 6 is a perspective view of a fragment

of a certain valve member forming part of the invention;

Fig. 7 is a side elevation of a modified form of the invention;

Fig. 8 is a central longitudinal section through the same;

Fig. 9 is an enlarged detail vertical cross section taken on the line 9—9 of Fig. 7;

Fig. 10 is an enlarged detail vertical cross section taken on the line 10—10 of Fig. 8; and

Fig. 11 is an enlarged detail vertical cross section taken on the line 11—11 of Fig. 8.

Referring to said drawings, and first to Figs. 1 to 6, inclusive, which show the preferred embodiment of the invention, the reference character 12 designates a housing, here shown in the form of a barrel having a finger hold 13 at one end and a tube 14 threadedly secured at the other end. A point or other piercing member 15 is threadedly secured in the free end of the tube 14. The point 15 and adjacent end portion of the tube 14 are provided with apertures or other openings 16 through which fluid may be moved into or out of the tube.

Within the barrel 12 is a valve member 17 which is of cylindrical form and is fitted to the bore of the barrel 12 so as to make a fairly tight joint therewith. The valve member 17 is shouldered, as at 18, and from said shouldered portion extends a stem 19 which is provided on its other end with a knob or handle 20 by means of which the valve member may be rotated in the barrel or completely withdrawn therefrom.

Projecting from the valve member 17, in co-axial alignment therewith, is an inner tube 21 which extends within the outer tube 14 to a place adjacent the openings 16. A slight clearance space is left between the tubes 14 and 21 to provide an air passage which leads from a vent opening 23 in the barrel and a recess 22 formed in the cylindrical face of the valve member 17 to the end of the tube 21. The recess 22 is capable of registering, when in one position of the valve member, with the vent opening 23, thereby venting the tubes 14 and 21.

The bore of the inner tube 21 extends part way through the valve member 17, thereby

forming a conduit 24 which leads from the openings 16 to the end of the conduit 24, and the wall of the valve member 17 is formed at opposite sides with ports 25 and 26 that are capable of being brought into register one at a time with passages 27 and 28 that are formed in nipples 29 and 30 which project from the barrel 12. The nipple 29 is adapted to be connected with a flexible tube (not shown) which leads from a suitable vacuum pump, and the nipple 30 is adapted to be connected to a flexible tube (not shown) which leads from a container or receptacle in which is contained a fluid under pressure. Suitable markings may be placed on the shoulder 18 to indicate the location of the ports 25 and 26 relative to the passages 27 and 28 in the nipples 29 and 30, and means may be provided for determining the exact location of said ports, as, for instance, a spring pressed catch 40 may be provided in the shoulder 18 for engagement in recesses 41 formed in the finger hold 13.

In use, the instrument is connected to the two flexible tubes which lead from their respective sources of supply. The tube is inserted at the desired place and the knob or handle 20 is turned to bring the port 25 into register with the passage 27 which communicates with the vacuum pump. In this position of the valve member, the port or opening 26 is covered by the wall of the barrel 12. Any gases or liquids which enter the openings 16 pass through the inner tube 24 and discharge out through the bore 25 and passage 27 to and through the flexible tube which is connected with the vacuum pump. The liquid fills the cavity in the outer tube 14 beyond the inner tube 21 and so long as the end of the inner tube is submerged in the liquid the latter discharges through the inner tube. As the liquid is being withdrawn there is likely to be a movement of the internal viscera toward the point where the suction and removal of fluids is taking place. In case the viscera are drawn over the openings 16 in the outer tube, and the fluid in the cavity within the outer tube 14 beyond the inner tube is withdrawn to such an extent that the end of the inner tube is no longer submerged in the liquid, then outside air will be admitted through the vent opening 23, groove 22 and the annular space between the outer and inner tubes to the inner tube, thus venting the inner tube, whereupon further suction of fluid and movement of the viscera will cease. This condition will continue until the end of the inner tube is again submerged in fluids which find their way into the cavity within the outer tube.

In case any viscera or other tissues are drawn over the openings 16, they will not be drawn in through the openings, because the tube is vented. From actual practice it has been found that by venting the tube, as above

described, in case any of the viscera or tissues cover the openings 16, said parts are prevented from being drawn in through the openings, and as soon as other fluids gather around the openings, the fluids will be withdrawn from the part into which the tube is inserted.

After the fluids have been withdrawn, the knob or handle 20 is turned, thereby rotating the valve member 17 through an arc of 180°, thus bringing the port or opening 26 into register with the passage 28 in the nipple 29, and at the same time moving the bore or opening 25 out of register with the passage 27 and also moving the recess 22 away from the opening 23. In this position, communication is established between the passage 28 and the main conduit of the tube, through which liquid or embalming fluid is forced from the receptacle or container and discharged into the body.

In the modified form of the invention shown in Figs. 7 to 11, inclusive, the barrel 12<sup>a</sup> with its nipples 29<sup>a</sup> and 30<sup>a</sup>, the tube 14<sup>a</sup>, valve member 17<sup>a</sup>, knob or handle 20<sup>a</sup> and stem 19<sup>a</sup> are substantially of the same construction as the preferred form. The tube 14<sup>a</sup> is provided with openings 16<sup>a</sup>, and the valve member 17<sup>a</sup> is provided with ports or openings 25<sup>a</sup> and 26<sup>a</sup> that are adapted to be brought into register with the passages in the nipples 29<sup>a</sup> and 30<sup>a</sup>, as in the preferred form. In place of the finger hold 13, a disk 13<sup>a</sup> is rigidly secured upon the stem 19<sup>a</sup> to provide means whereby the valve member 17<sup>a</sup> may be rotated in the barrel 12<sup>a</sup> and a flanged sleeve 12<sup>b</sup> is threadedly secured upon the barrel and engages in annular groove in the valve member to secure said valve member against longitudinal movement in the barrel.

The inner tube of the preferred form is omitted, as well as the vent opening 23, and the point or piercing member 15<sup>a</sup> instead of being secured to the tube is mounted upon a stem 15<sup>b</sup> which extends through the tube 14<sup>a</sup> and through the valve member and is provided with a knob 15<sup>c</sup> upon its end, whereby the point or piercing member 15<sup>a</sup> may be drawn into the stem portion 19<sup>a</sup> of the valve member 17<sup>a</sup>. A shoulder 15<sup>d</sup> is provided upon the stem 15<sup>b</sup> which is arranged to strike against the end of the conduit in the valve member when the point or piercing member is retracted.

This form of the invention is intended particularly for use in draining blood from corpses in the process of embalming them. The nipple 29<sup>a</sup> may be connected to a vacuum pump by a flexible tube and the nipple 30<sup>a</sup> may be connected to the container or receptacle by a flexible tube and compressed air may be supplied to said container or receptacle, as in the preferred form. The valve member 17<sup>a</sup> is adjusted to bring the port or

opening 25<sup>a</sup> into register with the passage through the nipple 29<sup>a</sup>, after the pointed end of the instrument has been inserted into a vein or artery, and the point or piercing member 15<sup>a</sup> is retracted, thereby permitting the blood to drain out through the tube 14<sup>a</sup>, valve member 17<sup>a</sup>, nipple 29<sup>a</sup> and the flexible connection which is attached thereto.

To inject fluid into the arteries or veins, the knob or handle 13<sup>a</sup> is partially rotated to bring the port or opening 26<sup>a</sup> into register with the nipple 30<sup>a</sup>, thus placing the tube in communication with the container or receptacle in which the fluid is contained under pressure. Fluid is thereupon forced through the instrument and into the vein or artery.

From the above, it will be seen that the valve member provides means whereby the instrument may be used for draining fluids from a body and for injecting fluids into a body without disconnecting the instrument from the flexible tubes. It is simple in construction and may be readily taken apart for the purpose of cleaning.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention. I desire, therefore, not to limit myself to the exact form of the construction shown and described, but intend, in the following claims, to point out all of the invention disclosed herein.

I claim as new, and desire to secure by Letters Patent:

1. An instrument of the character described comprising a housing having a perforated pointed tube projecting therefrom, said housing also having a fluid outlet passage and a fluid inlet passage, and a valve member in said housing having a conduit opening to the conduit in the perforated tube, said valve member being provided with ports one associated with each fluid passage and each capable of registering one at a time only with an associated fluid passage.

2. An instrument of the character described comprising a barrel having a perforated pointed tube projecting therefrom, said barrel also having a fluid outlet passage and a fluid inlet passage, and a valve member rotatably mounted in said barrel and having a tube extending therefrom and opening to the conduit in the perforated tube, said valve member being provided with ports, one associated with each fluid passage and each capable of registering one at a time only with an associated fluid passage.

3. An instrument of the character described comprising a barrel having a perforated tube projecting therefrom, said tube being provided with a piercing member on its free end, and said barrel having a fluid outlet passage and a fluid inlet passage, and a valve member rotatably mounted in said barrel and having a conduit opening to the conduit in

the tube, said valve member being provided with ports, one associated with each fluid passage and each capable of registering one at a time only with an associated fluid passage.

4. An instrument of the character described comprising a barrel having a fluid outlet passage and a fluid inlet passage and having a pointed tube projecting from one end of the barrel, said tube being perforated at its pointed end, and a valve member rotatably mounted in said barrel and having a conduit opening to the conduit in the tube, said valve member being provided with ports, one associated with each fluid passage and each capable of registering one at a time only with an associated fluid passage.

5. An instrument of the character described comprising a barrel having a perforated tube projecting therefrom and provided with a pointed end, said barrel also having a fluid outlet passage and a fluid inlet passage, and a valve member rotatably mounted in said barrel and having a tube projecting into the perforated tube and terminating adjacent the perforations therein, there being a clearance space between said tubes leading from a vent opening in the barrel, and said valve member having ports, each capable of registering one at a time with a fluid passage of the barrel.

6. An instrument of the character described comprising a barrel having a perforated tube projecting therefrom, said barrel also having a fluid outlet passage and a fluid inlet passage, and a valve member rotatably mounted in said barrel, and having a tube extending through the interior of the perforated tube and terminating at the perforations thereof, there being a vent opening in the barrel and an air passage leading therefrom to said end of the inner tube, and said valve member being provided with ports each capable of registering one at a time only with a fluid passage of the barrel.

7. An instrument of the character described comprising a barrel having a perforated pointed tube projecting therefrom, said barrel being formed with two nipples, one affording a fluid outlet passage from said barrel and one affording a fluid inlet passage to said barrel, and a valve member movably mounted in said barrel and having a conduit opening to the conduit in the perforated tube, said valve member being provided with ports, one associated with each fluid passage and each capable of registering one at a time only with an associated passage.

8. An instrument of the character described comprising a barrel having a perforated pointed tube projecting therefrom, said barrel being formed with two nipples, one affording a fluid outlet passage from said barrel and one affording a fluid inlet passage to said barrel, a valve member movably mounted

in said barrel and having a conduit opening to the conduit in the perforated tube, said valve member being provided with ports, one associated with each fluid passage and each capable of registering one at a time only with an associated fluid passage in the barrel, and a valve stem for said valve member provided with a knob on its outer end.

9. In an instrument of the character described, the combination of a barrel provided with a perforated tube and having a plurality of nipples leading from the bore of the barrel, and a valve member contained in the bore of said barrel and having a conduit communicating with the interior of the tube and also having ports one associated with each nipple and each arranged to be brought into register one at a time only with an associated nipple.

10. An instrument of the character described comprising a barrel having a perforated tube projecting therefrom, said barrel also having a fluid outlet passage and a fluid inlet passage, a valve member in said housing having a conduit opening to the conduit in the perforated tube, said valve member also having ports, one associated with each fluid passage and each capable of registering one at a time only with an associated fluid passage, a piercing member, a stem upon which said piercing member is mounted at one end, said stem extending through the bore of the perforated tube and valve member and having a knob upon its end, and said piercing member normally projecting from the perforated end of the perforated tube and capable of being retracted from said end.

GEORGE H. SLAUGHTER.

40

45

50

55

60

65