Feb. 3, 1942. E. S. SAIGHMAN 2,271,927

TOURNIQUET

Filed June 16, 1938

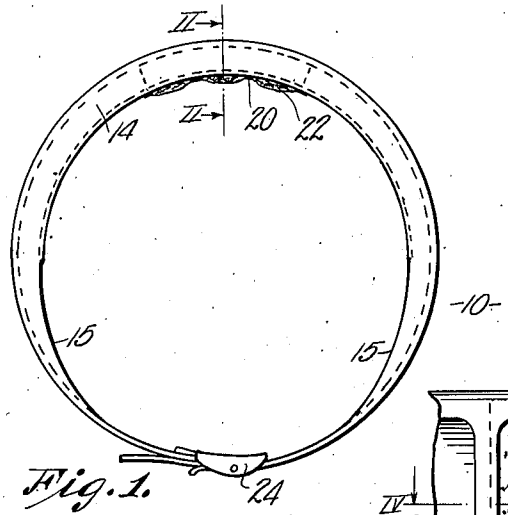


Fig. 1.

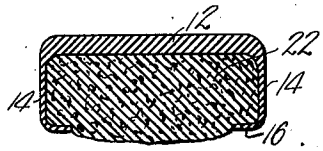


Fig. 2.

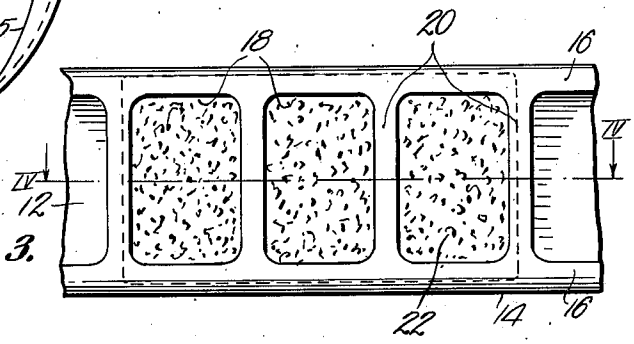


Fig. 3.

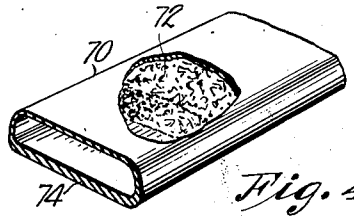


Fig. 9.

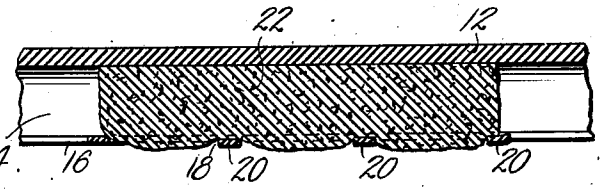


Fig. 4.

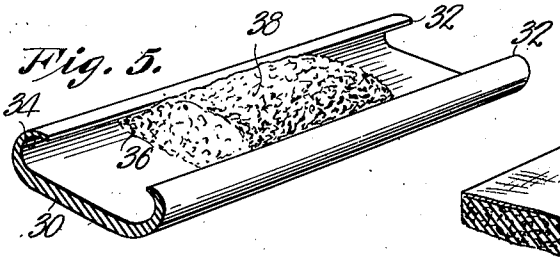


Fig. 5.

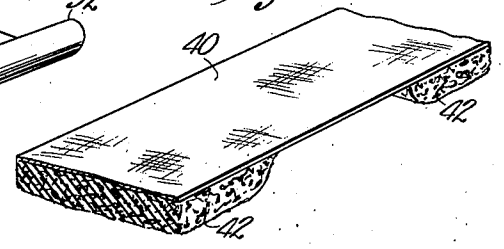


Fig. 6.

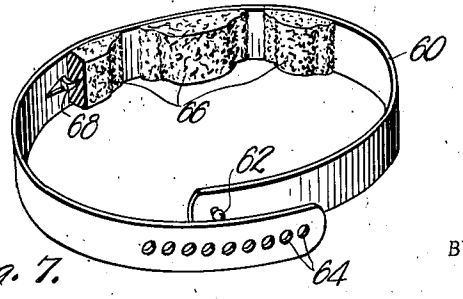


Fig. 7.

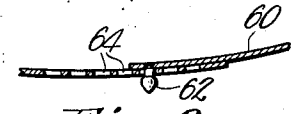


Fig. 8.

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TOURNIQUET

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Application June 16, 1938, Serial No. 213,985

1 Claim. (Cl. 128—327)

This invention relates to improvements in tourniquets, and particularly to a tourniquet suitable for retarding the flow of blood and lymph secretions in the tubular, superficial trunks and chains of minor vessels located adjacent the surface of the body.

Most tourniquet devices of the flexible type are so constructed and operated as to set up a tensile strain throughout the full length of the circumscribing portion of the tourniquet, sufficient to restrict the lumens of the underlying superficial tubular vessels to restrict the flow of the fluids therethrough. Due to the fact that the contour of the body portions on which the device is being used varies, and some of the surfaces adjacent the tubular vessels are sometimes substantially planar, an extreme tension must be applied in order to effectually restrict said vessels. This extreme tension causes considerable discomfort to the patient and usually retards the flow of blood through all the vessels circumscribed by the tourniquet.

The principal portions of the body on which the tourniquet is to be used includes the upper and lower extremities, neck, torso, and any other portion of the body around which it might be placed to control the flow of liquid through the circulatory systems contained therein.

It will be noted by an examination of the human body that certain portions thereof to which the tourniquet is to be applied, has more or less planar surfaces and in certain instances, there are depressions. These planar and depressed portions are usually bridged by the tourniquet now in general use, so that little or no direct or inward pressure is exerted against these parts to control the flow of liquid in the circulatory vessels contained therebeneath. Under these conditions it becomes necessary to apply an excessive tension on the tourniquet in order to obtain proper control of the vessels.

The principal object of the present invention is the provision of a tourniquet of simple construction that will overcome the above objections by applying to the tourniquet, pressure more directly to vessels to be controlled.

A further object of this invention is the provision of a tourniquet comprising an elongated, flexible member with longitudinally adjustable resilient pads carried on its inner surface.

Another object of the invention is the provision of a tourniquet having an elongated, flexible band provided on its one side with transversely projecting resilient pads adapted to be placed above certain blood vessels and to exert pressure thereagainst as the tourniquet band is placed under tension.

Other objects are simplicity and economy of construction, ease and efficiency of operation, and adjustability to meet the varying conditions encountered in regulating and controlling the liquid flow through certain of the circulatory vessels of the body.

Reference will now be had to the drawing wherein:

Figure 1 is a plan view of a tourniquet embodying this invention.

Fig. 2 is an enlarged, sectional view taken on line II—II of Fig. 1.

Fig. 3 is an enlarged, fragmentary view of an inside portion of the tourniquet.

Fig. 4 is a sectional view taken on line IV—IV of Fig. 3.

Fig. 5 is a perspective view of a portion of a modified form wherein the pads are slidably mounted in a channel formed band.

Fig. 6 is a fragmentary perspective view of a modified form wherein the pad or pads are secured by means of an adhesive to a flexible tourniquet band.

Fig. 7 is a perspective view of a modified form wherein the tourniquet band is made of a flexible metal band.

Fig. 8 is a sectional view showing a means for inter-engaging the end portions of the metal band shown in Fig. 7; and,

Fig. 9 is a perspective view of a modified form of the tourniquet showing a tubular band adapted to receive pads.

The tourniquet band **10** is made of a flexible material that will readily adapt itself to the contour of the body, and in order to obtain variable tensions, it has been found convenient to make this band of an elastic material such as rubber. This material not only permits a very accurate degree of tension, but also lends to the comfort of the patient. The outer wall **12** of band **10** is relatively thick and adapted to take the tensile strain when the tourniquet is in use.

A portion of band **10** intermediate its ends is tubular in shape and has inturned, relatively thin, side walls **14** and inside wall **16**, said inside wall having a series of spaced apart, transverse openings **18** which extend substantially half the length of said band, thereby producing a series of transverse bars **20**. The outer wall **12** being thicker and of greater diameter than the inner and side walls, takes the tensioning strain while the side and inner walls serve to frictionally hold the pad or pads **22** in proper relative position

during the operation of the tourniquet. Side walls 14 may be tapered at 15 to meet the outer wall 12. Pads 22 are made of a resilient material such as sponge rubber, so that it will conform to the contour of the surface against which it is pressed and then will return to its original shape when not in use. The tubular band has open ends through which the pad may be inserted or removed.

As shown, the pad 22 may extend through the opening 18, however, the inner wall 16 may be made so extremely thin that it will not offer resistance sufficient to interfere with the free operation of the pad 22 associated therewith. One end of band 10 is provided with a fastening means 24, such as a clamping buckle by means of which the ends of the band may be secured together.

In the operation of this tourniquet, the pad or pads are positioned over that portion of the body carrying the tubular vessel or vessels to be restricted, then the band 10 is properly tensioned and fastened together at its ends by means 24. When so positioned, a downward force will be exerted against pad 22 thereby causing it to exert a pressure against the body whereby the lumens are closed sufficiently to produce hyperaemia. It is very apparent that the tension exerted on the band will be much less than would be required when using the tourniquet now in general use, because of the fact that the pressure so exerted is more definitely directed by the pad or pads, to the tubular vessels. Several pads may be carried by the band, to direct pressure to certain circulatory vessels. In some instances, as much as fifty percent of the portion of the body may be circumscribed by the padded portion of the band, while in other operations, it may be necessary to control but one tubular vessel.

Referring now to the modified form shown in Fig. 5, it will be observed that that portion of the band 30 shown is of channel form with inwardly projecting flanges 32, which serve to form undercut recesses 34 to receive the edge portions 36 of pad 38. The entire longitudinal central portion of the adjustable pad is thus exposed for direct contact with the surface of the body. While only a portion of this type of tourniquet is shown, it is intended that aside from the structure shown, it is similar to that shown in Fig. 1.

The modified form shown in Fig. 6 contemplates the use of a flexible band 40 made of fabric or a similar material, to which the sponge rubber pad or pads 42 are secured by means of an adhesive, stitching, etc.

Referring now to Figs. 7 and 8, the band 60 is shown as a strip of thin sheet metal of very flexible structure, having a fixed button 62 at one end portion adapted to selectively engage in one of the openings 64 to secure the band in tensioned relation. The inner wall of band 60 is adapted to receive and carry pads 66 which may be attached by means of a tongue 68 integral with the band, by an adhesive or any other means whereby the parts will be secured in relative relation.

The modified form shown in Fig. 9 contemplates the use of a tubular formed band 70 made of a soft, flexible material into which is inserted any desired number of resilient pads 72. The outer wall 74 of the band is made much thicker than the inner wall 76, thereby facilitating proper positioning of the parts. These pads are adapted to be selectively moved to any position within the tubular member. Furthermore, this type of tourniquet, with the pads entirely covered, is very sanitary and convenient to operate. While only a fragmentary section of the tourniquet is shown, it is to be understood that in general, the structure is substantially like that shown in Fig. 1.

It will be observed that throughout the several forms above described, the structures are such that the tensile strain set up in the band is transmitted, in a large degree, through the pads to the circulatory vessel, thus making it impossible to bridge over any portion of the body above the certain vessel to be restricted. It is also apparent that the total pressure exerted by the operation will be much less than when using the old type tourniquet.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

A tourniquet comprising a tubular band of pliable elastic material having a thick outer wall and a relatively thin inner wall and having a series of openings formed through said thin inner wall, a resilient pad mounted in said tube and having portions thereof exposed through a plurality of said openings, means for securing said band about a body member with the outer wall thereof stretched to an abnormal length by a pre-determined force whereby the pad will exert a pre-determined pressure against portions of said encircled body member.

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