

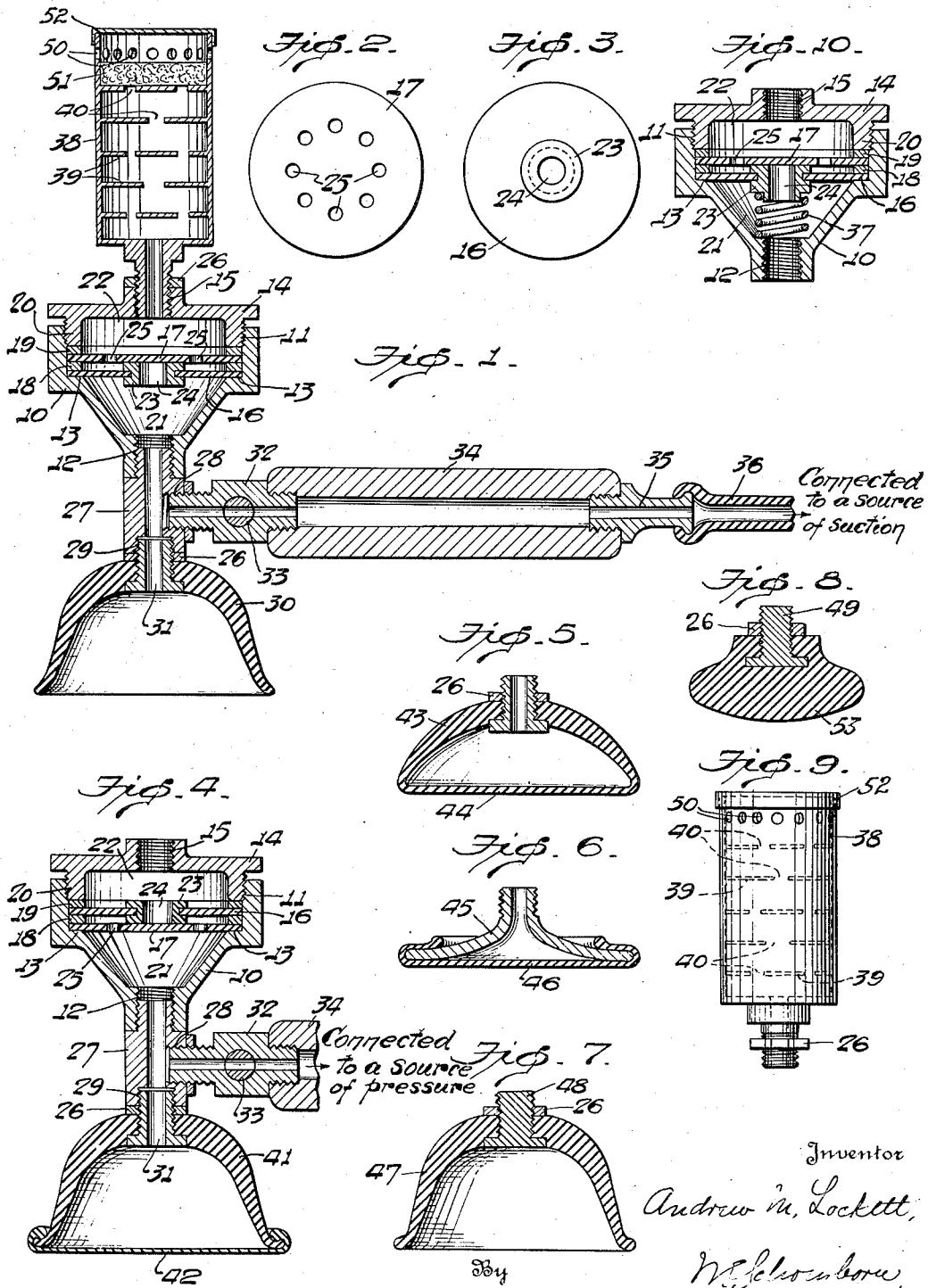
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THERAPEUTIC VIBRATOR

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THERAPEUTIC VIBRATOR

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This invention relates generally to that type of vibrator or massaging apparatus or instrument, such as shown, for example, in my former U. S. Patent No. 1,949,316, dated February 27, 1934, and is used in hospitals, barber shops, beauty parlors and homes, and it is particularly so constructed and arranged to be connected to and operated by a source of suction or pressure and with or without a suction or pressure effect to the part of the body to which the apparatus is applied.

Among the objects of the invention is to provide a vibrator of the convertible nature, above indicated, in which the several parts are light in weight, simple and inexpensive, capable of being easily assembled or interchanged for either suction or pressure operation, manufactured and sold at a minimum price, and which, moreover, is most efficient in action, fool proof and indestructible, and requiring no lubrication.

Other objects and advantages of the invention will appear from the detailed description and relation of the several parts and their mode of cooperation to be presently given.

The invention consists of structural characteristics and relative arrangement of elements, which will be hereinafter more fully described and particularly pointed out in the appended claims.

In the accompanying one sheet of drawing, similar reference characters indicate the same parts in the several figures of the drawing, in which:

Figure 1 is a central vertical sectional view of the apparatus when same is connected to and operated by a source of suction;

Figures 2 and 3 are plan views of the perforated elastic diaphragms forming the active elements of the apparatus;

Figure 4 is a similar view as Figure 1, showing the interchanged position of the elastic diaphragms when apparatus is operated by a source of pressure;

Figures 5, 6, 7 and 8 are sectional views of modifications of the massage cup;

Figure 9 is a side elevation of a small muffler which is adapted for use with the apparatus; and,

Figure 10 is a sectional view similar to Figure 1 of a modified form of the invention.

Referring, in the first instance, to Figures 1, 2 and 3, there is illustrated the arrangement of the convertible apparatus which is actuated by a source of suction and is provided with a valve casing 10, preferably of truncated-cone-shape, having an enlarged threaded opening 11 and a

smaller and oppositely disposed threaded opening 12, as shown.

Within the valve casing 10 and between said openings 11 and 12 is provided an annular shoulder or seat 13, for purposes to be presently described.

14 is a threaded circular cap or closure adapted to engage and close the threaded opening 11, said cap 14 being provided with a central opening 15.

Two independent perforated elastic diaphragms 16 and 17, preferably made of rubber, or other suitable elastic material, are arranged in superimposed and separated relation to each other by means of an annular ring or washer 18, and removably seated or supported on the annular shoulder 13. Another annular holding washer 19 is interposed between the annular rim portion of the upper surface of the diaphragm 17 and the projecting annular end 20 of the threaded cap 14, whereby said elastic diaphragms 16 and 17 can be firmly seated and clamped in a taut condition on the shoulder 13, and in the position shown in Figure 1.

The diaphragms 16 and 17 in their superimposed and clamped position divide the interior of the valve casing 10 into two separate and independent chambers 21 and 22, said diaphragm 16 having, preferably, rigidly attached, at its center section and moving with said diaphragm 16, a weighted ferrule 23 having a perforation or hole 24.

The other and cooperating diaphragm 17 is, preferably, provided with a plurality of perforations or holes 25, so constructed and arranged that they are not in register with the central hole or perforation 24 of the diaphragm 16, and the upper plane or surface of the weighted ferrule 23 adjacent to the diaphragm 17 in its normal position is so arranged as to be in contact with the underside and central section circumscribed by the openings 25, as shown in Figure 1, thereby sealing or cutting off communication between the two chambers 21 and 22, for purposes to be presently described.

Attached to the threaded opening 12 is a tubular fitting 27 having a lateral threaded opening 28 and a lower threaded opening 29 adapted to receive a massage or vibrator cup 30 securely held by a lock nut 26, and while said cup may be provided with a passage 31, as shown, in communication with the interior of the tubular fitting 27 and valve casing 10, and under suction or pressure, any other and well known form of cup may be readily substituted, as shown in Fig-

ures 4, 5, 6, 7 and 8, with or without suction and pressure.

32 is a threaded tubular fitting secured to the lateral opening 28, having therein a valve 33 for controlling the degree of suction or pressure within the connected tubular fitting 27 and lower chamber 21 formed in valve casing 10.

A hollow handle 34 for applying and manipulating the vibrator has one of its ends attached to and in communication with the fitting 32, while its other end is provided with a hollow projection 35 adapted to receive and communicate with one end of a flexible tube 36 connected with any suitable source of suction or fluid pressure.

While the vibrator is in use, should it be desired to reduce the noise, due to the hissing or admission of the air through the upper opening 15 into the interior of the valve casing 10, a small hollow muffler 38, provided within its interior with a series of separated disks 39 having staggered openings 40 and a series of upper openings 50 communicating with the exterior, as shown in Figure 9, may be attached to said opening 15, as indicated in Figure 1.

Said muffler 38 may also be provided within its interior, as shown in Figure 1, with any suitable form of air filtering material 51 to prevent any undue accumulation of dust or grit being deposited on the contacting surfaces of the cooperating diaphragms 16 and 17.

Figure 4 shows substantially the same construction as shown in Figure 1, in which the vibrator is adapted for use with a source of pressure, instead of suction or a vacuum, and is accomplished by interchanging or reversing the relative positions of the perforated diaphragms 16 and 17 by disposing the non-weighted diaphragm 17 adjacent to the lower chamber 21, which is in communication with the opening 28 and source of pressure, as shown.

Attached to the lower end of the vibrator and into the threaded opening 29 is attached a modified cup or pad 41 provided with a shield or closure 42 removably secured to the lower circular edge of said rubber cup, as shown. Said cup may be modified as illustrated by a cup 43, in which the shield 44 is made or cast integral, as shown in Figure 5.

Figure 6 illustrates a modified form of the pad shown in Figure 4, in which the same has been made flat in shape and the part 45 made of metal and the detachable pad 46 made of rubber or the like substance.

In Figure 7 is shown a cup or pad 47 cast or secured to a solid threaded plug 48 adapted to screw into and seal the threaded opening 29 and, hence, cut off communication with the outside atmosphere, through said opening 29, if so desired.

Figure 8 shows the usual form of pad having a solid threaded plug 49, on which the vulcanized or yielding rubber head 53 is formed, and it will be seen that any one of the several modified cups or pads can be substituted and attached to the threaded opening 29 of the device, if found desirable.

Figure 10 shows a modified form of Figure 1, in which the elastic diaphragm 16 and its weighted ferrule 23 are reacted upon by a small coil spring 37 abutting against and arranged between said ferrule 23 and the lower end of valve casing 10 forming chamber 21, as illustrated.

While the convertible vibrator, used as a vacuum device, as shown in Figure 1, can be changed to a pressure operated apparatus, shown in Figure 4, as herein explained, by simply reversing or

interchanging the relative position of the two superimposed perforated elastic diaphragms 16 and 17 with respect to opening 28 for admission of suction or pressure within the valve casing 10, it is manifest that the same conversion or result from suction to pressure operation can be quickly accomplished without disturbing the arrangement of diaphragms 16 and 17, shown in Figure 1, by simply unscrewing the valve casing 10 from the upper threaded end of tubular fitting 27 and reversing or turning upside down said valve casing 10, so that the central threaded opening 15 of the screw cap 14 engages the upper threaded end of the tubular fitting 27, and you will have the diaphragms 16 and 17 in the same cooperative relation with respect to the lateral opening 23 of said fitting 27 and which is connected to the source of pressure, as shown in Figure 4.

Referring to Figure 1, the operation of the invention is as follows:

When suction or a partial vacuum is produced in chamber 21 by the opening of valve 33 and the cup 30 is pressed against the surface of the part of the body to be treated, thereby preventing the inlet of air through said cup and passage 31, the pressure of the atmosphere through the upper opening 15, or muffler 38, if attached, into the upper chamber 22 and, thence, through the openings 25 of the upper diaphragm, forces the diaphragms 16 and 17 downward until the tension of the upper diaphragm 17 overbalances the pressure on that part of the diaphragm 17 which covers the hole 24 of ferrule or weighted diaphragm 16, and said diaphragms 16 and 17 separate, thereby permitting the air pressure within said upper chamber 22 to pass between said diaphragms through the hole 24 into chamber 21 and partially or completely break the vacuum and neutralize the pressures in said chambers 21 and 22 and on both sides of said diaphragms 16 and 17, when the described operation is rapidly repeated.

The rapid change or variation of pressure or degree of vacuum within the valve casing 10 engenders a vibrating effect to the apparatus and in the cup, and if an open cup 30 is utilized a vacuum cleaning function is carried out having a vibratory or variable pull or suction instead of constant suction or pull, as carried out by the ordinary vacuum cleaner.

If any one of the cups 41, 43 or 45, shown in Figures 4, 5 and 6, be substituted for cup 30, the vacuum or suction effect is eliminated, but in view of their shield or closure 42, 44 or pad 46 on the bottom of the cups being flexible, the vacuum within the apparatus or valve casing 10 pulls said shield or pad inwardly with a degree of movement depending upon the stiffness or flexibility of said shield or pad, and when the vacuum is broken the shield or pad rapidly returns creating a distinct patting effect under control by the regulation of the valve 33.

Should it be found that the noise made during the operation of the vibrator, due to the impact of the diaphragms 16 and 17 and entrance of the exterior air through the opening 15 into the valve casing 10, is annoying, the inconvenience may be remedied by attaching the silencer 38 to the threaded opening 15, and should the contacting surfaces of said diaphragms 16 and 17 be apt to become foul, due to dust or other impurities in the air, a layer of air filtering material 51 can be quickly inserted after detaching its removable top 52, as readily understood.

From the foregoing construction and arrange-

ment of the combined silencer and dust remover 38 attached to the device, as shown in Figure 1, a double function is effected in a single element in that said element 38 not only assures a remedial measure as to distressing noise, but at the same time excludes the admission of dust or grit into the interior of the casing 10 and prevents depositing same on the contacting surfaces of the cooperating diaphragms 16 and 17, thereby insuring the constant and efficient operation of said diaphragms and uninterrupted application of the device.

Referring to Figure 4, the operation of the invention is as follows:

When air pressure is conveyed to the chamber 21, both elastic diaphragms 16 and 17 are first forced in contact with each other, as shown, and as the pressure builds up and passes through the openings 25 of the diaphragm 17 and confined between said diaphragms 16 and 17, said built up pressure acting on the underside of the diaphragm 16 and the upperside of diaphragm 17, said diaphragms 16 and 17 will be put under tension and finally assume such a position as to cause the dominating built up tension in diaphragm 16 to free the weighted ferrule or weight 23 of the diaphragm 16 from sealing contact with said diaphragm 17, and permit said built up air pressure to be released and suddenly pass through the central perforation 24 into the upper chamber 22 and neutralize the pressures in said chambers 21 and 22 and on each side of said diaphragms 16 and 17, thereby enabling them, due to the built up tension in said diaphragms, to quickly assume their normal position, shown in Figure 4, when the described operation is instantly repeated. The effect of the rapid vibration or oscillation of the ferrule or weight 23 is transferred to the cup or pad 41, 44, or 46, as heretofore explained with reference to Figure 1 and needs no further disclosure.

Figure 1 shows a cup 30 adapted for vacuum or sucking effect during the massaging or treatment of the skin or muscles, or for removing dandruff from the scalp, or dust from clothing, while the cups or pads 41, 43 and 46, when used in connection with a source of pressure, as illustrated in Figure 4, enables said cups or pads, due to the air pressure passing through opening 31, to be converted into yielding and conforming pneumatic pads of varying pressure or impact under perfect control by adjustment of the valve 33, and capable of providing at any time a much desired patting vibrator of variable and regulated intensity.

When the device is used under pressure, as shown in Figure 4, and an open cup 30 is substituted for the cup 41, the condition within the cup is reversed and the pressure of the air comes directly against the skin, and if the cup 30 is held sufficiently firm to prevent escape of air you also can obtain a patting effect. However, a more satisfactory result can be obtained with one of the cups 41, 43, or 45, because the effective operation does not depend upon firmly pressing the cup against the skin, since the hollow cup itself is closed and no air can escape.

From the foregoing disclosure of the construction and mode of operation of the invention, it will be understood many changes will readily suggest themselves, as, for example, the size and shape of the valve casing 10, cups or pads, the diameter and thickness of the elastic diaphragms 16 and 17, and size of the holes or apertures 24 and 25 in said diaphragms, and weight of the os-

cillating ferrule or weight 23, can be varied, depending on the particular force and rate of vibration that are desired to be effected.

The force and rate of vibration may be reduced or modified by having the lower opening 31 closed, and can be accomplished by the use of cup 47 or pad 50, or a threaded screw plug 37, and the use of said cups or pads could be dispensed with if a rubber or woven fabric is interposed between the vibrator and the part of the body to be treated during the application of the device.

It has been found that when the elastic diaphragms 15 and 16 are made one-sixteenth of an inch thick and the vacuum employed is four or five inches of mercury, or air pressure between two or three pounds, good and efficient results are obtained.

What I claim is:

1. A therapeutic device, comprising a valve casing having two separated and independent ports, one port adapted to be connected to a pressure varying means and the other port adapted to be in communication with the exterior of said casing, two separate and independent superimposed vibratory elastic diaphragms provided with non-registering perforations and supported within, and in contact with each other and extending across the interior of said casing between said ports, and dividing said casing into two enclosed and separate chambers, said diaphragms and their perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

2. A therapeutic device, comprising a reversible valve casing having two separated and independent ports, one port adapted to be connected to a source of suction or pressure producing means and the other port adapted to be in communication with the exterior of said casing, two separate and independent superimposed vibratory elastic diaphragms provided with non-registering perforations and in contact with each other and supported within said casing between said ports, and dividing said casing into two enclosed and separate chambers, said diaphragms and their non-registering perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

3. A therapeutic device, comprising a reversible valve casing having two separated and independent ports, one port adapted to be connected to a source of suction or pressure producing means and the other port adapted to be connected or disconnected in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is weighted, supported within said casing between said ports, and dividing said casing into two enclosed and separate chambers, said diaphragms and their perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms, and a massaging pad attached to the exterior of said device.

4. A therapeutic device, comprising a valve casing having two separated and independent

ports, one port adapted to be connected to a pressure varying means and the other port adapted to be in communication with the exterior of said casing, two separate and independent superimposed vibratory elastic diaphragms provided with non-registering perforations and in contact with each other and supported within and extending across the interior of said casing between said ports, and dividing said casing into two enclosed and separate chambers, said diaphragms being interchangeable with respect to the port connected to pressure varying means and their perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their perforations during the vibratory movement of said diaphragms.

5. A therapeutic device, comprising a valve casing having two separated and independent ports, one port adapted to be connected to a source of suction or pressure producing means and the other port adapted to be in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is weighted, supported within said casing between said ports, and dividing said casing into two enclosed and separate chambers, said vibratory diaphragms being interchangeable with respect to each other and the port connected with the source of suction or pressure and their non-registering perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

6. A therapeutic device, comprising a cylindrical valve casing having two separated and independent ports, one port adapted to be connected to a source of suction or pressure producing means and the other port adapted to be connected or disconnected in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is provided with a weight centrally disposed and annular in shape, supported within said casing between said ports, and dividing said casing into two enclosed and separate chambers, said diaphragms being interchangeable with respect to the port connected to said source of suction or pressure and their non-registering perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

7. A therapeutic device, comprising a cylindrical valve casing having two separated and independent ports, one port adapted to be connected to a source of suction producing means and the other port adapted to be in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is weighted, said diaphragms within and extending across the interior of said casing between said ports, and dividing said casing into two enclosed and separate chambers, one of which chambers and perforation of said weighted diaphragm being in communication with said source of suction, and the non-registering perforations of said dia-

phragms so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

8. A therapeutic device, comprising a cylindrical valve casing having two separated and independent ports, one port adapted to be connected to a source of pressure producing means and the other port in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is weighted, said diaphragms supported within and extending across the interior of said casing between said ports, and dividing said casing into two separate and enclosed chambers, one of which chambers and the perforation of the non-weighted diaphragm being in communication with said pressure producing means, and the non-registering perforations of said vibratory diaphragms so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

9. A therapeutic device, comprising a reversible substantially cylindrical valve casing having two separated and independent ports, one port adapted to be connected to a source of suction or pressure producing means and the other port adapted to be connected or disconnected in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is provided with a weight centrally disposed and annular in shape, supported within said casing between said ports, and dividing said casing into two separate and enclosed chambers, said vibratory diaphragms and their non-registering perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

10. A therapeutic device, comprising a valve casing having two separated and independent ports, one port adapted to be connected to a source of pressure producing means, and the other port in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is weighted, said diaphragms being in contact with each other and supported within and extending across the interior of said casing between said ports, and dividing said casing into two separate and enclosed chambers, one of which chambers and the perforation of non-weighted diaphragm being in communication with said pressure producing means, and the non-registering perforations of said vibratory diaphragms so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms, and an enclosed hollow massaging pad having its interior in communication with said source of pressure and secured to the exterior of said device.

11. A therapeutic device, comprising a valve casing having two separated and independent ports, one port adapted to be connected to a

source of pressure producing means, and the other port in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is weighted, said diaphragms supported within and extending across the interior of said casing between said ports, and dividing said casing into two separate and enclosed chambers, one of which chambers and the perforation of non-weighted diaphragm being in communication with said pressure producing means, and the non-registering perforations of said diaphragms so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms, an enclosed yielding and hollow massaging pad having its interior in communication with said source of pressure and secured to said device, and means for varying the pressure within and the impact of said hollow massaging pad.

12. A therapeutic device, comprising a valve casing having two separated and independent ports, one port adapted to be connected to a source of pressure producing means and the other port in communication with the exterior of said casing, two independent superimposed elastic vibratory diaphragms provided with non-registering perforations, one of which is weighted, said diaphragms supported within and extending across the interior of said casing between said ports, and dividing said casing into two separate and enclosed chambers, one of which chambers and the perforation of non-weighted diaphragm being in communication with said pressure producing means, and the non-registering perforations of said diaphragms so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms, and an enclosed hollow massaging pad attached to said device and having its interior in communication with said source of pressure and the interior of said casing.

13. A therapeutic device, comprising a cylindrical valve casing having two separated and independent ports, one port adapted to be connected to a source of suction producing means and the other port adapted to be in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is weighted, said vibratory diaphragms within and extending across the interior of said casing between said ports, and dividing said casing into two separate

and enclosed chambers, one of which chambers and perforation of said weighted diaphragm being in communication with said source of suction, a spring within said casing and interposed between and reacting against the casing and weighted diaphragm, and the non-registering perforations of said diaphragms so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

14. A therapeutic device, comprising a valve casing having two separated and independent ports, one port adapted to be connected to a pressure varying means and the other port adapted to be connected or disconnected in communication with the exterior of said casing, two independent superimposed vibratory elastic diaphragms provided with non-registering perforations and supported within and extending across the interior of said casing between said ports, and dividing said casing into two separate and enclosed chambers, said diaphragms and their perforations so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms, and a combined filter and muffler secured to and communicating with the interior of said casing through said other port in communication with the exterior of said casing.

15. A therapeutic device, comprising a cylindrical valve casing having two separated and independent ports, one port adapted to be connected to a source of suction producing means and the other port adapted to be in communication with the exterior of said casing, two superimposed vibratory elastic diaphragms provided with non-registering perforations, one of which is provided with a perforated weight, said diaphragms within and extending across the interior of said casing between said ports, and dividing said casing into two separate and oppositely disposed chambers, one of which chambers and perforation of said weight being in communication with said source of suction, a coiled spring within said casing and interposed between and reacting against the casing and weight, and the perforations of said diaphragms so constructed, arranged and cooperating with each other as to intermittently seal and separate, to permit communication between said two chambers through their non-registering perforations during the vibratory movement of said diaphragms.

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