July 7, 1959 A. DEMENY 2,893,382

MASSAGE APPARATUS

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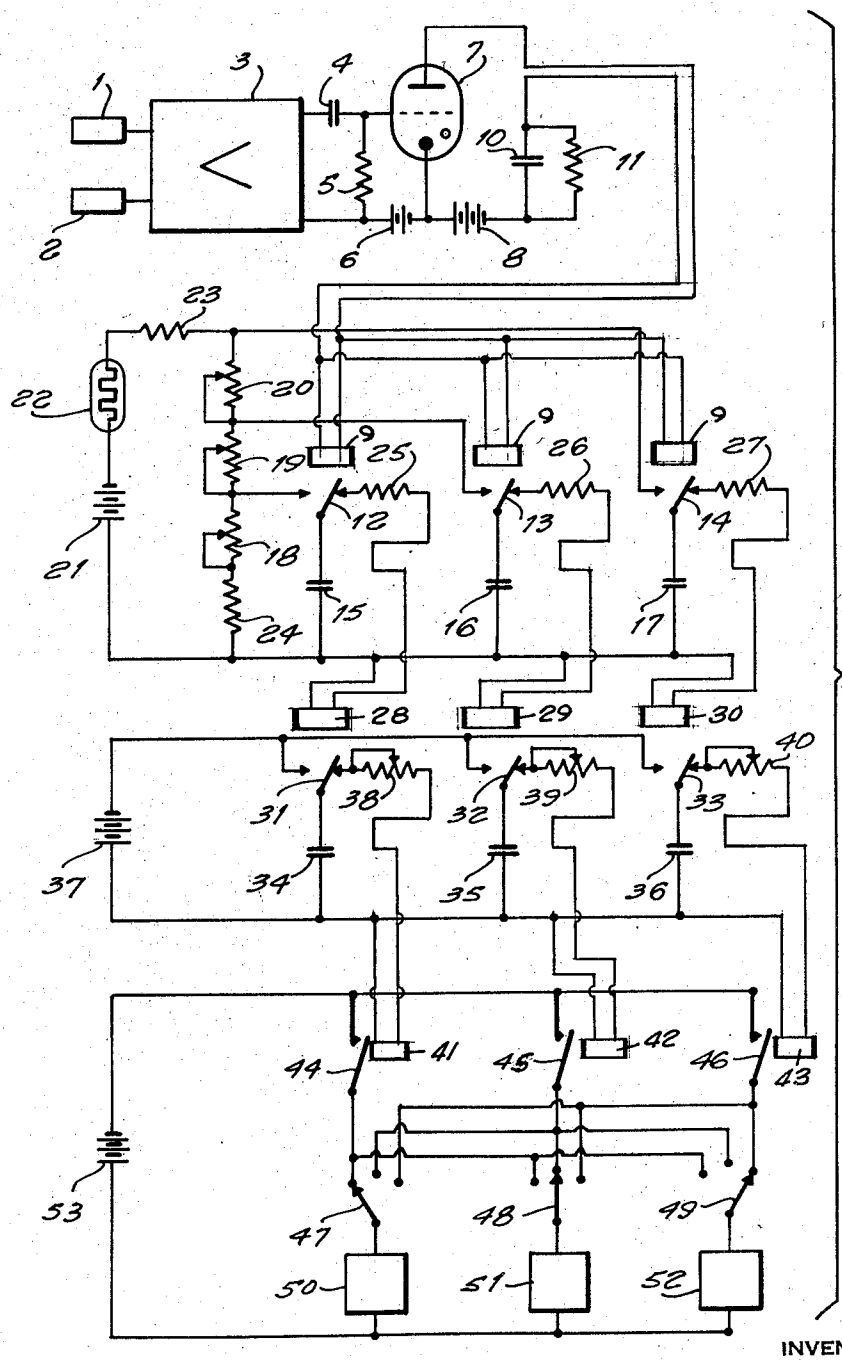


FIG. 1.

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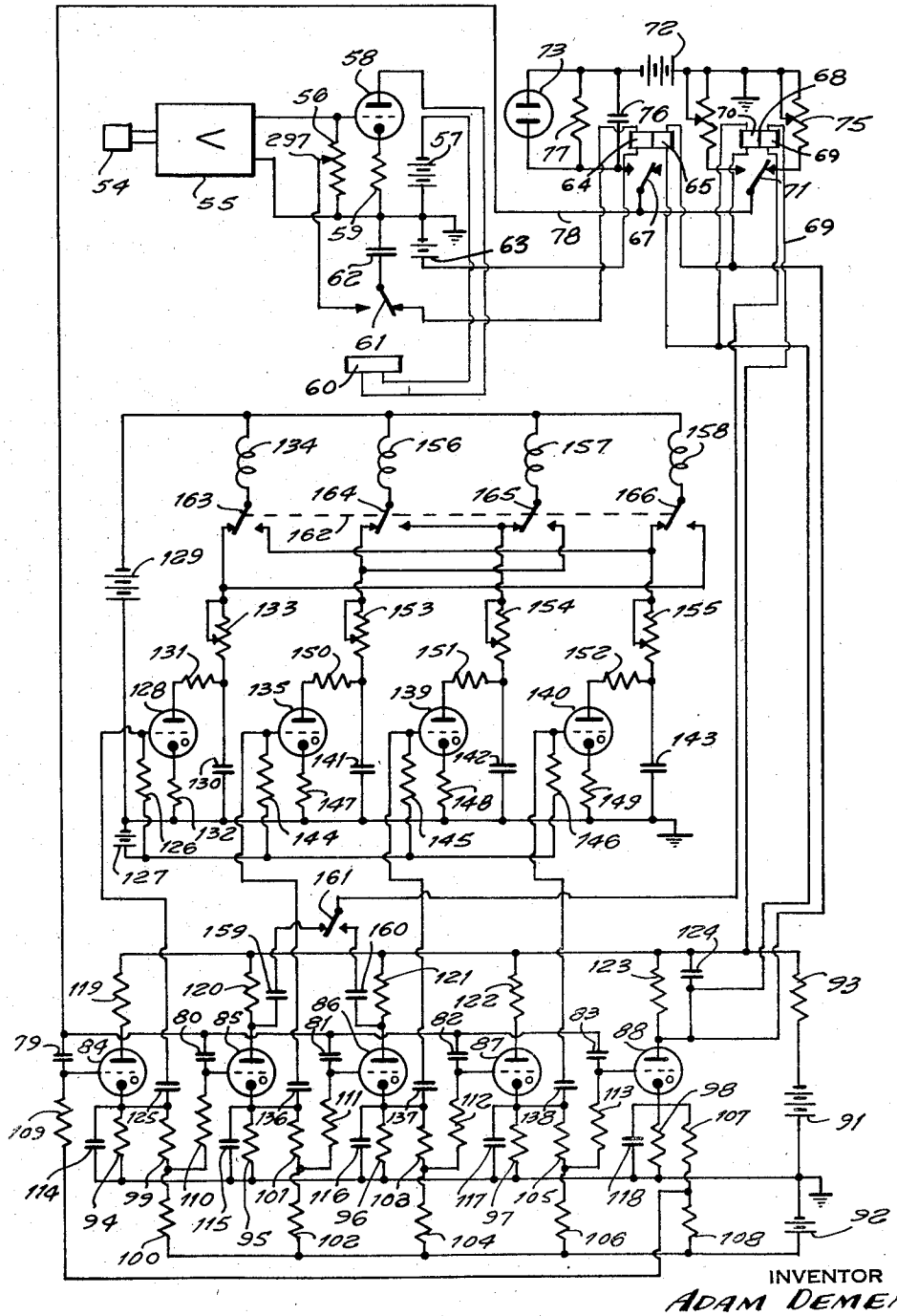


FIG. 2.

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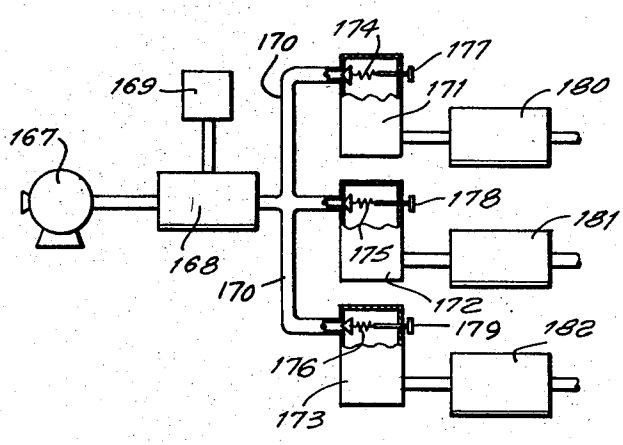


FIG. 3.

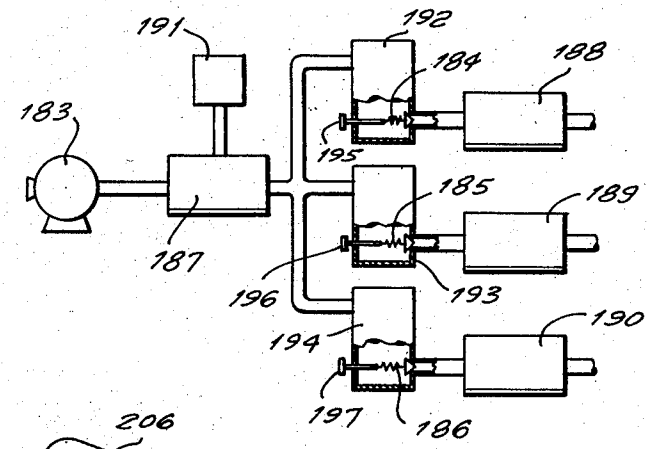


FIG. 4.

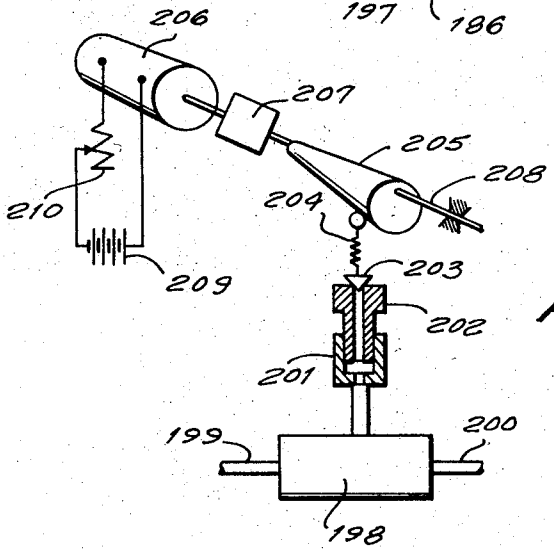


FIG. 5.

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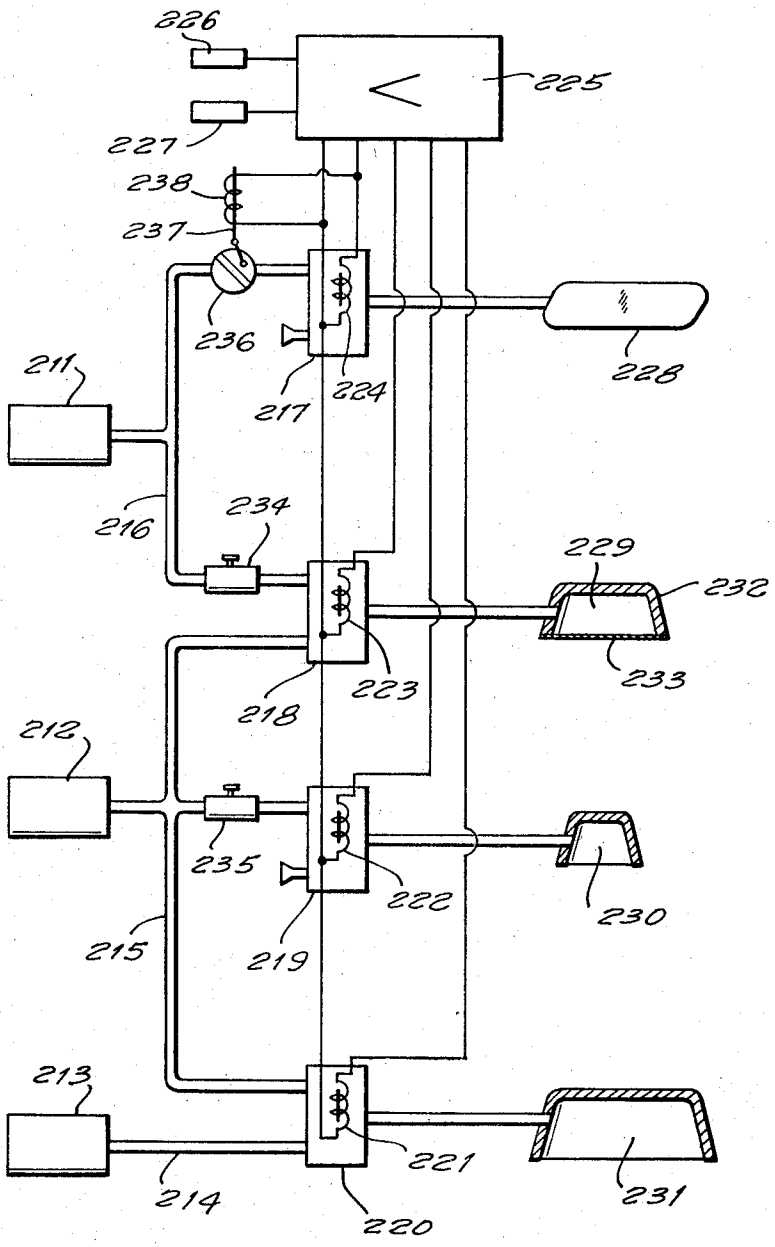


FIG. 6.

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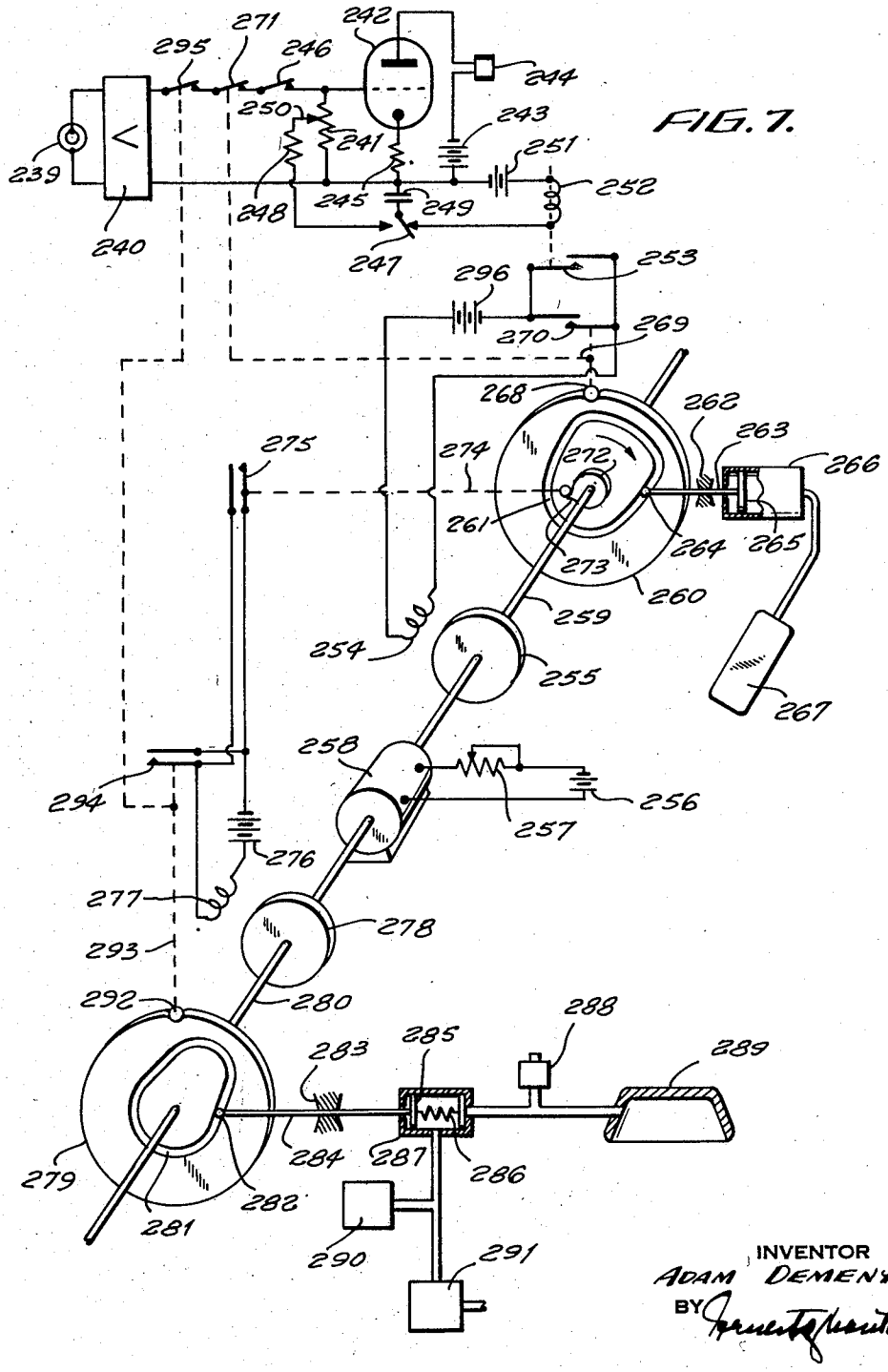


FIG. 7.

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United States Patent Office

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MASSAGE APPARATUS

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Application August 31, 1953, Serial No. 377,645

Claims priority, application Switzerland September 1, 1952

11 Claims. (Cl. 128—38)

The present invention relates to a massage apparatus in general and to such apparatus with at least two pressure exerting organs which are subjected in timely succession, and not simultaneously, to pressure variations responsive to a control device which in turn is controlled by a physiological value determined by the action of the heart, in particular.

It is one object of the present invention to provide a massage apparatus which is designed in such manner that the velocity of the peristaltic wave is accommodated to the blood velocity at the port of the body to be treated and the start of the peristaltic wave is coordinated to the proper value of the blood pressure at the place of the start.

It is another object of the present invention to provide a massage apparatus which comprises a plurality, but at least two pressure exerting organs, which are applied to or inside the body of the patient, which organs are successively subjected to pressure variations, whereby these pressure variations are controlled by a control device, which itself is responsive to a physiological value which follows the heart action and which has, preferably, an adjustable phase difference between 0 and 0.6 seconds. In this connection the word "pressure" should receive an extensive interpretation, since it may be atmospheric pressure, as well as below or above atmospheric pressure and the medium, which carries it, is not necessarily determined in advance.

It is still another object of the present invention to provide a massage apparatus which performs two functions. One, it must follow the condition of the vessels and, two, it must supply the corresponding pressure to the therapy organs. The first function is the subject of the control device. Its task is to follow the blood circulation of the patent and in dependence of such circulation to control the exertion of pressure and partly the pressure picture in the individual pressure exerting organs. In order to follow the blood circulation the control device requires a feeler capable of receiving a physiological value correlated to the heart action. There are a number of physiological values, synchronized with the heart, which are suitable for this purpose. Thus, by example, the tension of the heart action, the heart sounds, the blood pressure, etc., may be used as such values and correspondingly electrodes or mechanoelectrical transformers as for instance piezocrystals, electromagnetic, electrodynamic pick-ups are available as feelers.

It is yet another object of the present invention to provide a massage apparatus of the type described above, which includes a control device having means for changing the direction of operation, since in accordance with the type of illness a distal or centripetal or alternating movement of the peristaltic wave is desired.

It is also a further object of the present invention to provide a massage apparatus of the type described above which includes means for setting time intervals during which the individual pressure exerting organs are subjected to a predetermined pressure.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which

Figures 1 and 2 show circuit diagrams of two different control devices;

Figs. 3 and 4 show schematically two types of pressure sources;

Fig. 5 is a schematic showing of a pressure reservoir;

Fig. 6 is a circuit diagram disclosing the cooperation between the control device and the pressure sources; and

Fig. 7 is a circuit diagram in which each therapy organ is coordinated to a predetermined pressure source.

The devices disclosed in the drawings are merely examples of devices which perform the functions outlined above.

Referring now to the drawings, and in particular to Figs. 1 and 2, two embodiments of a control device are shown, whereby for sake of simplification it is assumed that three and four pressure exerting organs, respectively, are provided.

The control device, as shown in Fig. 1, comprises the electrodes **1** and **2** which are connected with an RC coupled amplifier **3**, preferably of a frenquency of less than 15 cycles per second. The amplifier **3** is connected over a coupling condenser **4** with the grid resistance **5** of a thyratron **7**, which grid reistance **5** is in connection with the electric source **6**. The anode of the thyratron **7** is charged by an electric source **8**, which is in series with the condenser **10** and the relay **9**. A resistance **11** is arranged in parallel with the condenser **10**. The electrodes **1** and **2** are adapted to pick up the tension of the heart action of the patient. The amplified R-wave of the tension of the heart action creates now over the coupling condenser **4** and the grid resistance **5** a tension which changes momentarily into positive the negative grid tension of the thyratron **7** created by the electric source **6**, whereupon the thyratron **7** becomes active, its anode being charged positively by means of the electric source **8**. This brings about the operation of the relay **9**. Upon extinguishing the signal, the condenser **10** takes the thyratron **7** out of operation in known manner, and the resistance **11** restores the original position.

Coupled with the above mentioned circuit is a second closed circuit which includes the electric source **21** and in series therewith the iron-hydrogen resistance **22**, the adjustable resistances **18**, **19** and **20** and the resistance **24**. The adjustable resistances **19** and **20** are connected with contacts **12**, **13**, respectively, which contacts as well as contact **14** are operated by the relay **9** and are in series with the respective condensers **15**, **16** and **17** in their closed positions. In their open position, they connect the condensers **15**, **16** and **17** with the respective resistances **25**, **26** and **27**, preferably of equal size, and the respective relays **28**, **29** and **30**.

During the time in which the relay **9** is in operative position, the contacts **12**, **13** and **14** are closed and the corresponding condensers **15**, **16** and **17** are charged to a value which may be individually controlled by the adjustable resistances **18**, **19** and **20**, respectively. When the relay **9** assumes the inoperative position, the condensers **15**, **16** and **17** are discharged over the resistances **25**, **26** and **27** and the relays **28**, **29** and **30**, respectively. The relays remain in operative position for a longer or shorter time period, depending upon the charge of the condensers **15**, **16** and **17**, and it should be emphasized that the relay **30** cannot become inoperative before the relay **29** assumes the inoperative position and the latter relay **29** not before the relay **28** assumes the inoperative position. The time necessary for operation of these relays **28**, **29** and **30** serves as timely transposition of the controlling physiological value to the individual pressure exerting organs.

As clearly indicated in Fig. 1, the relays 28, 29 and 30 are coupled to a third closed circuit by operating the contacts 31, 32 and 33, respectively thereof. This circuit includes the electric source 37 to which the condensers 34, 35 and 36 are connected in parallel in the closed position of the contacts 31, 32 and 33. However, in the open position of the latter, the condensers 34, 35 and 36 are in series with the adjustable resistances 38, 39 and 40, respectively, and with the respective relays 41, 42 and 43. The contacts 31, 32 and 33 are coordinated to the respective relays 28, 29 and 30, which contacts connect during their operative positions of the corresponding relays 28, 29 and 30 the condensers 34, 35 and 36 with the electric source 37. If, however, the coordinated relays 28, 29 and 30 become inoperative, the corresponding condensers 34, 35 and 36 are discharged in succession over the relays 41, 42 and 43 and the adjustable resistances 38, 39 and 40. The latter determine the time interval necessary for rendering the relays 41, 42 and 43 operative.

The last mentioned circuit is in turn coupled with a fourth circuit by means of the relays 41, 42 and 43 and which includes the electric source 53 connected in series in the closed position of the contacts 44, 45 and 46, which are operated by the relays 41, 42 and 43, respectively, over choice connections 47, 48 and 49 to the electromagnets 50, 51 and 52. The contacts 44, 45 and 46 are closed by the respective relays 41, 42 and 43. The choice connections 47, 48 and 49 serve the purpose to selectively coordinate each of the electromagnets 50, 51 and 52 to each of the contacts 44, 45 and 46, which electromagnets are energized by the electric source 53. The electromagnets 50, 51 and 52 are the means with which the control device controls the pressure device described below. Thus, the adjustable resistances 38, 39 and 40 determine the duration and the choice contacts 47, 48 and 49 determine the succession in the start of the pressure conditions brought about by the electromagnets 50, 51, 52.

The control device described in Fig. 2 operates in accordance with a method which is principally different from that of the device shown in Fig. 1. The device of Fig. 2 comprises a contact-microphone 54 which is connected with an amplifier 55. The latter is connected with the grid of a tube 58 and in parallel with a grid resistance 56. The cathode of the tube 58 is connected with the cathode resistance 59 and the anode of the tube 58 with a relay 60 which is in series with an electric source 57. The relay 60 is adapted to operate the contact 61. The latter is in series with a condenser 62 which is in connection with the electric source 63. The grid resistance 56 is adjustable and has an adjustable contact 297. The electric source 63 is in a closed circuit including the condenser 62, the contact 61 and the coil 64. The latter is one of the coils of a differential relay 65, which includes another coil 66. The differential relay 65 is adapted to operate the contact 67. The coil 66 is in a circuit with the coil 70 of another differential relay 68 which includes another coil 69. The relay 68 is adapted to operate the coordinated contact 71. The contact 67 is part of the tilting oscillator which comprises the electric source 72, the glimmer lamp 73, the resistances 74 and 75, the condenser 76 and the resistance 77 in parallel. Both contacts 67 and 71 are connected over the conduit 78 in parallel to the condensers 79, 80, 81, 82 and 83 which in turn are in parallel with the respective grids of the thyratrons 84, 85, 86, 87 and 88, adapted to operate as a counter, and also include the respective condensers 125, 136, 137 and 138. Since the circuit of the counter is known per se and does not form part of the present invention, it will suffice to catalogue its components. It comprises the electric sources 91 and 92, the cancellation resistance 93, the cathode resistances 94, 95, 96, 97 and 98, the resistances of tension dividers 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, the grid resistances 109, 110, 111, 112, and 113, the shortening condensers 114, 115, 116, 117 and 118, and the anode resistances 119, 120, 121, 122 and 123. The rectifiers 89 and 90 are connected with the coils 66 and 70, respectively, and on the other hand with the condenser 124. The respective cathodes of the tubes 84, 85, 86 and 87 are connected with the respective grids of the thyratrons 128, 135, 139 and 140, which grids are connected with the electric source 127 over the respective grid resistances 126, 144, 145 and 146. The respective anodes of the thyratrons 128, 135, 139 and 140 are connected with the electric source 129, over the adjustable resistances 133, 153, 154 and 155 and over the resistances 131, 150, 151 and 152, and in parallel with the respective condensers 130, 141, 142 and 143. Finally, each of the respective anodes of the thyratrons 128, 135, 139 and 140 are in series with the respective electromagnets, 134, 156, 157 and 158. Condensers 159 and 160 are connected with the tubes 85 and 86, respectively, over the switch 161. There are also switches 163, 164, 165 and 166 provided which are coupled together by means of linkage 162 for connection of the electric source 129 with the respective anodes of thyratrons 128, 135, 139 and 140.

The device disclosed in Fig. 2 operates in such manner that the contact-microphone 54 picks up by example the pulse of the bulbus. The tension of the microphone 54 is amplified in the amplifier 55. The sudden pressure rise occurring at the microphone produces a negative grid signal over the grid resistance 56 and the relay 60 which has been energized originally from the electric source 57 over the tube 58 and its cathode resistance 59 is rendered inoperative and opens the contact 61. Since the condenser 62 had a negative charge from the electric source 63, the grid of the tube 58 receives a negative charge. The relay 60 remains inoperative, as long as the condenser 62 has been discharged over the adjustable contact 297 of the adjustable resistance 56. If, however, the relay 60 is rendered operative, it closes again the contact 61 and the condenser 62 is charged from the electric source 63 over the coil 64. The differential relay 65 is designed in such manner, that the contact 67 coordinated to the relay 65 is forced into one position by current pulses in one of its coils and into the other position by current pulses in the other coil, and then remains in the position until new current pulses bring about a change of its position. The relay 68 is designed in similar manner with the coils 69 and 70 and the coordinated contact 71. The contact 67 changes its position by a current pulse in the coil 64, thereby starting two processes. First, the tilting oscillator is brought into operation and with a frequency derived for instance from the adjusted value of the resistance 75. Second, a positive pulse is sent over the conduit 78 through the condensers 79, 80, 81, 82 and 83 to the grid of the thyratrons 84, 85, 86, 87 and 88 which are put into the circuit as a counter. Before the mentioned positive grid pulse, which rendered the tube 88 operative, which is the only steady position of the device, the tube 84 becomes operative, while the tube 88 becomes inoperative. The detailed method of operation is known per se. The rectifiers 89 and 90 prevent the energization of the coils 66 and 70 over the condenser 124 when the tube 88 is inoperative. By rendering active the tube 84 a positive pulse is impressed upon the grid of the thyratron 128, which grid has a negative pretension from the electric source 127 over the grid resistance 126, whereupon the thyratron 128 becomes active, since it has a positive tension at its anode from the electric source 129. Now the condenser 130 is discharged over the thyratron 128, with the effect, that it is rendered inoperative due to the tension losses at the resistances 131 and 132. The condenser 130 is then charged again over the adjustable resistance 133 and the electromagnet 134. The latter, which again is provided for the control of the pressure device, remains active during a time period which essentially is determined by the value of the condenser 130 and of the adjustable resistance 133. When the above mentioned tiltable generator supplies a new positive tension load to the conduit 78, the tube 85 becomes active, while the tube 84 is ex-

tinguished. This has the effect that the thyratron 135 is energized over the condenser 136, whereupon in its circuit the same operations take place, which have been just described for the circuit of the tube 128. Successively following tension pulses of the tiltable generator render the tubes 86, 87 and 88 successively operative, while simultaneously the previous one is extinguished. The condensers 136, 137, and 138 correspond, thereby, in their function to that of condenser 125, the thyratrons 139 and 140 to that of 128 and 135, the condensers 141, 142 and 143 to that of condenser 130, the resistances 144, 145 and 146 to that of resistance 126, the resistances 147, 148 and 149 to that of 132, the resistances 150, 151 and 152 to that of 131, the adjustable resistances 153, 154 and 155 to that of 133, and the electromagnets 156, 157 and 158 to that of 134. Upon rendering operative the tube 85 an additional effect is achieved over the above described effect. Namely a pulse is impressed on the coil 69 over the condenser 159, brought about operation of the relay 68, whereupon the contact 71 is operated with the effect that the adjustable resistance 74 is put in the circuit as frequency determining element instead of the adjustable resistance 75. Since in the device, shown by example, only four pressure exerting organs are provided, a frequency change at the beginning of the second or of the third period is important. In the latter case, this is achieved over the condenser 160, while the choice is made by means of the switch 161. The switches 163, 164, 165 and 166 permit the choice of direction of movement from the perastaltic wave. It is of course also possible to replace the shown switches by other suitable mechanism (not shown) which periodically, by example is operated after each time interval of five minutes or in accordance with any other time rule. After the tiltable generator has rendered operative the tube 88, the latter impresses a pulse on the coils 66 and 70 over the condenser 124. The contacts 67 and 71 are now operated, whereupon the tiltable oscillator is out of operation, while on the other hand as preparatory step the resistance 75 is put into the circuit, operating as frequency determining element. Now the entire system remains in this condition until the controlling physiological value again supplies a pulse to the feeler 54, whereupon the entire process is repeated.

Each of the Figs. 3 and 4, show, by example three pressure sources. Fig. 3 discloses an embodiment of three pressure sources having above atmospheric pressure. A pump 167, which is built as motor compressor, sucks air thereinto, compresses the same and is fed to a pressure reservoir 168 the pressure of which is maintained at a constant value by means of a pressure regulator 169 which may be built as reduction valve. The pressure reservoir 168 is in communication with the reduction valves 171, 172 and 173 by means of the conduit 170. The opening pressure of the reduction valves 171, 172 and 173 may be regulated by means of the springs 174, 175 and 176, respectively, with corresponding tensioning devices 177, 178 and 179, which are here shown as controlling screws. The tensioning devices 177, 178 and 179 operate in turn on the pressure reservoirs 180, 181 and 182 which constitute the pressure sources.

Fig. 4 is an embodiment of three pressure sources having a pressure below the atmospheric pressure. The motor pump 183 is formed as vacuum pump and the entire arrangement is similar to that of Fig. 3 with the exception of the pressure direction of the springs 184, 185 and 186. Particularly, the pressure reservoirs 187, 188, 189 and 190 are again provided and likewise the reduction valves 191, 192, 193 and 194, as well as the tensioning devices 195, 196 and 197 for the springs 184, 185 and 186 respectively.

Fig. 5 shows, by example, a device which permits the swinging of the pressure value in a pressure reservoir about an adjustable medium value for an adjustable amount and at an adjustable frequency. The pressure reservoir 198 with the entrance conduit 199 and the exit conduit 200 carries a device which substantially comprises two telescoping pipe pieces 201 and 202, one end of the latter being formed as seat for the valve 203. By moving the pipe pieces 201 and 202 relative to each other, it is possible to set the medium pressure value. Axially disposed to the pipe pieces is a pressure spring 204, one end of which engages the valve 203, while its other end engages an eccentrically mounted obtuse cone 205. This cone may be moved along its mounted axis and determines by its position the amount of the pressure variations, since it is rotated by means of the electromotor 206 over the reduction gear 207 upon a shaft 208 which is eccentrically disposed to the axis of the cone 205. By choosing a suitable motor 206, the modulation frequency may be adjusted by means of an adjustable resistance 210 which is in series with the electric source 209.

Fig. 6 shows schematically a device, merely by example, which indicates the cooperation between the control device and the pressure sources for the orthochron formation of the pressure variations in the therapy organs. The device is designed in such manner that a great number of variations may be shown. Thus the pressure varies in one therapy organ between atmospheric pressure and a pressure above the atmosphere, in another between pressure above the atmosphere and pressure below the atmosphere, in a third between pressure below the atmosphere and atmospheric pressure, and in a fourth between two pressures below the atmospheric pressure of different degree. It should be emphasized, however, that in the given example merely for the sake of simple showing each pressure exerting organ is shown only with two pressure sources which are successfully brought into communication, and that there is no difficulty to bring the therapy organs or a part thereof into communication with three or more pressure sources successively and alternately. One particularly important application in practicing this device is an arrangement in which one pressure source only above the atmospheric pressure and the atmospheric pressure as second pressure source is used, and successively a plurality, but at least two therapy organs are brought into communication with the latter. Referring now to Fig. 6, the device comprises a pressure source 211 having a pressure above the atmospheric pressure and the pressure sources 212 and 213, both of which have pressure below the atmospheric pressure. These pressure sources work now over the conduits 214, 215 and 216 on the shifting valves 217, 218, 219 and 220, which are operated by the electromagnets 221, 222, 223 and 224. The latter correspond to the electromagnets 50, 51 and 52 of Fig. 1. The electromagnets 221, 222, 223 and 224 are energized in the manner described above by means of the control device 225. The control device itself is responsive by means of the electrodes 226 and 227 to the tension of the heart action of the patient to be treated, preferably, within an adjustable time interval which ranges between 0 and 0.7 seconds. The shifting valves operate the pressure exerting organs 228, 229, 230 and 231. The latter must be of a construction suitable to the pressure to which they are subjected. The therapy organ 228 is shown as a cuff. It is, however possible to use instead a pelot or another closed hollow body with one opening and at least one pliable face. By example the therapy organ 229 is formed in such manner, that it comprises a rigid cup 232, a pliable membrane 233 for instance of rubber carried by the cup, which structure makes this pressure exerting organ suitable for pressure above as well as below the atmospheric pressure. The pressure exerting organs 230 and 231 are formed as suction bells. The throttle valves 234 and 235, given by example, serve the purpose of controlling the pressure variations. The stopcock 236 serves the same purpose, which stop-cock 236 is operated by the electromagnet 238 over the linkage 237. This arrangement permits by proper design multiple possibilities for the control of the pressure variations.

Fig. 7 shows, again by example, a device in which each

therapy organ is coordinated to a predetermined pressure source and the pressure of which is subjected to timely variation. An arrangement is shown here, how certain functions of the control device may be performed, if necessary by means of electro-mechanical means. For the sake of simplicity two pressure exerting organs only have been chosen. The timely transposition of the control pulse of the controlling physiological value is brought about by using a device similar to that shown in Fig. 2. A contact microphone **239** leads to an amplifier **240**. The latter controls the tube **242** upon appearance of a control pulse due to the tension reduction formed over the grid resistance **241**, so that the relay **244**, which is energized from the electric source **243**, is rendered inoperative. The cathode resistance **245** serves the correct setting of the working point of the tube. When the relay **244** is rendered inoperative, the contact **247** opens, thereby, blocking the control device for possible new occurring disturbance signals. Simultaneously it impresses a great negative tension on the grid of the tube **242** over the contact **247** and over the protective resistance **248**, so that the relay **244** remains inoperative and, in particular, for such time until the condenser **249** is sufficiently discharged over the resistance **248** and over that part of the resistance **241** which is taken up by the slide **250**. If this is achieved, the relay **244** becomes operative again and operates the contact **247**. The condenser **249** is now charged from the electric source **251**, and energizes for a short period of time the electromagnet **252**. The latter closes the contact **253**, thereby energizing the control magnet **254** of the electromagnetic coupling **255** from the electric source **296**. The motor **258**, which is fed from the electric source **256** and the number of revolutions of which is adjustable by means of the adjustable resistance **257**, rotates continuously and turns the control disk **260** by means of the shaft **259**, when the coupling **255** is closed. The control disk **260** has a guide **261** in which the connecting rod **263** is secured by means of a pin **264**, the connecting rod **263** being supported in the bearing **262**, so that the connecting rod **263** determines the position of the piston **265** in the cylinder **266**. A massage cuff **267** is connected to the cylinder **266**. The control disk **260** has also a control slot **268**, which is formed and arranged in such manner that when the disk **260** is turned from its zero position the contact **270** is closed and the contact **271** is opened by means of the linkage **269**. The zero position may be freely chosen, but will be chosen advantageously corresponding to the minimum pressure in cylinder **266**. The contact **270** has the effect that as long and only as long as the disk **260** does not return to its zero position, the coupling **255** remains in coupled position, while the contact **271** maintains the blocking of the control device. A cam **272**, rotatably connected with the disk **260**, is also adjustably rotatable relative to the disk **260** for any desired angle. The cam point **273** controls the contact **275** by means of the linkage **274**, so that the moment of closing the contact may be continuously retarded by rotation of the cam **272**. When the contact **275** is closed the electromagnet **277** operating the coupling **278** is fed with current from the electric source **276** and the control disk **279** is coupled for rotation by means of the shaft **280**. The disk **279** has again a properly formed guide slot **281** in which the rod **284** is guided by means of its pin **282**, the rod **284** being supported in the bearing **283**. The rod **284** determines the position of the disk **285** and, thereby the pressure of the spring **286** of the reduction valve **287** which operated the suction organ **289** over throttle device **288**. The reduction valve **287** is connected on its low pressure side, on the one hand, with a vacuum source **290**, which may be for instance a container with an air pump operated by a motor (not shown), and, on the other hand, with a second reduction valve **291**, the high pressure side of which communicates with the atmosphere. The control disk **279** has likewise a control slot **292** which operates by means of the linkage **293** in such manner that when the disk **279** is turned from its zero position, the contact **294** is closed and the contact **295** is opened. The contact **294** has the effect that as long and only as long as the disk **279** does not return to its zero position, the coupling **278** remains in its operative position, while the contact **295** maintains the blocking of the control device.

While I have disclosed several embodiments of the present invention, it is to be understood, that these embodiments are given by example only and not in a limiting sense, the scope of the invention being determined by the objects and the claims.

I claim:

1. A device for aiding the circulation of the blood comprising a plurality of pressure exerting organs adapted to be applied to predetermined parts of the body to be treated, a control device cooperating with and subjecting the said pressure exerting organs to pressure variations in timely succession, the said control device being responsive to a physiological value dependent upon the heart action of the body to be treated, the said control device including means for adjustably retarding successively said pressure variations in said pressure exerting organs, and pick-up means determining said physiological value.

2. The device, as set forth in claim 1, in which the said pick-up device comprises a pair of electrodes.

3. The device, as set forth in claim 1, in which wherein said means for retarding the pressure variations in the pressure exerting organs responsive to the change of the said physiological value is for an adjustable phase difference between 0 and 0.6 second.

4. The device, as set forth in claim 1, wherein the said control device includes means for reversing the direction of succession of subjecting adjacent pressure exerting organs to pressure variations.

5. The device, as set forth in claim 1, which includes at least two pressure sources for the said pressure exerting organs.

6. The device, as set forth in claim 1, which includes at least two pressure sources, one of the said sources being formed by the atmospheric pressure.

7. The device, as set forth in claim 1, which includes at least two pressure sources which include means for adjusting the pressure in the said sources.

8. The device, as set forth in claim 1, which includes means controlled by the said control device for bringing into communication each of the said pressure exerting organs with at least two pressure sources during each period of the heart action of the body to be treated.

9. The device, as set forth in claim 8, which includes at least one shifting device having means for controlling the pressure variations in the coordinated pressure exerting organs.

10. The device, as set forth in claim 1, in which the said control device includes means for setting in each of said pressure exerting organs at least two consecutive pressure variations during each period of the heart action of the body to be treated within an adjustable time interval which ranges between 0 and 0.7 second.

11. The device, as set forth in claim 1, in which at least one of the said pressure exerting organs comprises a cuff.

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