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MEANS FOR ASSISTING RETURN CIRCULATION
OF FLUIDS IN AN ANIMAL BODY
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2,747,570

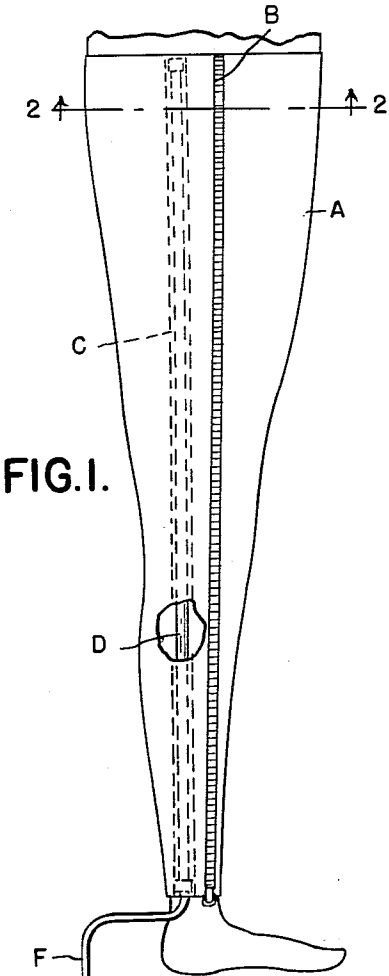


FIG. 1.

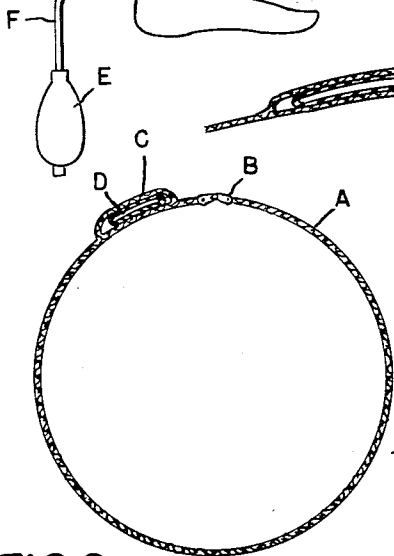


FIG. 2.

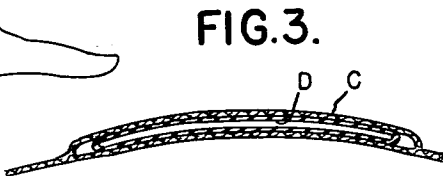


FIG. 3.

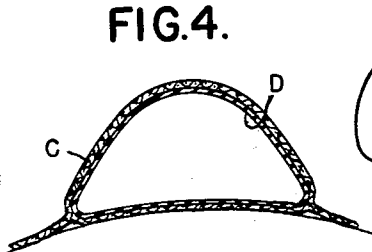


FIG. 4.

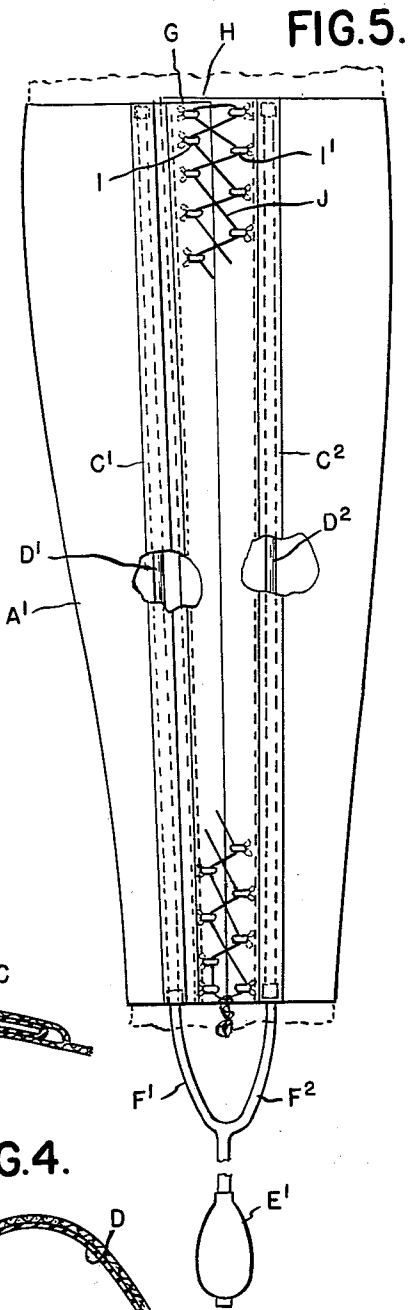


FIG. 5.

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MEANS FOR ASSISTING RETURN CIRCULATION OF FLUIDS IN AN ANIMAL BODY

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5 Claims. (Cl. 128—60)

The invention relates to means for stimulating the flow of fluids within an animal body and more particularly for stimulating venous and lymphatic flow in a body which is in recumbent position, as for instance a patient recovering from an operation. In a normal state of health and activity venous flow is largely due to alternating contraction and relaxing of the muscles in the vicinity of the veins. There is also the factor that the veins in a state of health have one way valves therein which permit the blood to flow therethrough in the direction of the heart but prevent reverse movement. However, in case of impaired health these valves cease to properly function, which may result in stagnation of the flow. Various devices have heretofore been used for the purpose of stimulating return circulation. Among these are constructions for subjecting the limb or other part of a human body to alternating increasing and decreasing fluid pressure. Inasmuch, however, as the valves in the veins may not be fully operative there is nothing to determine positively the direction of flow.

It is the object of the invention to obtain a pulsating pressure applying means in which the pressure is so regulated as to cause flow of fluid in one direction or towards the heart in case of venous circulation. To this end the invention consists in the construction as hereinafter set forth.

In the accompanying drawings:

Fig. 1 is an elevation showing a portion of a human body including a leg and a part of the trunk to which the flow stimulating means is applied;

Fig. 2 is a cross-section on line 2—2 through the non-elastic envelope and pulsating pressure applying means;

Fig. 3 is an enlarged section through the pulsating pressure applying means in collapsed position;

Fig. 4 is a similar view showing the inflated position of said pressure applying means;

Fig. 5 is an elevation showing a modified construction of envelope.

Broadly described my invention comprises an envelope of non-elastic material which envelopes the portion of the body to be treated, exactly skin fitting the same. This envelope is provided with means for periodically contracting the same circumferentially to apply radially inward pressure against the body and then releasing this contraction to restore normal negligible pressure. Preferably this contracting means is formed by a pocket located at one or more points in the circumference and extending longitudinally of the envelope, each of said pockets containing an inflatable tube. This tube when not inflated is in flattened condition within the pocket, exerting no tension thereon, but if inflated it will expand the pocket outwardly from the body with a resulting reduction in its transverse width which causes a circumferential contraction of the envelope. This in turn will create a radially inwardly directed pressure on the enveloped portion of the body. Thus, in addition to the elements thus far described means is provided for alternately inflating and deflating each of the tubes.

With the construction shown in Fig. 1 the envelope A is formed of flat non-elastic and preferably porous fabric which is fashioned to fit about a portion of the body, such

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as a leg, and even to extend up further on the body. The opposite edges of the fabric may be connected by a slide-fastener B to complete the enclosure but without normally exerting any radial pressure against the enveloped body. C is a pocket formed to extend the entire length of the envelope A and D is an inflatable tube within the pocket. E is an air pressure developing means such as a collapsible bulb with suitable controlling valves and F is a connecting tube between the bulb E and the lower end of the tube D. With the construction as shown the attendant may alternately inflate the tube D and deflate the same, such operations being timed as found to be most desirable according to the condition of the patient. While the air pressure within the tube D is the same throughout its length the radial pressure produced by contraction is greatest in the portions of smallest circumferential length and decreases as circumferential lengths increase. This will have the effect of producing a one-way flow of fluid within the veins or lymphatic passages of the body as the highest pressure will be against the portions farthest removed from the heart which are the smallest in circumference. Thus, even if the valves within the veins are not functioning the pulsating flow will be directed towards the heart.

Instead of forming an envelope fashioned to exactly fit an individual I may use the construction illustrated in Fig. 5. Here the fabric of the envelope A' is wrapped about a body to have one edge portion G overlapping the opposite edge portion H thereof. The fitting to the individual is accomplished by spaced series of hooks I and I' on the opposite edge portions and a lacing J connecting the hooks of said series. At least two of said inflation tubes D' and D² are arranged in pockets C' and C² in the envelope on opposite sides of said hooks and lacing. It is obvious that in applying the envelope care should be taken in the lacing of the same to conform it to the enclosed portion of the body with negligible pressure thereagainst. The tubes D' and D² are simultaneously inflated and to equal pressures by an air pressure developing means, such as the bulb E' which delivers the compressed fluid to said tubes through branch conduits F' and F².

What I claim as my invention is:

1. Means for stimulating fluid flow within an animal body comprising a non-elastic envelope adapted to fit about and in contact with a portion of the body to surround the same and extend longitudinally thereof with negligible pressure thereon, and means for circumferentially contracting said envelope and alternately releasing the same to produce a pulsating radially inward directed pressure against said body.

2. The construction as in claim 1 in which said contraction progressively varies in degree longitudinally of said envelope.

3. The construction as in claim 1 in which said contracting means includes an inflatable tube, a pocket in said envelope extending longitudinally thereof in which said tube is placed in flattened collapsed condition, and means for periodically inflating said tube and alternately deflating the same.

4. The construction as in claim 3 having a plurality of inflatable tubes in pockets spaced from each other circumferentially of the envelope and each connected to said inflation and deflation means.

5. The construction as in claim 4 in which the envelope is formed of a porous fabric.

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