

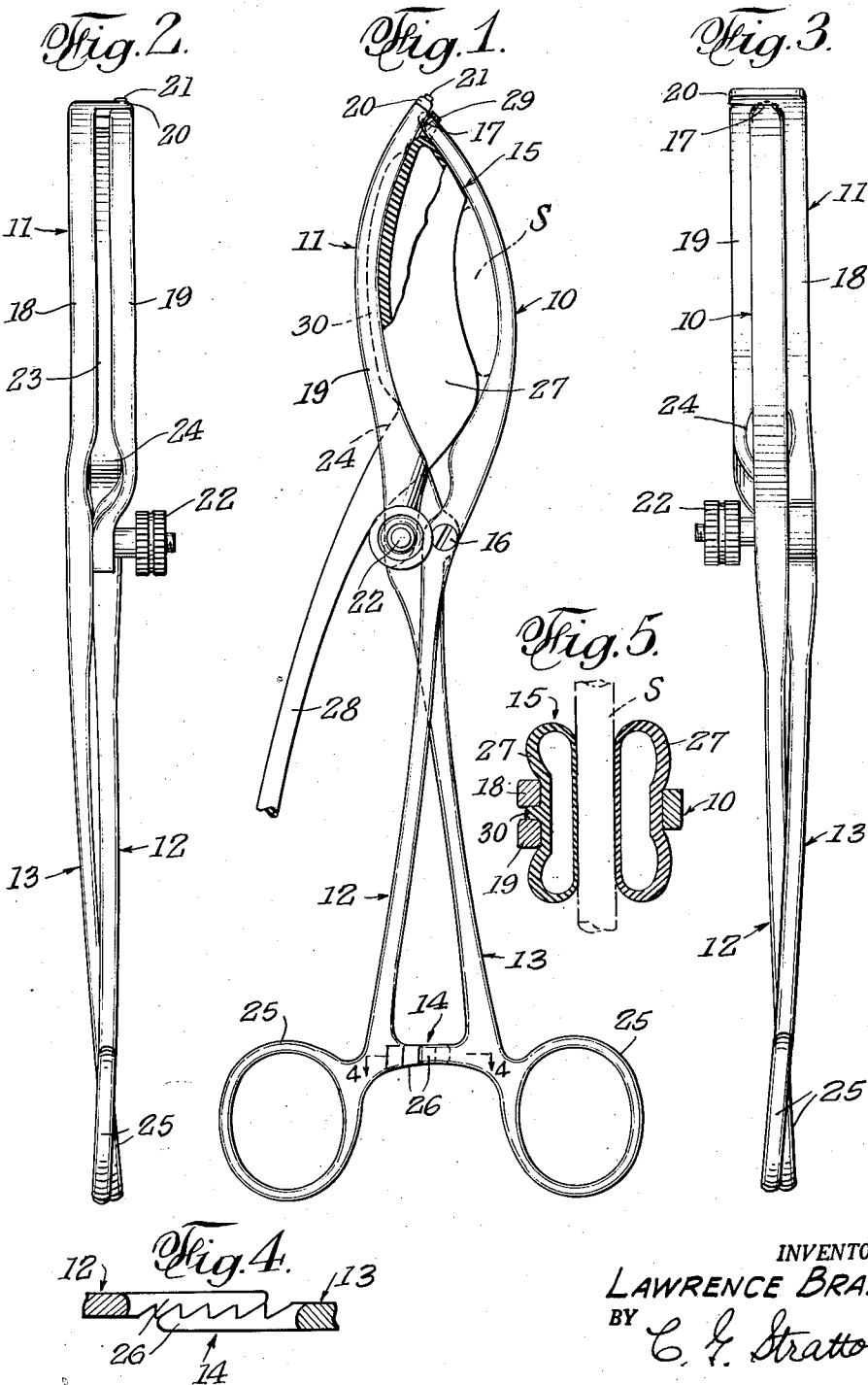
Nov. 25, 1958

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2,861,574

TOURNIQUET

Filed May 6, 1957



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2,861,574

TOURNIQUET

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Application May 6, 1957, Serial No. 657,215

8 Claims. (Cl. 128—327)

This invention relates to a tourniquet construction, the same more particularly dealing with a directly applied instrument for closing a hollow structure plexus or vessel of which arteries, veins, bowels, bronchi, lung hila, etc., are examples.

An object of the present invention is to provide a direct tourniquet by means of which pressure on a hollow anatomical structure may be maintained at a predetermined level, the same affording direct observation of complete collapse and cessation of blood flow of such vessel.

The difficulty in achieving protection of the integrity of vascular structures, during operative periods, has sought solution in so-called atraumatic instruments which have the common fault of a metal-to-metal pinching or collapsing of diseased walls with material damage that is, primarily the result of rigid and uncontrolled pressures between two metal elements.

Recognizing the above faults in prior devices, it is another object of the invention to provide a direct tourniquet for application to vascular structures and which, while efficiently performing its function as a tourniquet, nevertheless applies flow-arresting pressure in a non-injurious and safe manner.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawing merely shows and the following description merely describes, preferred embodiments of the present invention, which are given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

Fig. 1 is a front elevational view of a tourniquet embodying the principles of the present invention.

Figs. 2 and 3 are side elevational views from opposite sides of Fig. 1, an inflatable unit shown in Fig. 1 being omitted from said views.

Fig. 4 is an enlarged and fragmentary sectional view as taken on line 4—4 of Fig. 1.

Fig. 5 is a cross-sectional view of a modification.

The present tourniquet comprises, generally, hingedly connected and opposed blades 10 and 11, manipulating handles 12 and 13 for the respective blades, means 14 to releasably lock the blades in closed operative position, and air-inflatable means 15 operatively associated with the blades 10 and 11 and adapted to impose pressure on a vascular or other hollow structure S.

In their preferred form, the blades 10 and 11 are oppositely bowed or curved and define between them an oval space or area, substantially as shown in Fig. 1. A pivot 16 connects said blades at one end, said blades being

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separable at the opposite ends thereof by being moved around said pivot.

The blade 10 is shown as a simple rectangular-sectioned arm, which of course, may be varied in width, may be covered with compressible material such as rubber or cloth, and, if desired, may be provided on its concave inner face with roughening or knurling as a non-slip means. Since the blades are advantageously made of metal, suitably plated and polished to be capable of complete sterilization, the mentioned rubber or fabric cover may be used in instances where metallic contact with a vascular or other vessel may not be desired, or the increased frictional grip of such cover would be advantageous. The roughening or knurling is alternative to such cover material since the same minimizes slipping of large pulsating vessels gripped thereby in certain usages. The end of blade 10, opposite its pivot, is preferably provided with a point 17 or, at least, is substantially narrowed.

The blade 11 is preferably formed of two similar transversely spaced halves 18 and 19. The former is shown at one end with a lateral extension 20 that is apertured for a lug 21 on the half 19, and at the opposite end, said halves are connected by a screw and nut 22. For most of the length of blade 11, said halves 18 and 19 are spaced, as at 23, and, adjacent to screw and nut 22, this opening is enlarged to form a passage 24. It will be clear, from this construction, that the blade half 19 is adapted to be removed from its position alongside the blade half 18.

The handles 12 and 13 are alike and each is provided with a finger-engaging end 25. Said handles are preferably flexible. Although shown straight, the handles 12 and 13 may be otherwise formed, either curved or angled with respect to the general longitudinal disposition of the blades 10 and 11 for better or easier application of the tourniquet in various applications.

The means 14 is shown as toothed extensions 26 of handles 12 and 13, the same overlapping so their teeth engage and lock the handles against separation. Due to the mentioned flexibility of the handles, the lock is a resilient one and said flexibility further enables separation of the teeth of extensions 26 when opening the blades 10 and 11.

From the foregoing, it will be seen that the handle part of the instrument is comparable in design and function to a hemostat or other scissors-like instrument and that said part is provided for ease of manipulation of the blade part of the instrument. In fact, said handle part may be omitted and instead the end of the blades, opposite to the hinge 16, may be connected by a suitable separable latch, catch or other means, to firmly hold the blades in locked or clamping position.

The inflatable means 15 is shown in Fig. 1 as a rubber bag or bladder 27 that, when deflated, is flat and is adapted to be inflated through a flexible tube 28 by any of the devices used for inflating tourniquets, sphygmomanometers, etc. Such bag may be provided with a loop 29 by means of which it may be held properly positioned by engaging the end 17 of blade 10.

The space or slot 23, while otherwise not needed, may be utilized to accommodate a rib 30 provided on the bag, in which case the latter is held against lateral displacement and the loop 29 may be dispensed with.

It will be realized that the blade 11 is made as two separable halves to facilitate placing of the bag in operative position with the tube 28 thereof passing through passage 24. The engagement of the tube in the passage is a further means for locating the bag properly between the blades.

As shown in Fig. 5, the means 15 may comprise two bags 27 and, although shown disposed in an instrument

having blades 10 and 11, both said blades may be formed of separable halves, as above described.

In use, the bag or bags, in deflated condition, are placed between the blades, the instrument so engaged with a vessel S as to place the same between blade 10 and bag 27, or between two bags, as in the modification. Now, by closing the blades as by the handles 12 and 13 and lock means 14, or by latch or lock means that may be used in lieu of said handles, and inflating the bag or bags, as the case may be, the vessel S is safely subjected to pressure. It will be realized that, without effecting any change in the mechanical disposition of the instrument, the level of pressure on the vessel S may be maintained and/or varied, as desired, by a change in the pressure supplied to the bag or bags.

While the foregoing has illustrated and described what are now contemplated to be the best modes of carrying out my invention, the constructions are, of course, subject to modification without departing from the spirit and scope of the invention. It is, therefore, not desired to restrict the invention to the particular forms of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desired to secure by Letters Patent is:

1. A tourniquet comprising two hingedly connected oppositely curved blades, means separably holding said blades in oval-defining relationship, and inflatable bag means disposed between the blades and which, when inflated, impose pressure on a vessel also disposed between the blades.

2. A tourniquet comprising two hingedly connected oppositely curved blades, means separably holding said blades in oval-defining relationship, and inflatable bag means disposed between the blades and which, when inflated, impose pressure on a vessel also disposed between the blades, said bag means embodying portions in such engagement with one of the blades as to retain the same against lateral displacement relative to said blade.

3. A tourniquet comprising two hingedly connected oppositely curved blades, means separably holding said blades in oval-defining relationship, and inflatable bag means disposed between the blades and which, when inflated, impose pressure on a vessel also disposed between the blades, said bag means comprising a normally-flat inflatable bag and embodying a portion so engaged with one of the blades as to retain the same against lateral displacement relative to said blade.

4. A tourniquet comprising two hingedly connected

oppositely curved blades, means separably holding said blades in oval-defining relationship, and inflatable bag means disposed between the blades and which, when inflated, impose pressure on a vessel also disposed between the blades, said bag means comprising a normally-flat inflatable bag and embodying a portion so engaged with one of the blades as to retain the same against lateral displacement relative to said blade, the latter blade comprising separable halves, and the mentioned bag portion being disposed between said halves.

5. A tourniquet comprising two hingedly connected oppositely curved blades, means separably holding said blades in oval-defining relationship, one of said blades being formed of longitudinal separable halves, a passage being defined between the halves, and an inflatable normally-flat bag disposed between the blades and which, when inflated, imposes pressure on a vessel also disposed between the blades, said bag being provided, at one end, with an inflating tube and said tube passing through said passage.

6. A tourniquet comprising two hingedly connected oppositely curved blades, means separably holding said blades in oval-defining relationship, one of said blades being formed of longitudinal separable halves, a passage being defined between the halves, an inflatable normally-flat bag disposed between the blades and which, when inflated, imposes pressure on a vessel also disposed between the blades, said bag being provided, at one end, with an inflating tube and said tube passing through said passage, each blade being provided with a handle, and said blade-holding means being provided on said handles to co-operate to hold the blades closed over the bag means.

7. The combination of a pair of hingedly-connected bowed blades that, when moved on their hinge to closed position, define an oval space therebetween, and a normally-collapsed inflatable bag disposed in said space and which, when inflated, imposes pressure on a vessel between itself and one of the blades.

8. The combination of a pair of hingedly-connected bowed blades that, when moved on their hinge to closed position, define an oval space therebetween, and two normally-collapsed inflatable bags disposed in said space and which, when inflated, impose pressure on a vessel between said bags.

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