

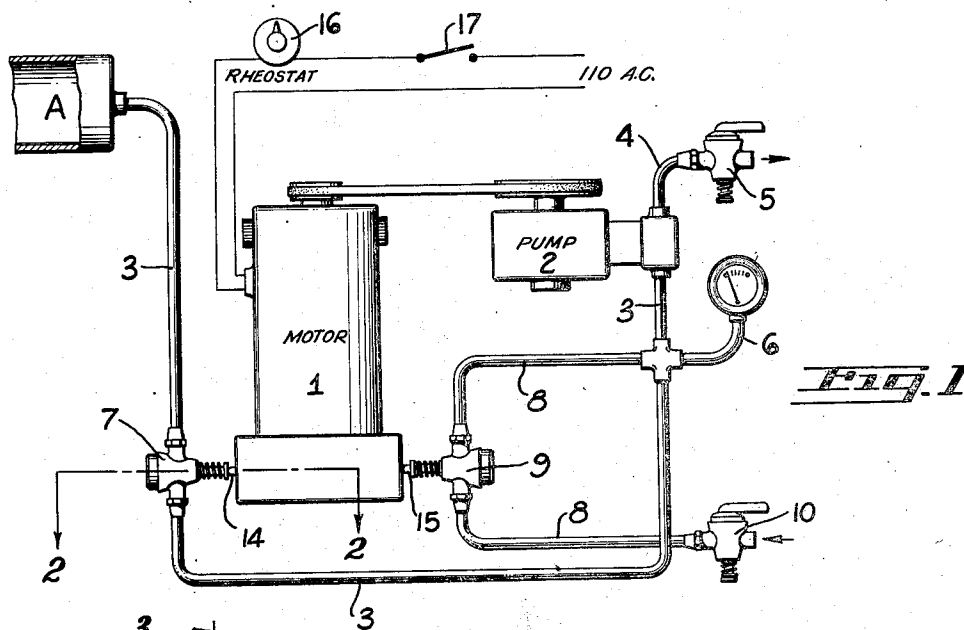
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J. P. RILEY

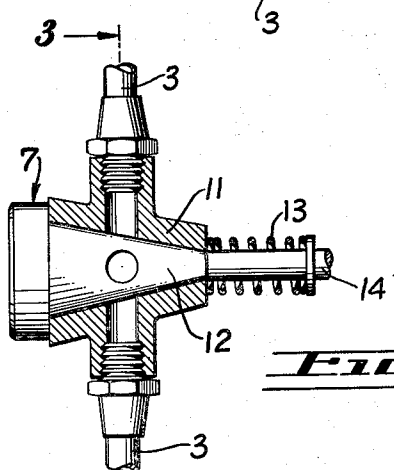
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VACUUM PULSATING EXERCISING APPARATUS

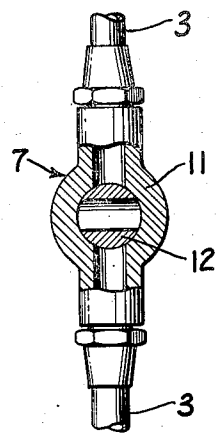
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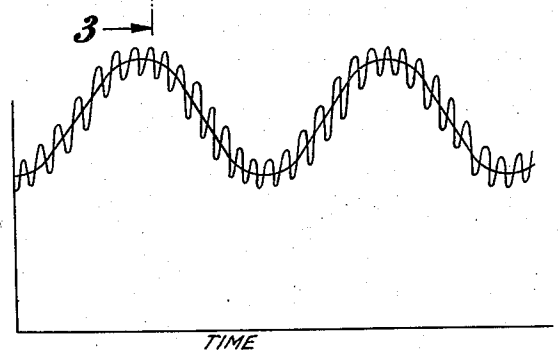
**Fig. 1**



**Fig. 2**



**Fig. 3**



**Fig. 4**

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## VACUUM PULSATING EXERCISING APPARATUS

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1 Claim. (Cl. 128—38)

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My invention relates to a vacuum pulsating exercising apparatus, that is, to an apparatus for producing and controlling vacuum pulsations within a hollow applicator placed over a region of a patient's body or surrounding a leg or an arm.

Included in the objects of my invention are:

First, to provide an apparatus of this class wherein not only is the region under treatment subjected to rhythmic variations in negative pressure, but is simultaneously subjected to superposed pulsations.

Second, to provide an apparatus of this class wherein regulations of the intensity and duration of each cycle may be readily and quickly accomplished.

Third, to provide an apparatus which may be made in a simple, compact form so as to be readily portable.

With the above and other objects in view, reference is directed to the accompanying drawing:

Figure 1 is a diagrammatical view of my automatic vacuum pulsating exercising apparatus.

Figure 2 is a sectional view through 2—2 of Figure 3, showing the pulsating valve.

Figure 3 is a sectional view thereof through 3—3 of Figure 2.

Figure 4 is a graph indicating the character of pressure undulation and superposed pulsations obtainable with my apparatus.

My exercising apparatus includes: an electric motor 1, having preferably several drive shafts, one of which is employed to drive a vacuum pump 2. An intake line 3 communicates between the vacuum pump and an applicator A. The applicator per se is conventional, and in this case is shown in the form of a cup. However, the applicator may take various forms in order to fit over various portions of the body. It may be in the form of a hollow boot or sleeve, to fit the arm or leg of the patient.

A discharge line 4 leads from the vacuum pump and is provided with a discharge valve 5. Connecting with the intake or vacuum line 3 is a gauge 6 to indicate the vacuum pressure therein. The vacuum line is interrupted by, or passed through, a pulsating valve 7, which will be described in more detail hereinafter.

Branching from the vacuum line is a bleed line 8 which is intersected by, or passed through, a vacuum cycle or bleed valve 9 and terminates in a vacuum intensity or throttle valve 10. The pulsating valve and the vacuum cycle valve 9 are similar in construction. Each valve includes

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a valve body 11, which receives a tapered core 12 adapted to be rotated so as to alternately open and close the valve. A tension spring 13 maintains the tapered core seated. Pulsating valve 7 is connected to a shaft 14 and the multishaft motor 1, whereas the vacuum cycle valve 9 is connected to shaft 15.

The motor is controlled by a rheostat 16 for the purpose of varying its speed. The rheostat may be in series with the control switch 17.

Operation of my vacuum pulsating exercising apparatus is as follows:

Upon placing the applicator over the portion of the patient to be treated, the vacuum pump is operated. Both the pulsating valve 7 and vacuum cycle valve 9 are rotated; the vacuum cycle valve rotates slowly, as compared to the pulsating valve.

Inasmuch as the vacuum cycle valve controls the flow in the bleed line 8, it affects the degree of vacuum which may be created in the applicator A; that is, when the vacuum cycle valve is closed, the vacuum in the applicator reaches a maximum. As the vacuum cycle valve 9 opens, this vacuum is relieved. As a consequence, a cyclic variation in pressure is created, the time interval being determined by the speed at which the vacuum cycle valve is rotated.

By adjustment of the vacuum intensity valve 10, the vacuum intensity may be regulated, increased vacuum being obtained by throttling vacuum intensity valve 10. The discharge valve 5 serves a somewhat similar function.

Simultaneously with the rotation of vacuum cycle valve 9, the pulsating valve 7 is operated at a substantially higher velocity. The effect is to communicate the vacuum pump and applicator intermittently, and thus produce pulsations which are superposed on the rhythmic or cyclic change in vacuum pressure produced by movement of the vacuum cycle valve 9. This effect is illustrated diagrammatically in Figure 4, wherein the major curve represents the vacuum pressure variation produced by the vacuum cycle valve 9, whereas the superposed undulations represent the vacuum fluctuations due to the pulsating valve 7.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claim.

I claim:

In a vacuum pulsating exercising apparatus for use with applicator adapted to be sealed over a region of the body, the combination of: a pump

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having a vacuum side connected with said applicator to produce a vacuum therein; a bleed line and bleed valve therefore interposed between said pump and applicator; a throttle valve also interposed in between said pump and applicator; means for cyclically operating said bleed valve at a predetermined speed to produce a varying effective pressure in said applicator, and means for simultaneously operating said throttle valve at a predetermined greater speed than said bleed valve to superpose pressure pulsations in said applicator.

JOHN P. RILEY.

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