

Oct. 13, 1931.

A. R. KEMPF

1,827,241

TOURNIQUET

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Fig. 1.

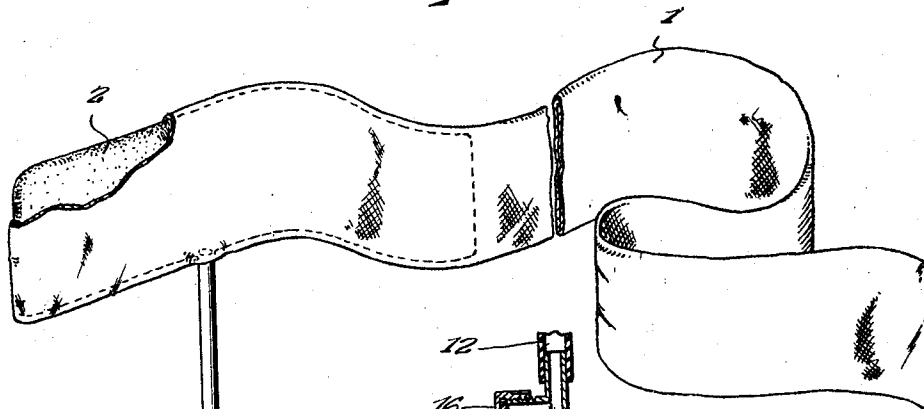


Fig. 2.

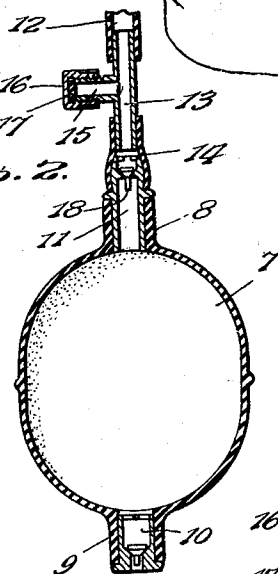


Fig. 5.

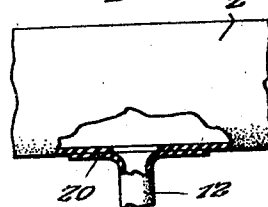


Fig. 4.

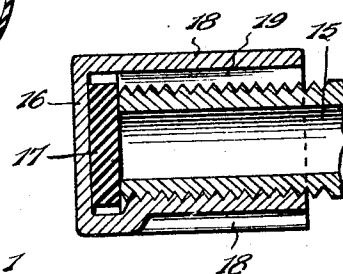
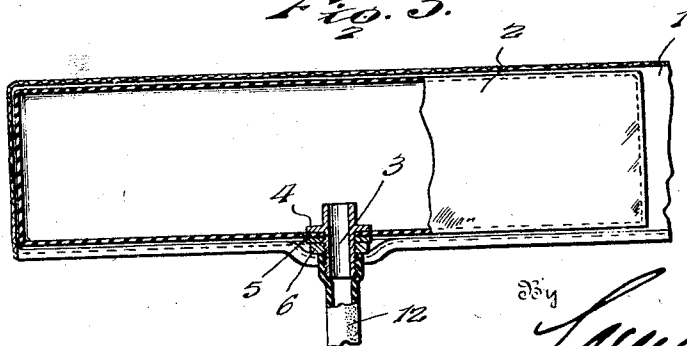


Fig. 3.



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TOURNIQUET

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This invention relates to surgical appliances and more particularly to a tourniquet by means of which pressure may be exerted about a person's arm and cause the veins to be extended and serums or medicines injected into the veins.

One object of the invention is to provide a tourniquet consisting of a bandaging strip having enclosed within a portion of its length an inflatable tube or bladder adapted to be inflated after the strip is bound about a person's arm and when inflated apply equal pressure about the arm.

Another object of the invention is to provide a tourniquet in which the amount of pressure exerted by the inflated bladder may be controlled and this pressure caused to be gradually increased until the desired pressure has been obtained and also gradually reduced and thereby prevent danger of a hypodermic needle inserted into a vein becoming displaced or broken due to muscular reaction when the pressure is increased or released.

Another object of the invention is to provide improved means for inflating the bladder and improved means for controlling passage of air out of the bladder.

The invention is illustrated in the accompanying drawings, wherein

Figure 1 is a perspective view of the improved tourniquet with a portion of the bandaging strip broken away about one end of the bladder.

Fig. 2 is a longitudinal sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a longitudinal sectional view through the bladder and the portion of the bandaging strip in which the bladder is disposed.

Fig. 4 is an enlarged sectional view taken longitudinally through the air outlet and closure cap for the same, and

Fig. 5 is a fragmentary view showing a modified construction.

The bandaging strip 1 of the improved tourniquet is formed of soft fabric and consists of a strip of material folded and stitched together along its edges. Therefore, the bandaging strip will be of double thickness which not only increases its strength but

also provides the strip with a pocket to receive a bladder 2. The bladder is formed of rubber and is disposed in one end portion of the bandaging strip, as shown in Figures 1 and 3. Intermediate its ends the bladder is provided with a neck 3 preferably formed of metal although any suitable material may be employed. This neck projects outwardly and is adapted to extend through an opening left in the side seam of the bandaging strip. A collar 4 is formed about the neck to bear against the inner surface of the bladder and the neck is externally threaded so that after it has been passed through an opening formed in the bladder and a washer 5 applied to the neck to bear against the outer surface of the bladder a securing nut 6 may be applied to the neck and when tightened cause the portion of the bladder about its neck-receiving opening to be firmly gripped between the flange 4 and washer 5. Therefore, the neck will be very firmly secured to the bladder and danger of a leak occurring about the neck prevented. Normally the bag or bladder 2 is flat and, therefore, the bandaging strip may be bound tightly about a person's arm but when the bag is inflated it tends to assume a shape circular in cross section and the inflated bag exerts pressure which is evenly distributed about the arm instead of being greater at one point which would be the case if the tourniquet was tightened by twisting or by pressure exerted at one point about the arm. This also prevents danger of the skin becoming caught when twisting a bandage and causing the arm to be bruised.

In order to inflate the bag, there has been provided a rubber bulb 7 formed with an outlet neck 8 and an inlet neck 9 at its opposite ends. A check valve 10 is fitted into the inlet neck 9 and since this check valve opens inwardly and is adapted to be closed by pressure exerted when the bulb is compressed air may be drawn into the bulb through the inlet but when the bulb is compressed the check valve will be closed and the air forced out of the bulb through the nipple 11 mounted in the outlet neck 8. A tube 12 of any length desired and preferably formed of rubber so that it will be flexible but at the same time

air-tight has one end fitted tightly about the outer end portion of the neck 3 of the bag and the outer end of the tube is secured tightly about one end portion of a short tube or duct 13. This duct 13 is connected with the nipple 11 by a short piece of rubber tubing 14, and from an inspection of Figure 2 it will be readily seen that when the bulb is compressed air forced out of the bulb through the nipple 11 will pass through the duct 13 and tube 12 into the bag 2 in order to inflate the bag. A side arm or escape neck 15 extends transversely from the duct 13 intermediate its length and this neck which is externally threaded carries a cap 16 having a rubber disk or pad 17 disposed therein to bear against the open outer end of the neck to tightly seal the same when the cap is screwed tightly into place. It is desired to have the air escape through the neck 15 without it being necessary to entirely remove the cap and, therefore, the walls of the cap have portions pressed outwardly, as shown at 18, thereby defining passages 19 extending longitudinally of the cap, as clearly shown in Figure 4. From an inspection of this figure, it will be seen that when the cap is loosened and partially unscrewed from the neck 15 communication will be established between the neck and the inner ends of the passages 19 and, therefore, air may pass from the neck through these passages. By this arrangement it is not necessary to entirely remove the cap in order to allow the air to escape and there will be no danger of the cap becoming lost.

When the improved tourniquet is in use, the end portion of bandage strip having the bag or bladder disposed therein is applied to a person's arm and is preferably so located that the bag extends entirely about the arm with its ends meeting. The remaining portion of the bandaging strip is wrapped about the portion containing the bag and the free end of the strip tucked into place so that it will be held and prevented from slipping. The cap 16 is closed and the bulb alternately compressed and allowed to expand. At each compression air will be forced past the check valve 18 of the nipple 11 and through the duct 13 and pipe or tube 12 into the bag and as the bulb expands a fresh supply of air will be drawn inwardly through the inlet neck of the bulb. Repeated compressions of the bulb will cause the bag to be inflated until the pressure exerted thereby about a person's arm is sufficient to cause blood to be congested in the veins and when this occurs the veins will become distended and prominently displayed. A hypodermic needle for injecting serum or medicine can then be very easily inserted into a vein. After the needle is in place the cap 16 may be loosened in order to allow the air to escape. When the cap is loosened and the air passes outwardly through the neck, the bag or bladder will be gradually

deflated. Therefore, the pressure about a person's arm will be gradually reduced and muscular contractions or other movements will not be liable to take place which might cause the needle to be dislodged or broken.

Instead of having the tube connected with the bladder by a coupling as shown in Figure 3, it may be vulcanized or cemented to the bladder as shown at 20 in Figure 5.

Having thus described the invention, I claim:

A tourniquet comprising a binding strip having one portion formed with a longitudinally extending pocket, a bladder in the pocket of said strip, and means to inflate said bladder consisting of a tube extending from the bladder intermediate the ends thereof, a bulb for forcing air through said tube into said bladder having an inlet at its outer end and an outlet at its inner end, an inwardly opening check valve for the inlet of said bulb, a tubular coupling leading from said tube and connected with the outlet end of said bulb, a neck leading transversely from said coupling intermediate the ends thereof constituting an air outlet, and a cap threaded upon said neck and having its walls formed internally with a longitudinally extending groove constituting an air passage open at its ends, and a pad in said cap to close the outer end of said neck when the cap is tightened upon the neck.

In testimony whereof I affix my signature.
DR. ARTHUR R. KEMPF. [L. S.]