(No Model.)

G. L. B. ROUNSEVILLE.

SURGICAL TOURNIQUET.

No. 515,367. Patented Feb. 27, 1894.

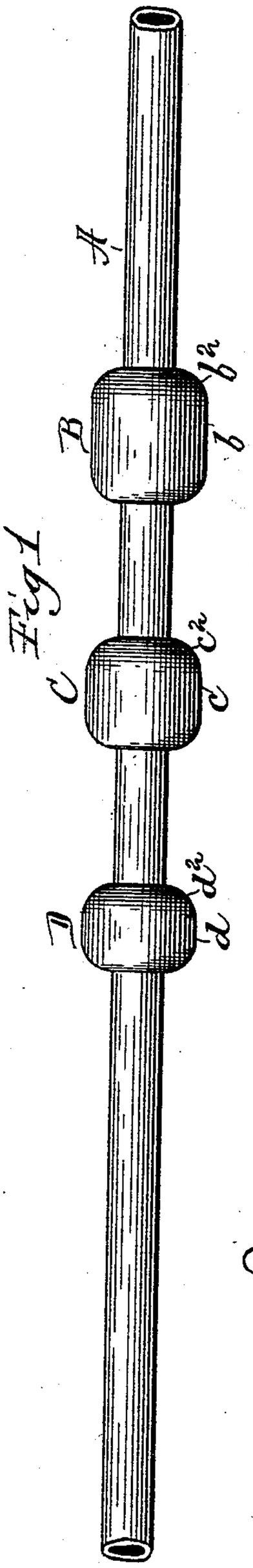

Fig 1

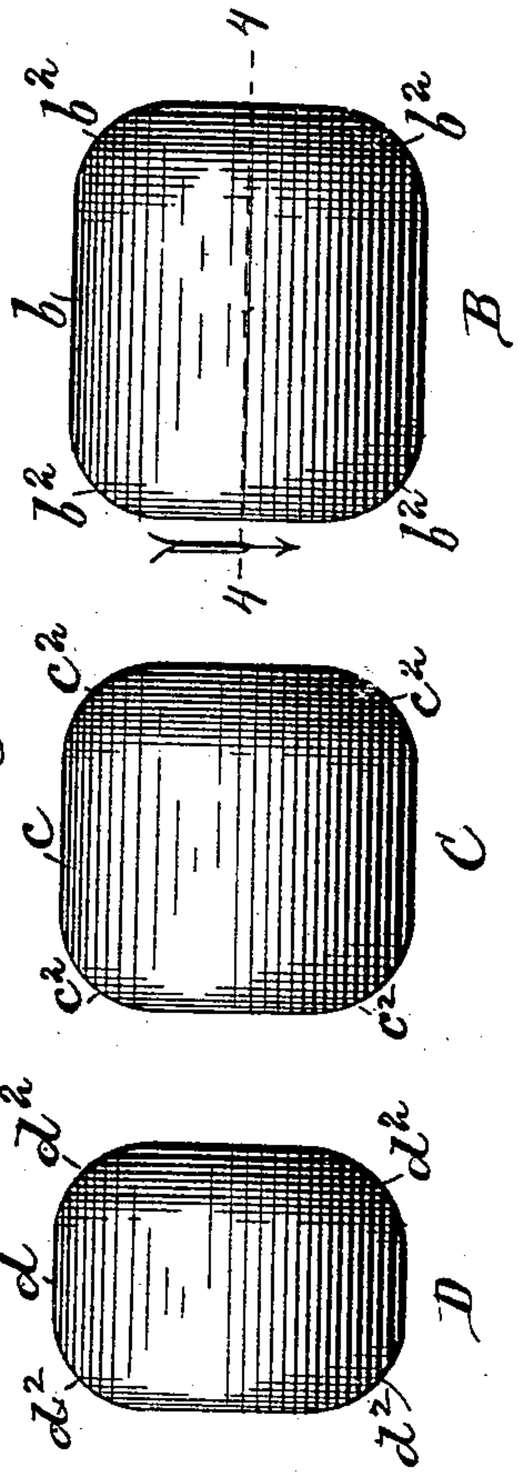

Fig 2

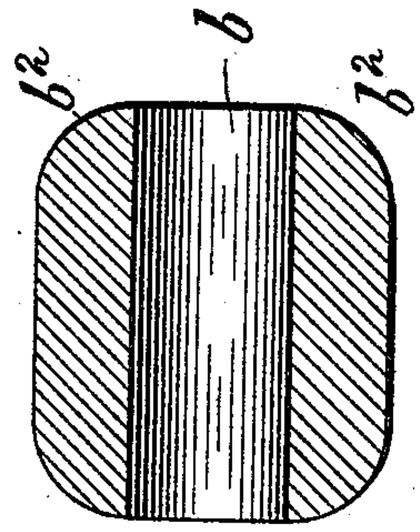

Fig 3.

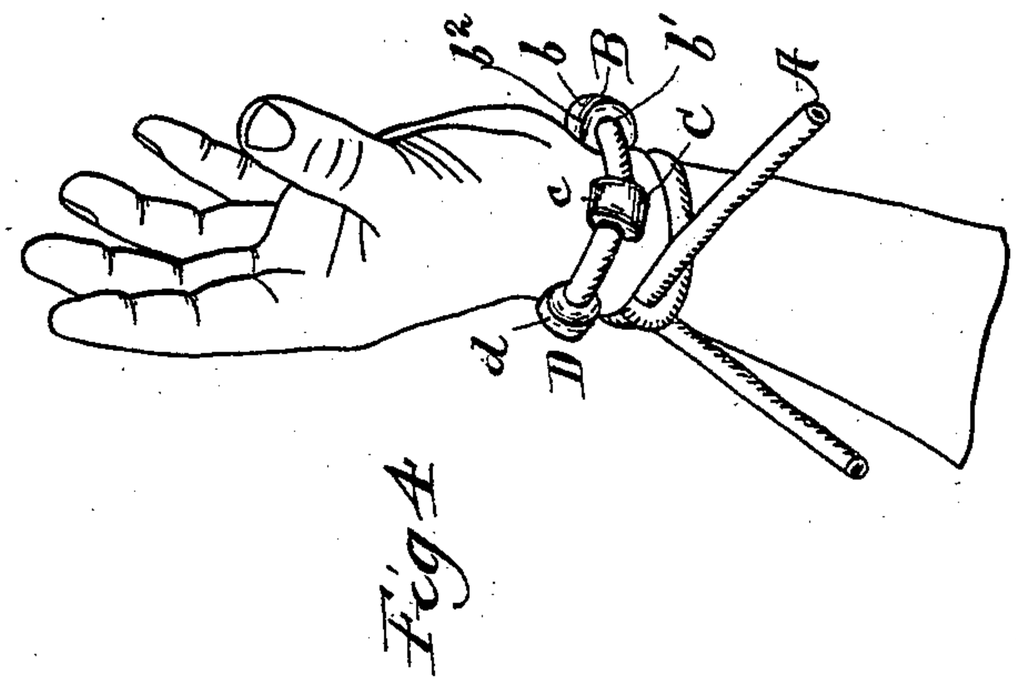

Fig 4

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SURGICAL TOURNIQUET.

SPECIFICATION forming part of Letters Patent No. 515,367, dated February 27, 1894.

Application filed September 16, 1893. Serial No. 485,685. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. B. ROUNSEVILLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Emergency-Tourniquets, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents an elevation of a tourniquet embodying my invention; Fig. 2, an elevation of the compresses detached; Fig. 3, a longitudinal section of one of the compresses, taken on the line 4. 4 of Fig. 2; and Fig. 4, an elevation of a hand and forearm with my tourniquet applied thereto.

In the drawings, Fig. 1 is upon one scale by itself; Figs. 2 and 3 are upon another and enlarged scale; and Fig. 4 is upon a scale by itself, considerably smaller than that of Fig. 1.

My invention relates to a tourniquet adapted for emergency use, the object being to provide a device which can be quickly and easily applied in case of an accident, and the action of which is efficient and satisfactory without undue compression of the part to which the tourniquet may be applied.

The invention consists in the form and material of the compress or compresses, which are strung upon an elastic cord.

I will describe the construction and operation of a tourniquet embodying my invention, and will then point out in claims the particular improvements which I believe to be new and wish to secure by Letters Patent.

In the drawings A represents the cord upon which the compresses are strung. This cord must be elastic, of course, rubber being the preferable material, and may be either tubular or solid. In the drawings it is represented as tubular. Compresses, B, C and D, are shown in the drawings strung upon this cord. As illustrated, these compresses are of different lengths, B, being the longest. These compresses are made of soft rubber, or other soft elastic material, and are cylindrical in form, the central portion of each being in the shape of a straight cylinder, *b*, *c*, and *d*, so as to provide at the center of each a straight surface of greater or less length according to the length of the compress. Each compress is perforated lengthwise and centrally, this central opening, *b'*, being shown in Fig. 3 of the drawings, which is a section of the compress, B. The other compresses have like openings, but they are not seen in the drawings because sections of the said compresses are not illustrated; they would simply be duplicates of the section of B except as to length. The central aperture in each compress is made about the size of the elastic cord, so that the compresses may be strung upon the latter, as seen in Fig. 1. It is desirable, however, to make these apertures just a little smaller than the cord, in order that the latter may be slightly contracted by the compresses when strung thereon, thus fixing the compresses with some degree of resistance in the position to which they may be adjusted. Each compress is rounded off at its ends so as to present a circular edge, b^2, at each end extending from the straight section, *b*, to the opening, *b'*, as seen in Fig. 3, in the compress B. The compresses, C and D, are also shown constructed in the same way with like rounded ends, c^2—d^2. To provide a tourniquet for use these compresses are strung upon the elastic cord, either one or more as may be be desired, thus furnishing a device which is easily carried about the person—for instance, in the pocket of a garment—and is ready for immediate application in case of an emergency. This tourniquet is applied in the usual way by winding the cord around the injured member of the body, so as to bring a compress over the artery, through which it is desired to stop the circulation. An illustration of such application is shown in Fig. 4 of the drawings, in which the tourniquet is shown applied to the wrist of the left arm, and is supplied with three compresses which are applied to the perforating branch, radial and ulna arteries so as to act upon all three at once.

With the construction of compress described above, it is obvious that the compressing surface, brought upon the artery transversely thereof, is very narrow at the point where it crosses the artery and falls away in each direction in the arc of a circle; and also that the compressing surface is straight for only a short distance in the direction of its length and then falls away in the arc of a circle at each end. The result is a complete stoppage of circulation in an artery with a

comparatively small amount of pressure. The cylindrical form of the compress in connection with the rounding of the ends provides for a lateral pressure in both directions upon the tissues surrounding the artery, thus tending to force them away from the artery somewhat. A sufficient pressure is, therefore, brought upon the artery without requiring the same pressure upon the surrounding tissues. In this respect the action of this device is quite different from that of a compress having a flat surface. Obviously if the compressing surface of the compress is flat, the entire tissue about the artery equal to the said flat surface must be compressed to the same extent as required at the artery itself, and to effect the desired result a very great pressure must be brought upon the compress in the application of the tourniquet. This is objectionable for the reason that there is great danger of pressure paralysis. It would be practically impossible to apply a tourniquet to the three arteries at the wrist, as illustrated in Fig. 4, with flat surfaced compresses without paralyzing the member. The application of this tourniquet as shown in Fig. 4 also illustrates the comparatively small amount of pressure that is required. As shown in the drawings, the tourniquet is secured by simply making a second wrap of the cord around the wrist and securing it by a simple half-hitch. I have found this manner of applying and securing the device entirely sufficient and satisfactory by actual use in a number of instances. After the tourniquet is applied the compresses may be adjusted without removal.

The compresses may be made oval from end to end instead of with a short cylindrical central body, as described and shown. I prefer, however, a short, straight central body for the reason that direct action upon the artery is thus insured with greater certainty; if the compress is a complete oval there will, of course, be liability to lateral displacement, so that the section of greatest circumference, and, consequently, greatest pressure, will not be brought directly over the artery. This danger is avoided with the form of compress described above and shown in the drawings, though I do not wish to be understood as excluding the oval form from my invention. I also prefer soft rubber or other suitable soft elastic substance as the material for the compress. This is for the reason that the action, due to the form described above, is assisted by the elastic yielding of the substance; in the lateral pressure explained, the material of the compress will yield more or less, thus further preventing a severe compression of the tissues which is unnecessary and objectionable, while, at the same time, a sufficient pressure is brought directly upon the artery to produce the desired effect. But I do not wish to be understood as absolutely excluding hard rubber, or other hard substance, as a material for my compress.

The main feature of my invention may also be secured without a completely cylindrical form of the compress. One side may be cut away, leaving a substantially flat surface, which, in application, would be the upper surface. Obviously the opposite surface would have the same shape and bearing which has been described above and so would produce the same effect; that is, it would be circular or convex transversely and rounded at its ends, just the same as though the compress was an entire cylinder, and so would produce the same effect. But it would require a little more care in use, as, of course, it must be applied with the rounded surface as the bearing or compressing surface, while with the cylindrical form described no attention need be paid to the adjustment of the compress in this particular; the bearing surface will, of course, be the same all around the device.

I do not wish to be understood as limiting my invention to any particular size or proportion of compress, or any particular number upon one cord. The compresses are to be varied in size and proportion, both as to length and diameter, such sizes and such proportions being adopted as may be required for application to different parts of the body. A similar remark may be made as to the number of compresses. One alone may be placed upon the cord, or two, or more, according to the number of arteries upon which it is desired to act at one and the same time.

Having thus described my invention, what I claim to be new, and desire to secure by Letters Patent, is—

1. In a tourniquet, a compress provided with a long, straight bearing-surface of convex contour transversely, with its respective ends rounded upward, and having a passage running lengthwise thereof, in combination with an elastic string or cord adapted to said passage in the compress, substantially as described.

2. In a tourniquet, a compress, as B, of soft elastic material, having a central straight cylindrical section, as *b*, and rounded or oval ends, as b^2, substantially as described.

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