United States Patent

[11] 3,599,631

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[33] **Switzerland**
[31] **017,587/68**

[54] APPARATUS FOR MEDICALLY TREATING CIRCULATORY AILMENTS OF THE HUMAN BODY

17 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **128/24.2,** 128/40
[51] **Int. Cl.** **A61h 21/00**
[50] **Field of Search** ..... 128/24, 24.1, 24.2, 25, 32, 33, 38—40, 44

[56] **References Cited**

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Primary Examiner—L. W. Trapp
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ABSTRACT: An apparatus for the treatment of circulatory ailments comprises two enclaves in the form of cylinders each having a vibrating cushion and carried by pairs of arms secured to an oscillatory table. Means are provided for oscillating the oscillatory table in synchronism with the cycles of compression and depression created within the cylinders. The cylinders have a gas inlet and a quartz lamp for destroying microbes carried along with the air brought in the cylinders for disinfecting the wounds of the human body members introduced in the cylinders.

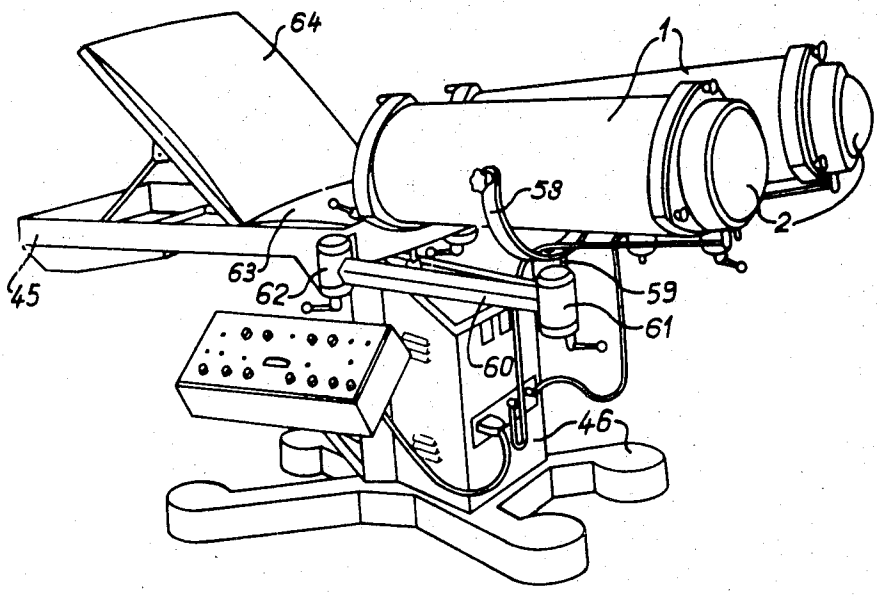

FIG.1

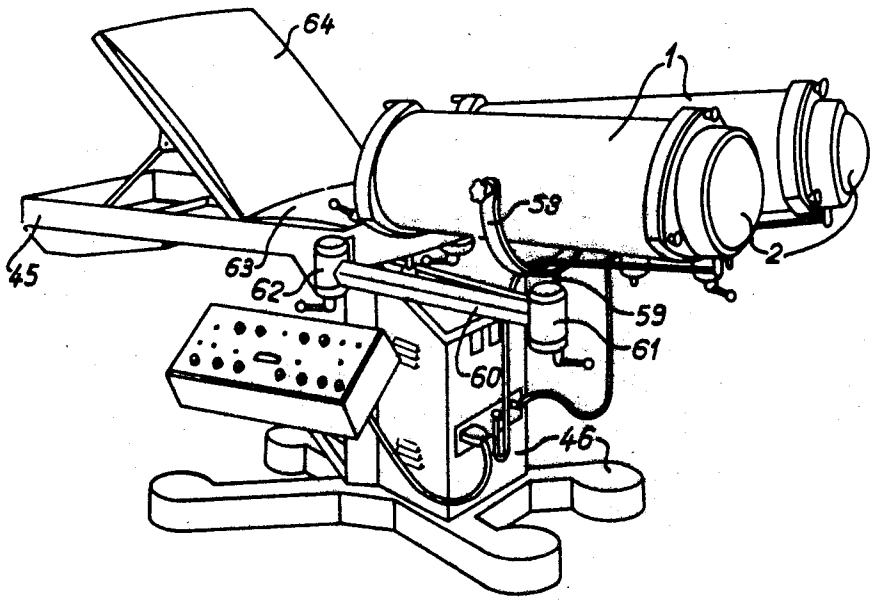

FIG. 2

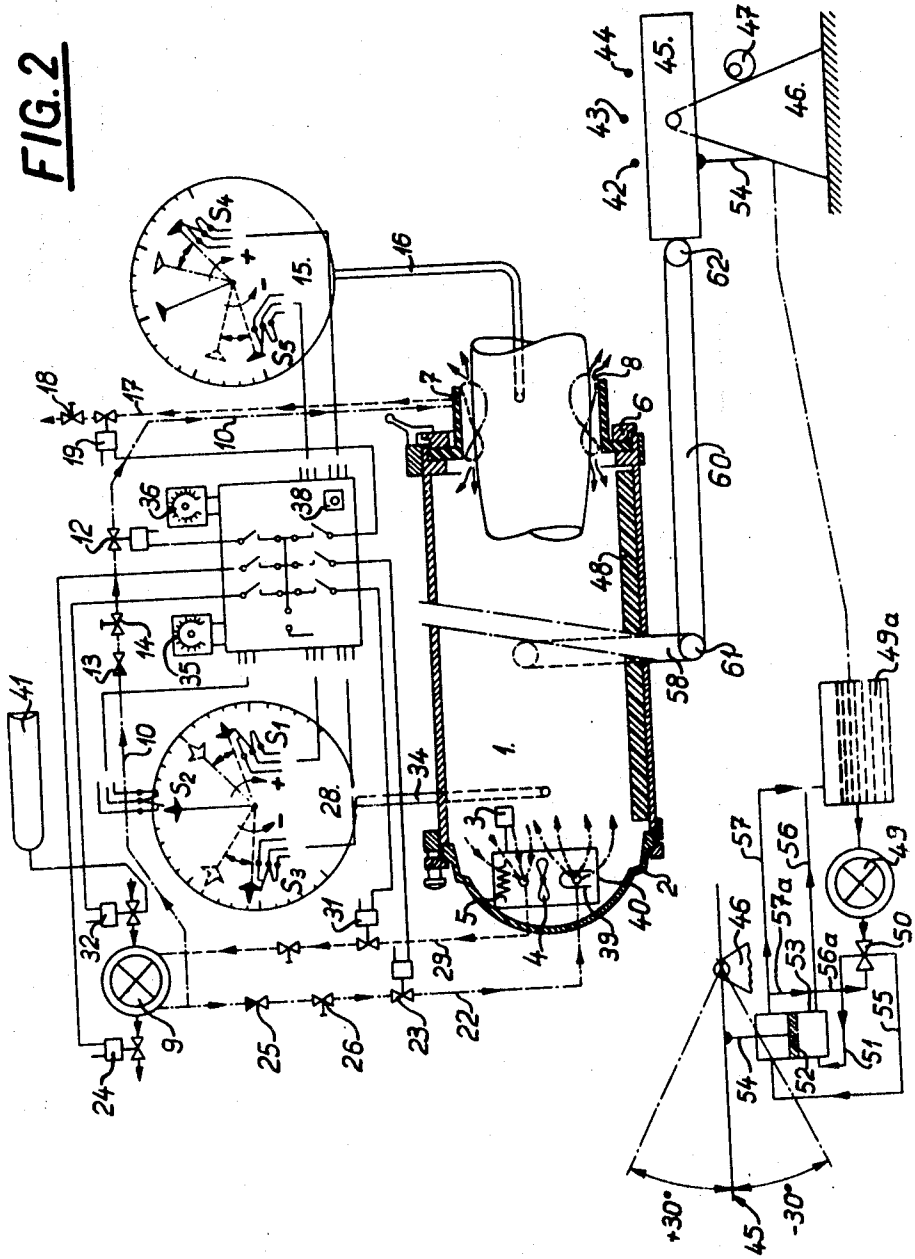

FIG.3

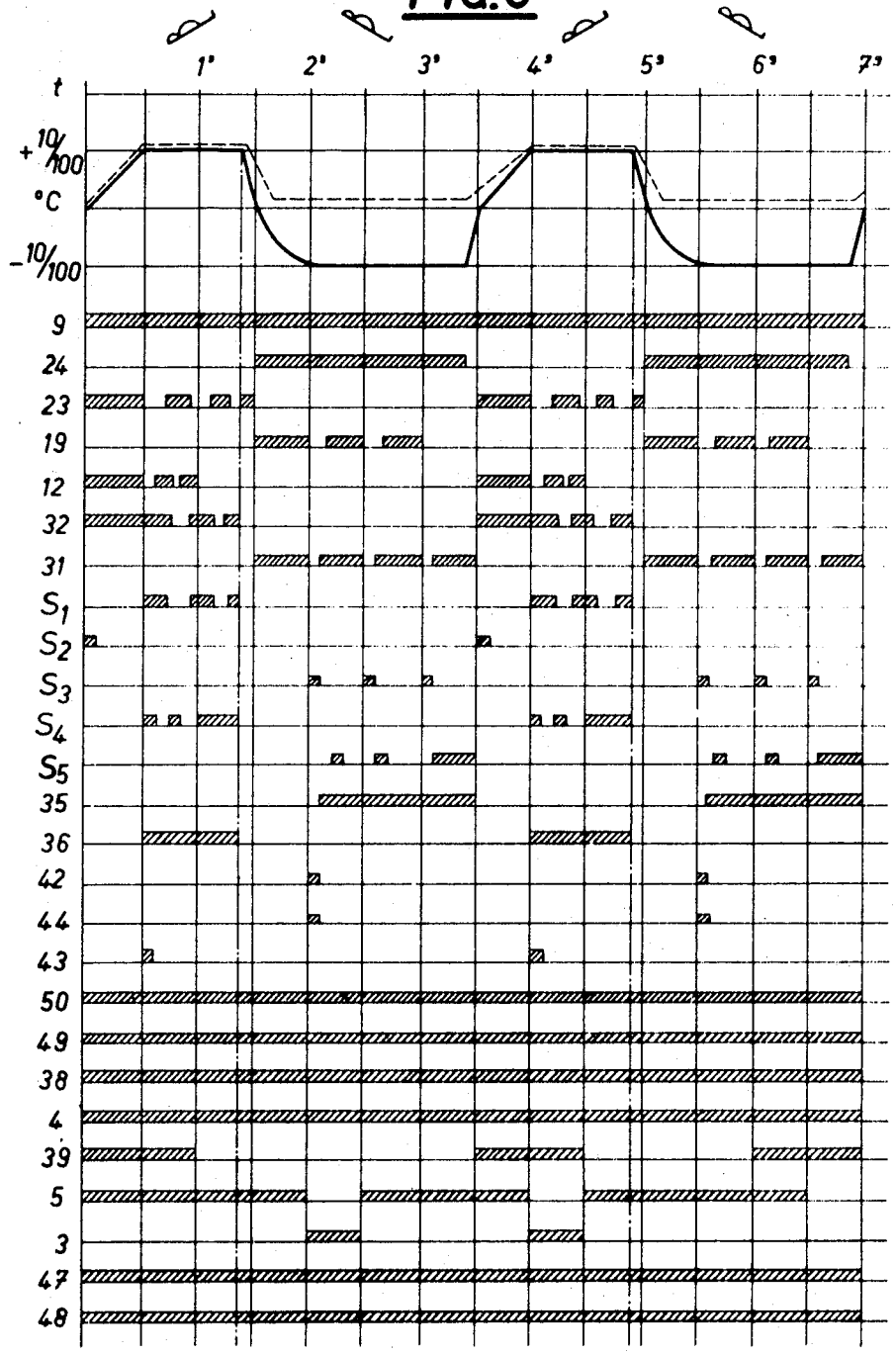
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FIG. 4

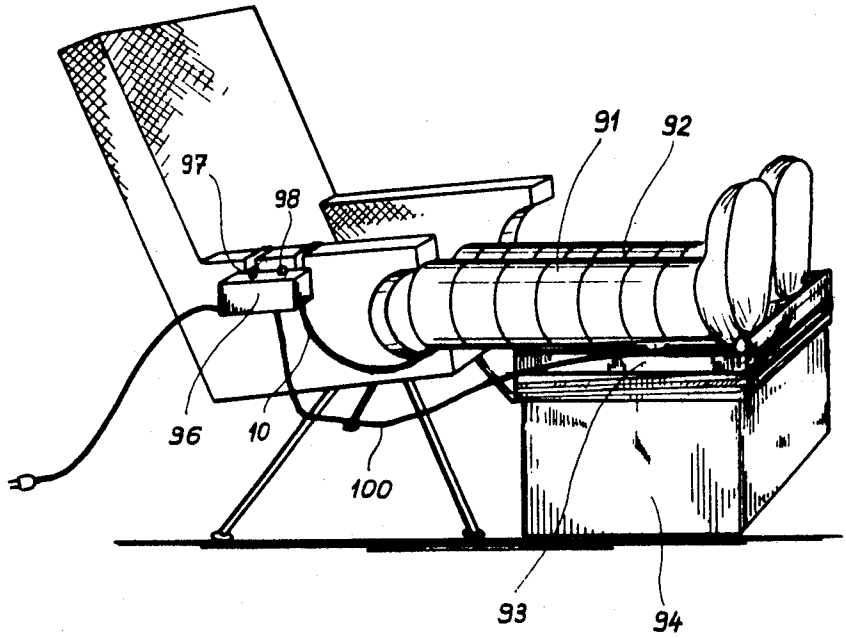


FIG. 5

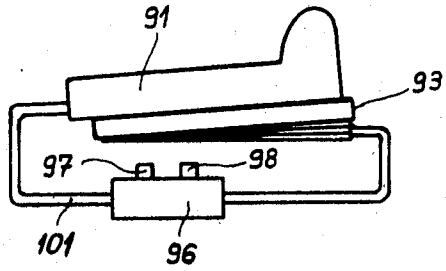
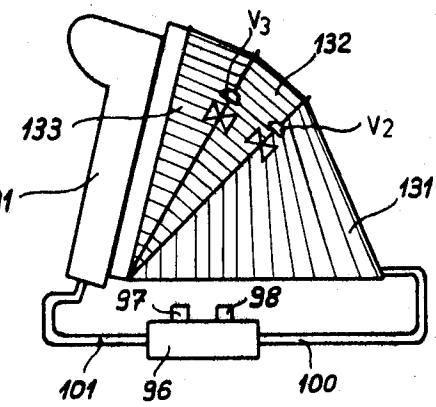


FIG. 6



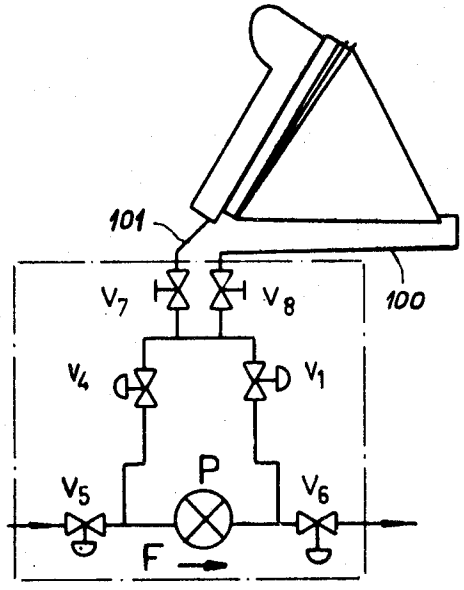


FIG. 7

APPARATUS FOR MEDICALLY TREATING CIRCULATORY AILMENTS OF THE HUMAN BODY

Apparatus is known using the pressurization and depression cycles as physical agents and have for therapeutic principle venous stasis, that is to say while the capillaries the veins and the veinlets of the limb are treated by depression, the pressurized system for closing the receptacle (inflatable or noninflatable sleeve) blocked, by its pressure, the veins and prevented the venous return. In addition to the pressure of the sleeves necessary to obtain a fluidtight closing, the aspiration of the suction made the compression effect increase in such a way that not only the veins but also the arteries were blocked and the expected effect of increasing arterial flow in the treated limb could not be obtained.

This deficiency was eliminated by the apparatus disclosed in U.S. Pat. No. 3,217,707 which, by adapting automatically to the muscular conditions of the treated limb and of the pressures to be reached, left the venous return intact and gave the possibility of increasing the arterial flow in the limb. Thus the increased arterial blood in the extremity of the body members could return as venous flow to the right-hand side of the heart and cause reflexes having for result an increase of the cardiac flow.

It has been found from the therapeutic results achieved that the volemia (increase in the volume of circulating blood) thus obtained caused an increase of the therapeutic effect beyond the time of one session of treatment.

In view of this, it becomes necessary to use not one but several members to act on the cardiovascular system since the members have reflex paths through which it is possible to act on the rest of the organism. Additionally since the effect of pressure increases in proportion to the square of the surface on which it acts, it is beneficial to subject the maximum of a member's surface to the action of pressure and to treat whenever possible two members at once. Thus pressure variations can remain relatively small while producing a sufficient effect since they are exerted on large surfaces.

The apparatus for the treatment of circulatory troubles according to the present invention comprises an enclave or housing intended to receive one of the members to be treated, means for controlling a pump intended to create pressure or vacuum in the enclave one of whose extremities is formed by a bottom carrying a connection for bringing air and containing a thermostat, a blower and means for heating or cooling, while the other end of the enclave has a removable cover with a fluidtight closure provided with an outlet containing an inflatable sleeve and an air inlet. Means are provided for automatically adjusting, according to a variable program, the pressure and the temperature inside the enclave and the pressure in the inflatable sleeve which becomes filled to a degree such that adhering excess pressure in the enclave pressurized air can escape from the enclave, this escape being compensated automatically in order to maintain constant the desired pressure and that during a determined change in pressure the blood flow in the venous system is not prevented. A second enclave, similar to the first, is provided and the two enclaves comprise cylinders containing a vibratory cushion and carried by pairs of arms with self-locking devices, an oscillating support whose oscillations are synchronized with the cycles of pressure and vacuum in the cylinders, a vibrator for the said oscillatory table, a gas inlet, and a quartz lamp which serves on the one hand to destroy microbes carried by the air brought into the cylinders and on the other hand to disinfect the wounds of members introduced in the said cylinders.

The accompanying drawings represent by way of example several embodiments of apparatus according to the present invention.

FIG. 1 is an overall perspective view of an apparatus according to the present invention;

FIG. 2 is a schematic diagram of the apparatus shown in FIG. 1;

FIG. 3 is a table showing operation of the apparatus for a standard treatment of circulatory troubles peripheral to the arterial genesis;

FIG. 4 is a perspective view of an apparatus with inflatable cushion;

FIG. 5 is a schematic view of an apparatus with the cushion in a deflated position;

FIG. 6 is a schematic view of the apparatus shown in FIG. 5 with the cushion in an inflated position;

FIG. 7 is a schematic representation of the pneumatic circuit for the apparatus of FIGS. 4, 5 and 6.

The apparatus shown in FIGS. 1 and 2 comprises two enclaves consisting of cylinders 1 intended to receive the body members to be treated. Each cylinder 1 is closed at one end by a fluidtight bottom 2 which carries on its interior a receptacle 40 in the shape of a tube open at two ends and which contains a blower 4, heating and cooling coils 5 and a quartz lamp 39 capable of emitting ultraviolet rays. The receptacle 40 is made of a material which is not permeable to the ultraviolet rays of the quartz lamp 39, in order to protect the eyes of the patient and of the treating personnel. The closed end also carries a thermostat 3 allowing adjustment of the temperature within the cylinder 1. The other end of the cylinder 1 is closed by a cover 6 which has an outlet 7 in which is mounted an inflatable sleeve 8. The sleeve 8 comprises a small diameter rubber tube and the inside thereof is connected to a conduit 10 through which compressed air can be introduced therein or evacuated therefrom by a conduit 17 the arrangement being such that after introducing the member to be treated, the sleeve 8 remains in continuous fluidtight contact with the body member and its pressure has a predetermined value. Preferably, the outlet 7 is made of thick rubber in order to be deformable in response to either pressure or vacuum condition existing in cylinder 1. Cover 6 with its outlet 7 is exchangeable to adapt to members to variously configured body be treated.

Cylinders 1 contain therein vibrators 48, for example vibratory cushions, whose vibrations have a very small amplitude, for example 0.3 mm. at a relatively slow frequency, for example 25 vibrations per second, in such a way that these vibrations, almost imperceptible by the patient, have a sedative effect of the neurovegetal system and produce muscle relaxation. They produce on the muscles an effect such that the latter act on the veins as compressors forcing the venous return. This device takes the place of the muscular effort eliminated by the stretched out position of the extremities of the patient within the cylinders 1. Cylinders 1 are mounted on supports 58 connected by pairs of lever arms 59, 60 (see FIG. 1) to self-locking devices 61, 62 to avoid the unwanted separation of the cylinders 1 from the seat 63 of the table 45 when the apparatus functions. Self-locking devices 61, 62 comprise gears constituted each by a free pinion, a toothed plate and a spring which forces the free pinion to mesh with the toothed plate to lock devices 61, 62. As seen in FIG. 1, the arms 59 are shorter than the arms 60, all these arms having double ball bearings which give them a very ready rotation at the level of the articulations carrying the self-locking devices 61, 62.

Owing to the above indicated assembly, it is possible to treat either the two legs, or one leg and one arm of the same side, for example for hemiplegic circulatory trouble, or an opposite arm and leg to increase by reflex action the circulation in a member that cannot be treated directly, or the two arms together. Additionally, the table 45 has a back 64 (FIG. 1) whose height is adjustable and which can also be subjected to vibrations of small amplitude by means of an oscillatory mass 47 positioned in base portion 46 in the support of the table. Preferably, vibrations are lateral relative to the longitudinal axis of the table and may or may not be synchronized with the pressure or vacuum cycles. The apparatus is equipped with an adjustable input and output pump 9, the output side of which is connected to the inflatable sleeve 8 through a conduit 10. An electromagnetically controlled valve 12, a nonreturn valve 13 and an adjustable clamping valve 14 are mounted within

the conduit 10. The electromagnetic valve 12 is controlled by electric signals from a pressure regulator 15 which has a maximum pressure level (+) and a minimum pressure level (−) which is connected by a conduit 16 to the conduit 10 in such a way that the pressure downstream of the clamp valve 14 and consequently that which exists in the inflatable sleeves acts on the regulator 15. Conduit 17 connected to conduit 10 comprises a clamp valve 18 and an electromagnetically controlled valve 19 which is controlled by electric signals developed by the pressure regulator 15.

A branch conduit is 22 connected to the conduit 10 upstream from the electromagnetic valve 12 and leads to an electromagnetic valve 23 upstream of which are disposed a nonreturn valve 25 and a clamp valve 26. Another electromagnetic valve 24 is connected to the branch 22. Finally a bottle of compressed gas 41, for example carbon dioxide, pure oxygen, nitrogen or any other therapeutic gas, is connected to conduit 22 and allows introduction of the contents, for example carbon dioxide which gives off, by evaporation, carbon dioxide in cylinders 1. The carbon dioxide penetrates in a transcutaneous manner in the members treated where it exerts vaseodilatory effects. Carbon dioxide also serves to reduce the temperature in the cylinders 1. It is possible, according to the treatment desired, to heat one of the cylinders 1 and to simultaneously cool the other by means of coil 5 and blower 4. The temperature desired in the cylinders being held constant by means of the thermostat 3 and being able to vary between ±78° C.

Preferably, a thermally insulated compartment is positioned in the base portion 46 of the support of table 45 and contains a radiator through which air intended to produce pressure in cylinders 1 is cooled by filling the compartment with solid carbon dioxide, in contact with the radiator, which cools the air circulating therein down to −78° C., this cold air being heated by coil 5 to the desired temperature and adjusted by thermostat 3. The coils 5 have a calorific power such that air is heated from −78° C. to arrive in cylinders 1 with a temperature of at least +6° C. and can be heated up to 41° C.

The electromagnetic valves 23 and 24 are controlled by electric signals developed by a pressure regulator 28 to maintain a pressure level between a maximum (+) and to a minimum (−). Regulators 15 and 28 can be, for example, of the manometer-type with contacts or with a photoelectric cell. A conduit 29 going from the cylinders 1 is provided with a pinch valve 30 and an electromagnetic valve 31 and is connected to the pump 9. This conduit is also controlled by an electromagnetic valve 32 connected to the pressure regulator 28. The electromagnetic valves 31 and 32 are controlled by signals developed by the regulator. A time relay 35 determines the duration of the vacuum phase while a time relay 36 determines the duration of the pressurizing phase in cylinders 1, the line relays being electrically connected to the regulator 28.

The starting of the apparatus takes place by means of a switch 38 to which is also connected the motor of the pump 9, the coils 5 for heating or cooling and the thermostat 3. The switch 38 also starts the hydraulic installation which controls the oscillations which are synchronized with the pressure and vacuum phases according to a preselected program which can be modified according to the desired treatment.

The hydraulic installation comprises a pump 49 which pulses a hydraulic liquid from a vat 49*a* and sends it into a four-way valve 50 which according to its position controls the raising or lowering of the table 45. For one of these positions, the fluid is sent by a conduit 51 and a cylinder 53 where it acts on a piston 52 which it pushes upwardly and whose rod 54 pivoted to table 45 causes the latter to oscillate upwardly and inclines it up to +30°. For the other position, the fluid passes through a conduit 55 and arrives above piston 57 to effect lowering of the table. The conduits 56 and 57 are return conduits and to return back the fluid to the vat 49*a* or by the four-way valve 50 to pump 49. Table 45 can assume, in addition to the inclined position as described above, an intermediate position for which it is horizontal. These three positions are determined by contacts 42, 43, 44. During the overpressure phase, the legs are raised, which renders more efficient the elimination of the blood and of the stasis liquid. Owing to the adjustable back 64, the feet can be brought up to 75 cm. above the level of the heart. In the vacuum phase, the legs are lowered which increases considerably hyperemia. The adjustable back 64 allows lowering of the level of the feet to 90 cm. below the level of the heart. In certain cases, these movements can be reversed in such a way that thelegs are raised during the hyperemicphase, which acceleratesthe venous return and are lowered in the elimination phase, avoiding in this manner as ischemia at the level of the skin and in serious cases of arterial deficiency. Finally the synchronization of the oscillatory movements can be eliminated. The adjustment of the back 64 thus allows selection of the position of the legs and the body which remain stationary during the phase of treatment. This is important for the treatment of chronic and posttraumatic oedemas.

The apparatus operates as follows: (see FIG. 3) by triggering the switch 38, the input and output pump 9 starts and the electromagnetic valves 32, 23 and 12 open causing fluid pressure increases in cylinders 1 and sleeves 8. The pressure regulator 28 closes its movable needle on contact S2. As soon as the desired pressure in the sleeves 8 is reached, the needle of the pressure regulator 15 closes contact S4 which closes the electromagnetic valve 12. Owing to the clamping or restricting action of valve 14 positioned in conduit 10 relative to that of valve 26 positioned in the conduit 22, the pressure increases more rapidly in sleeves 8 than in cylinders 1. In this way, the fluidtightness is ensured and the increasing pressure of the air inside cylinders 1 diminishes the pressure in sleeves 8 which is exerted on the muscle. Owing to this, the needle of the pressure regulator 15 moves away from contact S4 which opens electrovalve 12. As soon as the needle of the pressure regulator 15 again closes the contact S4 the latter closes electromagnetic valve 12. This compensation system takes place also in the muscles of the members introduced in the cylinders 1 which contract under the pressure of sleeves 8 which translates itself by a pressure drop noted by the regulator 15 which switches on the compensation system.

As soon as the pressure in cylinders 1 reaches the desired maximumvalue, the needle of the pressure regulator 28 closes contact S1 which triggers the time relay 36. The same closes electromagnetic valve 23 and opens electromagnetic valve 32. Thus, the pump 9 works without interruption sucking air through electromagnetic valve 32 and expelling air through electromagnetic valve 24. Pressure reductions in cylinders 1 move the needle of pressure regulator 28away from contact S1 and the latter opens electrovalve 23 and simultaneously closes the valve 24. As soon as the pressure once more reaches the maximum desired valve, the needle of the pressure regulator 28 again closes contact S1 which closes the valve 23 and opens the valve 24. The compensations described in cylinders 1 and sleeves 8 can go on indefinitely if pressure reductions occur.

At the end of a predetermined time, time relay 36 closes electrovalve 32 and possibly electrovalves 23 and 12 and opens simultaneously the electromagnetic valves 31, 24 and 19. Pump 9 sucks in air through the valve 31 and expels it through the valve 24, thus decreasing the pressure in cylinders 1 and the sleeves 8 deflate simultaneously with cylinders 1 through the valve 19. Owing to the smaller clamping or restricting action of valve 30 relative to that of valve 18, the pressure increases more rapidly in cylinders 1 than in sleeves 8 and the depression begins to show in cylinders 1, the sleeves 8 apply themselves more strongly against the members but since the latter offer resistance, this resistance is translated into a measurable increase in the pressure in sleeves 8.

This increase moves the needle of pressure regulator 15 away from contact S5 which effects opening of the valve 19. As soon as the pressure in the sleeves 8 again reaches the desired minimal value, the needle of the pressure regulator 15 closes again contact S5 which closes the valve 19. This com-

pensation system repeats each time that the pressure of sleeves **8** increases.

Owing to this, the pressure in sleeves **8** is always maintained constant during the suction phase in cylinders **1**. The inflation of the sleeves **8** during the suction phase in cylinders **1** relative to the latter is an essential condition of the apparatus.

As soon as the pressure in cylinders **1** reaches the desired minimum value, the needle of the pressure regulator **28** closes contact S3 which triggers the time relay **35**. The same closes the electromagnetic value **31** and opens the electromagnetic value **32**. Inlets of air in cylinders **1** between sleeves **8** and the members treated are described by the pressure regulator **28** whose needle moves away from contact S3 which opens the valve **31** and closes the valve **32**. As soon as the vacuum in cylinders **1** again reaches the desired maximum value, the needle of the pressure regulator **20** again closes contact S3 which closes the valve **31** and opens the valve **32**.

The described compensation in cylinders **1** can repeat itself indefinitely as long as the air supply to the cylinders **1** is repeated.

At the end of the preselected timing, the time relay **35** closes the valves **31** and simultaneously opens the valves **32** and **23** causing the cylinders **1** to fill with air. The needle of the pressure regulator **28** closes upon passing contact S2 which accordingly opens the valve **12** and sleeves **8** fill again with air. The above described cycle recommences automatically until the switch **38** is triggered.

The nonreturn valves **13** and **25** prevent equalization between the fluid pressures within the sleeves **8** and cylinders **1** as well as the use of a second pump.

As shown in FIG. **3**, the vibratory mass **47**, vibrators **48** in cylinders **1** and blower **4** are continuously triggered during the cycles of pressurizing and of depressions. During these cycles, pump **49** feeds cylinder **53** with hydraulic liquid which causes oscillation of the table **45** while closing contacts **42,44** according to the position taken by the latter and according to the adjustable selected program.

In FIG. **3**, the pressurizing phase is synchronized with elevation of the legs and the suction phase with an inclined position of the legs. This treatment is appropriate for complaints such as Raynaud's disease, neurocirculatory distonia, chilblains; for functional complaints accomplished by anatomical complaints such as Buerger's disease, arterial sclerosis, arthritis, frostbite, diabetic arterial complaints; for anatomic obstructions, such as severe forms of Buerger's disease, severe form of arterial sclerosis, third degree frostbite, and, finally for various treatments before and after sympathectomia, after endarcteriectomia, grafts, and wet or dry gangarenes.

Finally it should be noted that the veins with the veinlets and the capillaries are used as the field of action. By diluting them by suction there is obtained an increase of a peripheral blood supply which causes at the same time an increase in the peripheral resistance allowing for an increase in the arterial flow. Since the inflatable sleeves **8** do not compress the veins during this phase of increase in the blood mass in the treated members, the return of a venous blood remains intact. This venous blood, increased quantitatively, can be expelled by the body as arterial blood in the main circulation, the whole process producing finally active hyperemia in the entire organism.

By compressing the veins by external pressurization, there is obtained elimination of the venous blood, of metabolical wastes and of centers of stasis. Moreover there is occasioned an increase in the peripheral resistance against the arterial flow, the whole causing finally an ischemia which is sought in order to produce a reactive hyperemia.

By blocking the veins by the inflatable sleeves at a precise moment, that is at the moment the depression cycle is changed to the pressurization cycle, there is obtained a passive hyperemia.

Through the veins, the described apparatus causes three different hyperemias which follow one another:

a. an active hyperemia by an increase of the arterial flow in the entire organism.

b. a passive hyperemia by temporary blocking (about 15 seconds) of the veins at the level of the inflatable sleeves.

c. a reactive hyperemia following the ischemia.

Another type of support is shown in FIGS. **4—7** and comprises pneumatic cushion **93** laid on a support **94** supporting two boots **91** and **92** whose function is similar to that of the enclaves of the previous example. The inflation of the boots and of the cushion is carried out by means of a control box **96** through two flexible tubes **100** and **101**.

Boots **91** have double walls, the outer wall being rigid and possibly composed of pivoted elements and an inner wall whose thickness decreases from the entrance of the boots to the feet thereof. When compressed air is introduced between the two walls of the boots, the deformation of the inner wall is consequently greater in the end part of the boot, corresponding to the distal part of the leg and compressed by the boot. The compression of the blood vessels will be therefore greater in the distal part than in the proximal part.

FIG. **5** shows schematically the installation with the cushion in its completely deflated position, while FIG. **6** shows the cushion completely inflated at its highest position.

Cushion **93** is composed of three compartments **131**, **132**, **133**, which it is possible to inflate successively to obtain three different elevations, compartment **131** corresponding to an elevation of 45° while compartments **132**, **133** correspond each to an additional elevation of 15°.

To avoid too much strain on the pump, the compressed air introduced in the compartments of the cushion does not fill the entire volume occupied by the cushion but each of the compartments of the cushion is constituted by two lateral compartments with double vertical walls connected by a front compartment with a double wall in order to form a chamber whose perpendicular cross section is in the shape of a U.

The chamber of the compartment **132** is also connected to the chamber of the compartment **131** by an electromagnetic valve V2 and the chamber of the compartment **133** to the chamber of the compartment **132** by an electromagnetic valve V3. These valves are controlled by means of two additional buttons (not shown) disposed on the control box **96**.

FIG. **7** shows the pneumatic scheme of the pump and the valves positioned in the control box **96**. This pneumatic circuit comprises a pump P, four electromagnetically-controlled valves V1, V4, V5 and V6 and two manual control valves V7 and V8.

When it is desired to inflate the boots and/or the cushion, button **97** is pressed to trigger the pump and electrically open valves V1 and V5, air circulating in the pump in the direction of arrow F. According as to whether it is desired to obtain the inflation of the boots alone or the cushion alone or both at once, the corresponding valves V7 and V8 will be opened or closed.

To deflate, the button **98** is pushed to trigger the pump P and open the valves V4 and V6 while the valves V1 and V5 remain closed. The air contained in the box and in the cushion will then be pumped through valves V7 and V8, valve V4, pump P and valve V6, through which it will freely escape.

During the simultaneous inflation of the boots, the valves V7 and V8 are open in such a way that the desired increased inclination is obtained before the boots are completely inflated to increase the pressure effect of the boots by gravity and to avoid using traumatising pressures.

Many modifications are possible in the making of the support of the variable inclined boots. It will be, for example, possible to use two elements of a rectangular pneumatic mattress connected by one of their sides, the opposite sides of these compartments being connected by a flexible or rigid base. The adjustment of the degree of inclination could then take place by adjusting the fastening point of one of these compartments to the base by adjusting the length of this base.

Naturally it is possible to position the base of the cushion on an inclined support if it is desired to have the possibility of adjusting the position of the legs below the horizontal. In a modification, each boot can be supported by an individual inflatable support, which makes it possible to individually adjust the position of the legs.

What I claim is:

1. Apparatus for treating circulatory troubles by acting on the upper and/or lower members of the human body, comprising: a first enclave dimensioned to receive therein one member of a human body to be treated; means including a pump for alternatively pressurizing or creating a vacuum in said enclave; one end of said enclave being closed by a bottom portion carrying air inlet means and containing a thermostat, a blower and heating or cooling means, said enclave having another end fluidtightly receiving a movable cover and provided with an outlet with an inflatable sleeve and an air inlet; means for automatically adjusting according to a variable program the pressure and the temperature inside said enclave and the pressure in said inflatable sleeve whereby said sleeve is able to shift up to an extentthat during the pressurizing cycle in said enclave, pressurized air can escape from said enclave and including means for automatically compensating for the escaping air to maintain constant the desired pressurizing and that during a desired decrease in pressure, the flow of blood in the venous system of the member being treated will not be prevented; and a second enclave similar to said first enclave; each said enclave comprising a cylinder containing therein a vibratory cushion, means comprising pairs of arms with self-locking means for carrying said cylinders, an oscillating support having oscillations synchronized with the pressurizing and vacuum cycles in said cylinders supporting each cylinder, a vibrator for oscillating said oscillating supports, a gas inlet, and a quartz lamp mounted in each cylinder for destroying microbes carried in the air brought in said cylinders and disinfecting wounds in the human members introduced in said cylinders.

2. Apparatus according to claim 1, including means for synchronizing the movements of said oscillating support and the variations in pressure in said cylinders according to a variable program.

3. Apparatus according to claim 1, wherein said support has the shape of a table and including means for effecting movement of said table in accordance with said program in such a way that when said cylinders are pressurized, the members of the patient being treated and raised relative to the horizontal and when said cylinders are under vacuum, the members are either in the horizontal or downwardly inclined position.

4. Apparatus according to claim 1, including means for effecting movement of said oscillating support in accordance with said program in such a way that when the cylinders are pressurized, the members of the patient being treated are either in horizontal or in downwardly inclined position and that when the cylinders are evacuated, the members are raised with respect to the horizontal.

5. Apparatus according to claim 1, including means for synchronizing the vibrations of the vibratory cushion in accordance with the pressurizing and evacuation cycles in the cylinders and wherein said vibrations are lateral with respect to the longitudinal axis of the cylinders.

6. Apparatus according to claim 1, wherein said oscillating support has an adjustable back, said back being positionally adjustable thereby allowing adjustment of the level of the heart relative to the level of the feet of the patient so that the cardiac load resulting from the treatment can be varied.

7. Apparatus according to claim 1, wherein said support can be inclined up to ±30° and can be brought into a horizontal intermediate position.

8. Apparatus according to claim 1, wherein said means for heating and cooling, said blower and said quartz lamp are positioned in a fluidtight chamber which is not transparent to ultraviolet rays emitted by said quartz lamp, said chamber adjoining to the extremity of said enclave closed by said bottom.

9. Apparatus according to claim 1, wherein said heating means comprises a coil positioned at the outlet of said blower.

10. Apparatus according to claim 9, wherein said coil is effective to heat air in proportion to the desired temperature adjusted by said thermostat.

11. Apparatus according to claim 1, including a thermally insulated compartment positioned in the base of said support containing therein a radiator through which air intended to produce pressure in said cylinders is cooled by filling the compartment with solid carbon dioxide which upon contact with said radiator will cool the air circulating therein down to −78° C., said cooled air being heated by heating coils to the desired temperature adjusted by the thermostat.

12. Apparatus according to claim 11, wherein said coil has a calorific power so that air is heated from −78° C. to arrive in said cylinders at a temperature of +6° C.

13. Apparatus according to claim 1, wherein said self-locking devices comprise gears constituted by a free pinion, a toothed plate and a spring which forces said free pinion to mesh with said toothed plate to lock the corresponding device.

14. Apparatus according to claim 1, wherein said arms carrying said self-locking devices have double ball bearings allowing rotation of said arms at a level of articulation carrying said self-locking devices.

15. Apparatus according to claim 1, wherein said arms of each pair are of different length and wherein the arm directed toward said cylinder is shorter than the other arm.

16. Apparatus according to claim 1, having means for eliminating the movements of said oscillating support and switches for manually triggering said pump to bring said support into a desired position and for leaving it in said position during an entire treatment session.

17. Apparatus according to claim 1, wherein said oscillating support is constituted by a variable inclination automatic support comprising at least one chamber and means for inflating said support.