June 14, 1960 A. J. SMIALOWSKI 2,940,452

VASCULAR EVERTOR

Filed Nov. 7, 1958

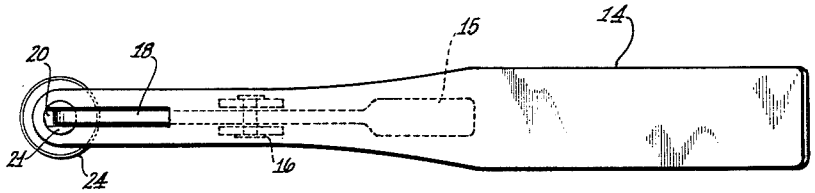

Fig. 4.

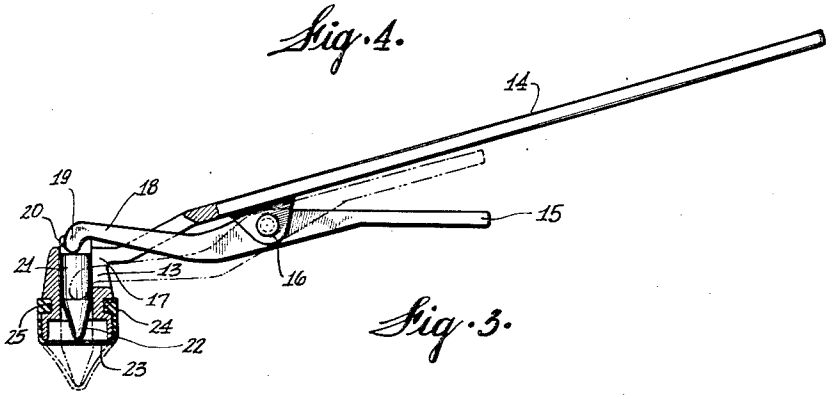

Fig. 3.

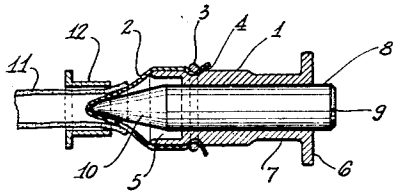

Fig. 1.

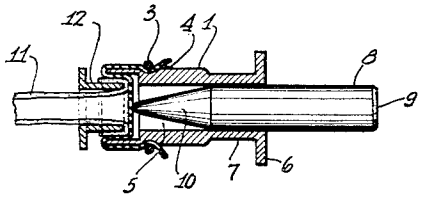

Fig. 2.

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VASCULAR EVERTOR

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4 Claims. (Cl. 128—334)

This invention relates to a device for everting the ends of blood vessels and the like.

In the use of peripheral suturing apparatus such as described in copending application Serial No. 717,656, filed February 26, 1958, it is quite desirable that means be provided for facilitating the step of everting the end of a blood vessel over the end of a bushing or the like preparatory to effecting the suturing operation.

It is an object of this invention to provide a device of simple manufacture for everting the end of a blood vessel, such device being convenient and effective in operation.

The invention will be described with reference to the accompanying drawing, in which:

Figure 1 is a sectional side elevation of a device in accordance with the invention,

Figure 2 is a sectional side elevation of the device in another operating position thereof,

Figure 3 is a sectional side elevation of a modified form of the device, and

Figure 4 is a partial plan view of the device shown in Figure 3.

Referring to Figures 1 and 2, 1 is a tubular body having a diaphragm 2 of rubber or like material extending over one end thereof in partly stretched condition. The edge portion of the diaphragm is, as shown, folded over the exterior surface of the body 1 and held securely in place as by a clamping ring 3 in cooperation with an annular recess 4 in the wall of body 1. One end portion of the bore of the tubular body 1 adjacent the diaphragm is enlarged to form an annular recess or cup 5. The other end of the tubular body is preferably provided with an external flange 6 and an adjoining wide groove 7 to serve as a convenient finger grip.

Reciprocally mounted in the bore of the tubular body is a plunger 8. The plunger is somewhat longer than the body 1 and has a flat end 9 adjacent the grip 6, 7 for engagement by the thumb of the user when the fingers are applied to the grip. The other end portion 10 of the plunger is cone-shaped as shown, with a rounded extremity, such end portion, on manual depression of the plunger, being adapted to project beyond the adjacent end of the body 1 with resultant distension of the diaphragm 2. The surface of the cone may be of 15° to 20° included angle.

In use, the instrument is held by the grip 6, 7 between the fore finger and second finger of the hand, and the plunger depressed by the thumb with resultant distension of the diaphragm, and the conically deformed diaphragm inserted in the mouth of the blood vessel 11 to which has been applied the bushing 12 of the suturing apparatus, as clearly shown in Figure 1. The body 1 is then slowly reciprocated with relation to the plunger towards the

bushing while, at the same time, pressure on the plunger is progressively released. This action is continued until the bushing enters the cup 5 to the extent shown generally in Figure 2. The instrument is then withdrawn leaving the blood vessel end everted on the bushing 12.

Figures 3 and 4 illustrate a modified form of the instrument suitable for use in a limited space. In this form, a tubular body 13 corresponds to body 1 but is of substantially shorter length. It is provided with a handle 14 adjacent one end thereof and a lever 15 pivoted to the handle at 16. The handle and wall of the body 13 is slotted at 17 to permit travel of an offset end portion 18 of the lever therethrough. The extremity 19 of the lever is arranged to seat in a groove 20 in the end of a plunger 21, the other end portion 22 of which is cone-shaped, similarly to the end portion 11 of the plunger 8 previously described. A moulded rubber or like diaphragm 23 is mounted on the other end of body 13, the diaphragm having an internal rib 24 for locking engagement with an annular groove 25 in the exterior wall surface of the body 13. The bore of the body 13 is enlarged adjacent the latter end thereof to provide a bushing receiving cup 26. Use of such a diaphragm and the mounting described renders convenient the removal and replacement thereof without the use of tools. Moreover, the handle 14 and lever 15 facilitate the use of the instrument. This form of the instrument is utilized in substantially the same manner as that of the other modification.

The parts of the instruments described, with the exception of the diaphragm, may be formed of any suitable metal or plastic composition.

I claim:

1. An instrument for everting the end of a blood vessel comprising a body having an axial bore, a diaphragm mounted on one end of said body and having a portion stretched over the mouth of said bore, said bore having a portion of enlarged diameter extending inwardly from said mouth, and a plunger of greater length than said body reciprocally mounted in said bore, said plunger manually reciprocal to distend said diaphragm.

2. An instrument as defined in claim 1, said plunger having a cone-shaped end portion for engagement with said diaphragm.

3. An instrument for everting the end of a blood vessel comprising a body having an axial bore extending therethrough, a diaphragm mounted on one end of said body and having a portion stretched over the mouth of said bore, said bore having a portion of enlarged diameter extending inwardly from said mouth, a plunger of greater length than said body reciprocally mounted in said bore, and means for reciprocating said plunger comprising a handle fixed to one end thereof, and a lever pivoted to said handle and engaging one end of said plunger, the other end of said plunger being engageable with said diaphragm to distend the same in response to reciprocation of the plunger.

4. An instrument as defined in claim 3, said body having an annular groove in the external surface thereof, and said diaphragm having a peripheral internal rib for seating in said annular groove to removably retain said diaphragm on said body.

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