

Dec. 16, 1969

SHIGEO TAKEUCHI

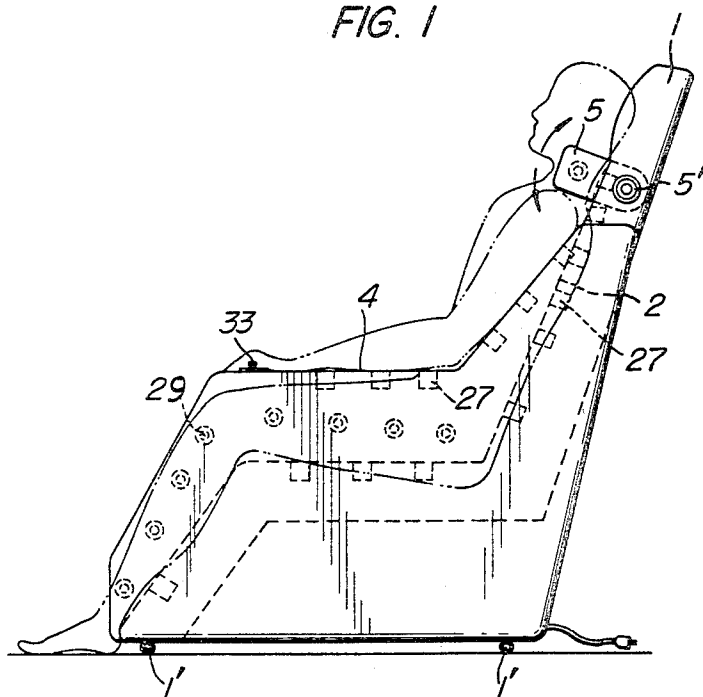
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MASSAGING APPARATUS

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FIG. 1



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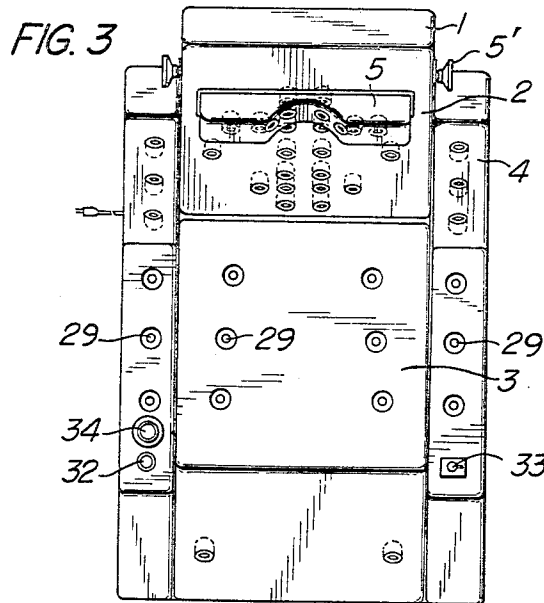
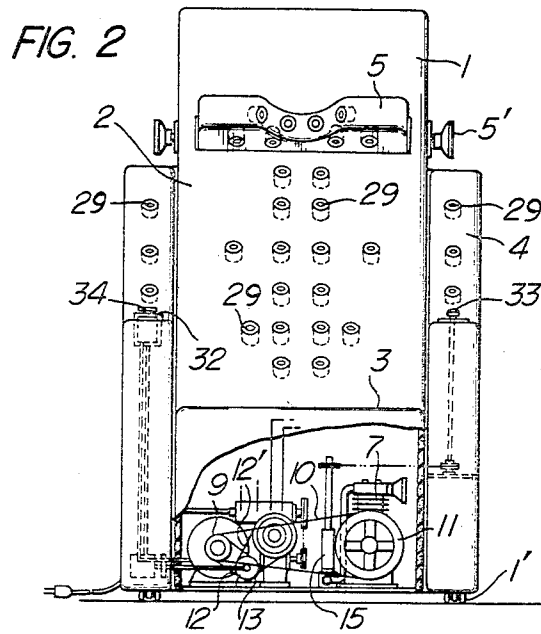
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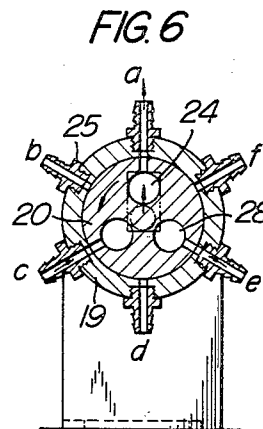
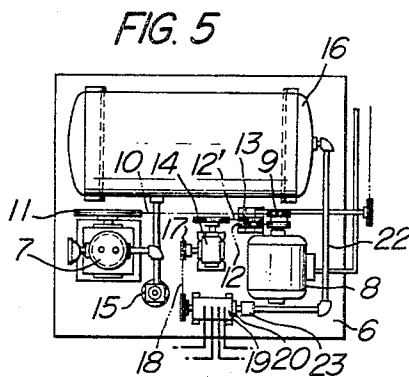
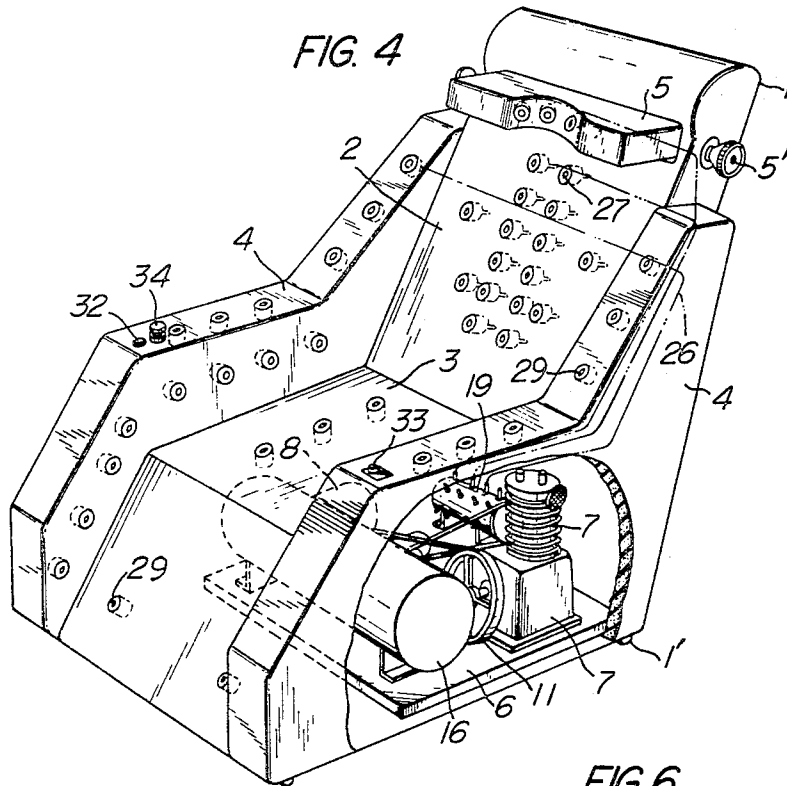
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FIG. 7

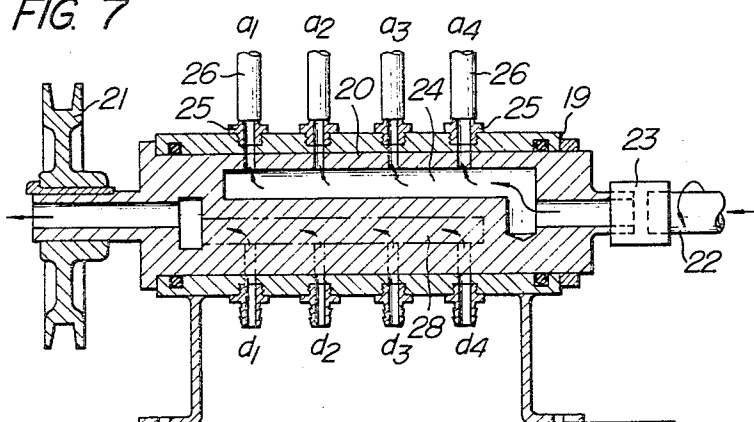
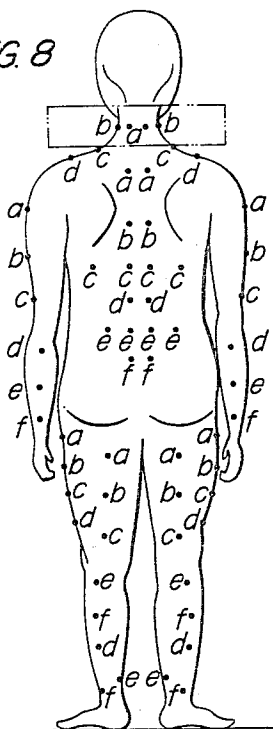


FIG. 8



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FIG. 9A

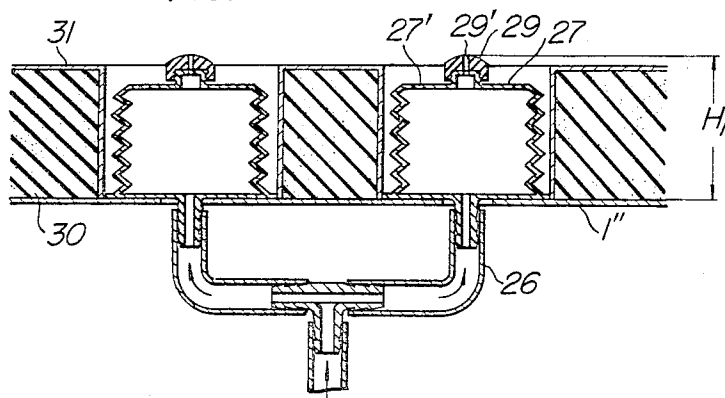


FIG. 9B

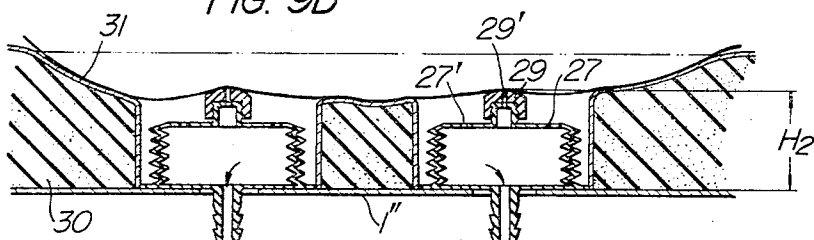
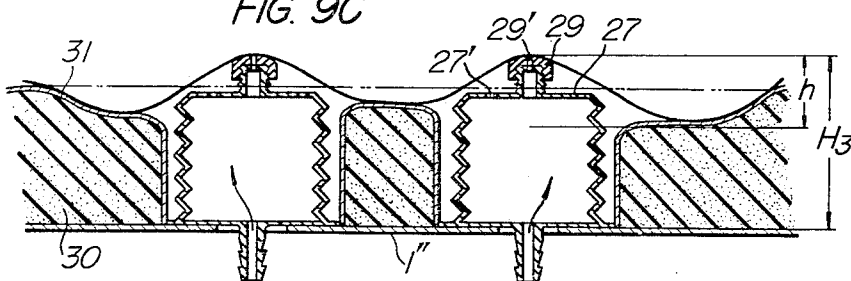


FIG. 9C



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MASSAGING APPARATUS

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U.S. Cl. 128—33

2 Claims

ABSTRACT OF THE DISCLOSURE

A therapeutic spot pressure application apparatus having a cushioned article such as armchair and bed, a fluid pressure generating mechanism within or outside said article, means within said article adapted to be expanded by the fluid pressure from said pressure generating mechanism to thereby apply spot pressure to a number of points on the human body sitting or lying on said article.

The present invention relates to a mechanical spot-pressure application apparatus which is used for therapeutic purpose.

Since olden times, finger-pressure treatment has been widely practiced in Japan as a part of the massage treatment by trained and licensed professional masseurs and masseuses.

With our life environment having been growing into more and more complicated one, month after month, with a kaleidoscopic flurriness in the recent years, and with the rapid development in the means of transportation of late resulting in a remarkable speed-up of vehicles, one cannot live without suffering a great deal of stresses imposed on his body and nerves. The ever-increasing fatigue accumulated in our body in our daily life has led to an acute demand for the development of an ideal spot-pressure application apparatus capable of mechanically providing the effect of finger-pressure treatment given by a well-experienced masseur at low cost.

On the other hand, the charges of masseurs and masseuses have leaped to such a high level, being stimulated by the hike of the livelihood standards of the general public, that a majority of workers such as day laborers and automobile drivers who use their muscles all day long and who, accordingly, acutely need quick recovery from fatigue are left without any handy and economical means available for relaxing their stiff shoulders and for relieving them of their accumulated fatigue. Development of such an effective mechanical spot-pressure application apparatus as can be used in one's home, whenever desired, to relieve him of his fatigue and stiff muscles has been longed for also by elderly and aged persons.

There have been known several types of mechanical massaging apparatuses. However, none of them has ever successfully solved the foregoing requirements, because of their functional incompetency. Moreover, those massaging apparatuses of the prior art have been very little welcome by the users because of their failure in providing treatment in a comfortable manner due to their rigid structures and limited kinds of action and limited controllability.

It is, therefore, an object of the present invention to provide a most reasonable spot-pressure application apparatus designed so as to apply an appropriate amount of external stimulus of pressure force to various spots (hereinafter to be also referred to as treatment points, as required) of human body to facilitate the circulation of the blood and to activate slow metabolism, thereby accelerat-

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ing quick recovery from fatigue and also providing the effect of reducing fat and superfluous flesh of man.

Another object of the present invention is to provide an ideal spot-pressure application apparatus which can impart the effect of finger-pressure treatment to the various spots in the five major regions of human body, namely, the scruff of the neck, back arms, thighs and legs from the upper portion to the lower portion in a manner as if the pressure is applied with the fingers of a professional masseur and which can be freely controlled of the intensity of the spot pressure force and which can impart its user a comfortable and resilient touch of finger pressure unlike the rigid, uncomfortable and limited massaging effect obtained from a conventional massaging apparatus, by the use of fluid pressure (air pressure, oil pressure or the like) system.

The drawings illustrate an example of spot-pressure application apparatus embodying the present invention.

FIG. 1 is a side elevational view of the apparatus;

FIG. 2 is a front view of the apparatus with part removed to show the inner construction;

FIG. 3 is a plan view of the apparatus;

FIG. 4 is a perspective elevation, with part broken away;

FIG. 5 is a plan view of a compressed-air generating mechanism;

FIG. 6 is a cross sectional view, in an enlarged scale, of a valve means for distributing compressed air and contained in the mechanism in FIG. 5;

FIG. 7 is a longitudinal sectional view of the valve means of FIG. 6 in an enlarged scale;

FIG. 8 is a schematic diagram of human body structure indicating various treatment points on the body surface; and

FIG. 9-A, FIG. 9-B and FIG. 9-C illustrate the respective stages of the movement of the expansible spot-pressure means during the operation of the apparatus.

Description of the present invention will now be made on the structure of a preferred embodiment by referring to the drawings.

The apparatus of the present invention comprises an armchair 1 having a back-leaning section 2, a seating section 3, an arm-resting section 4 and a neck-resting section 5 and also an air-pressure generating means 6 contained in the space under the seating section 3.

The armchair 1 is provided with casters 1' at four corners of the bottom face thereof so that the armchair 1 may be freely transferred to a desired place in a room or from one room to another. The neck-resting section 5 is provided with an arrangement such that the neck-receiving member of the neck-resting section 5 may be pivotally swung about the axis of a handle 5' as the result of the forward and backward rotation of the threaded shaft of the handle 5' so that the position of the neck-resting section 5 may be adjusted to the height of the upper half of the individual person sitting on the armchair 1.

The air-pressure generating means 6 provided in the lower portion of the armchair 1 is equipped with an air compressor 7 and a motor 8 for driving it. This motor 8 has a two-step V-pulley 9 which is secured to the shaft of said motor. The driving power of the motor 8 is transmitted from one of the steps of said V-pulley 9 to the V-pulley 11 of the air compressor 7 by means of a V-belt 10, and also transmitted from the other of the steps of the pulley 9 to a speed change gear 13 by means of a V-belt 12. Further from said speed change gear 13 the driving power is transmitted to a speed reduction gear 14 by means of a V-belt 12'.

The air after being compressed by the air compressor 7 is transferred, through a pipe, into a pressure tank 16 to be accumulated therein, with an unloader 15 being

provided at one portion of the pipe. This unloader 15 is adapted to automatically discharge excess air from said pipe whenever the pressure of the compressed air accumulated in the tank exceeds a predetermined level so that an excessive compression of air in the tank is prevented.

Reference numeral 19 represents a valve means for distributing compressed air having, rotatably mounted therein through O-rings, a rotary member 20 having generally cylindrical shape and provided with one air-inlet bore 24 extending from one end face of said rotary member 20 for a distance thereinto in parallel with the longitudinal axis of said rotary member and also provided with two air-exhaust bores 28 extending from the other end face of said rotary member 20 for a distance thereinto in parallel with the longitudinal axis of said rotary member. An inlet member defining the mouth of the air-inlet bore 24 is provided on the one end face of said rotary member 20. A pipe 22 extending from the pressure tank 16 is connected, by means of a rotary joint 23, to said inlet member. An outlet member defining the mouths of said air-exhaust bores 28 is provided on the other end face of the rotary member 20. A V-pulley 21 is secured to said outlet member and is connected with said V-pulley 21 by means of a V-belt 18 running therebetween.

Six rows of holes each consisting of four spaced holes are formed radially through the peripheral outer wall of said air-distribution valve means 19 in such manner that each two adjacent rows of holes are disposed on said peripheral outer wall at an interval of 60 degrees from each other and relative to the longitudinal central axis of the cylinder of said valve means. A joint member 25 is provided for each hole so as to form a total of twenty-four ports, namely, a^1 to a^4 , b^1 to b^4 , c^1 to c^4 , d^1 to d^4 , e^1 to e^4 , and f^1 to f^4 . These ports are connected by means of connecting hoses 26 to a plurality of longitudinally expandable means 27 contained in the aforesaid sections of the armchair 1. As will be understood from FIG. 9, the longitudinally expandable means 27 are accommodated in the openings formed, in an appropriate manner, through resilient members 30 made of foamed synthetic rubber or synthetic resin which are covered by a cover 31 made of a leather or a cloth and constituting the faces of the respective sections of the armchair 1. Said longitudinally expandable means 27 are anchored by means of screws to steel frame member 1" secured to the bottom or back faces of said resilient members 30. Each of the longitudinally expandable means 27 is provided, at its upper end, with a spot-pressure application head 29 made of a vulcanized rubber.

Referential numerals 32 and 34 represent a remote control switch and a speed-change handle respectively which are mounted on a right elbow rest 4 of the chair 1 and numeral 33 indicates a pressure-adjustment handle mounted on a left elbow rest of the chair. The spot-pressure application heads 29 of the longitudinally expandable means 27 are so arranged that they project slightly beyond the face of the cover 31 at normal times before the apparatus is put into operation.

Description will next be directed to the operation of the apparatus. First, the electric cord extending from the apparatus is connected to a plug socket of the power source, and thereafter the user sits on the armchair 1 in a manner as shown in FIG. 1. Then, the user turns on the remote-control switch 32. Whereupon, the motor 8 is connected to the power source and starts rotation, driving the air compressor 7 by means of the V-belt 10, resulting in that the compressed air is supplied to the pressure tank 16. On the other hand, the rotation of the motor 8 is transmitted, via another V-belt 12, to the speed change gear 13, and thence to the speed reduction gear 14 through still another V-belt 12'. The rotation which has been reduced of its speed by the speed reduction gear 14 is then transmitted, via a V-belt 18, to the rotary member 20 of the air-distribution valve means 19

so as to rotate said rotary member 20 at a low speed (which is approximately in the range of from 20 to 40 r.p.m.). The compressed air coming from the pressure tank 16 is supplied to the respective longitudinally expandable means 27 first through the group of ports $a^1 \dots a^4$. The air inlet bore 24 is then progressively brought into communication successively with the remaining groups of ports, namely, $b^1 \dots b^4$, $c^1 \dots c^4$, $d^1 \dots d^4$, $e^1 \dots e^4$ and $f^1 \dots f^4$, and thus the compressed air is successively distributed to the longitudinally expandable means 27 in each section of the armchair 1. The compressed air which has been supplied to the longitudinally expandable means 27 which communicates with the ports of the respective groups is then discharged outside the apparatus when said ports are brought into communication with the air-exhaust bores 28 after a predetermined lapse of time from the time of the termination of their communication with the air-inlet bore 24 due to the progressive rotation of the rotary member 20. Thereafter, the air-inlet bore 24 is again brought into communication with the ports due to the progressive rotation of the rotary member 20, allowing the compressed air to be supplied to the longitudinally expandable member 27, again. In the manner as has been described above, the continued rotation of the rotary member 20 causes the longitudinally expandable means 27 to repeat longitudinal expansion due to the supply of compressed air and contraction due to the exhaustion of the supplied air at predetermined cycles, resulting in cycled application and release of spot pressures to and from the body of the person sitting on the armchair 1.

Description will hereunder be directed to the manner in which spot pressures are applied to the body of the user as the result of the expanding and contracting actions of the longitudinally expandable means 27 which are effected according to the above-described procedure, by referring to FIG. 9. FIG. 9-A shows the longitudinally expandable means 27 in their normal state prior to being actuated, each of the means being of a height of H_1 . When the body of the user is seated on the armchair 1, the longitudinally expandable means 27 are compressed, due to the weight of the body of the sitting person imposed upon the means 27, to assume the state of FIG. 9-B having a height indicated by H_2 , and the surrounding resilient members 30 are also compressed to a state which is also shown in FIG. 9-B. With the subsequent supply of the compressed air into the longitudinally expandable means 27 through the connection hose 26, said means 27 are caused to expand longitudinally so as to assume a height indicated by H_3 in FIG. 9-C with the result that the spot-pressure heads 29 of the longitudinally expandable means 27 exert a pressure against the body of the sitting person by a distance of h . The upper faces of the longitudinally expandable cylinders 27 and the spot-pressure heads 29 thereof are provided with appropriate slits 27' and 29', respectively, so as to aid the contraction of the longitudinally expandable cylinders 27.

As is seen in FIG. 8, there are scattered a total of about sixty longitudinally expandable means 27, which correspond to the tips of the fingers of a masseur, throughout the entire faces of the armchair 1 in accordance with the locations of the so-called treatment points which are superficially scattered on the human body including the "hollow of the nape" on the neck. Namely, there are eight of them in the zone covering the area from the neck to the shoulders; sixteen of them in the zone covering the area from the back to the behind of stomach; twelve of them in the zones of both arms; and twenty-four of them in the zones covering the thighs and the legs. It is needless to say that the number of these longitudinally expandable means 27 may be increased or decreased so as to meet the desire of the users.

As has been described in detail in the above, the apparatus of the present invention is operated in the following simple procedure. Specifically, the user, after seating on

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the armchair, is required only to manipulate the switch 32 located on the right arm of the chair, whereupon the apparatus is actuated to effect the spot-pressure actions which begin with the upper portion of the scruff of the neck and downwardly to the shoulders; from the upper portion of the back downwardly to the region of the behind of stomach; from the upper arms to the lower arms, and so on, as if the user is receiving a finger-pressure treatment from a well-trained masseur, and the spot-pressure treatment is repeated in cycles continuously for a desired length of time until the user turns off the switch 32. In the event that the user feels that the force of the spot-pressure actions exerted by the longitudinally expandable means 27 is weak, it is only necessary that the user turns the pressure-adjustment handle 33 toward the side marked "strong". This manipulation of the handle 33 tightens the spring of the unloader 15 connected to said handle 33, which, in turn, will serve to elevate the pressure of the compressed air in the pressure tank 16, and accordingly, the internal pressure of the longitudinally expandable means 27 which is imparted by the supplied compressed air will be elevated, resulting in an increase in the force of the spot-pressure applied to the body of the user. In case it is desired to weaken the spot-pressure force, it is only necessary for the user to manipulate said pressure-adjustment handle 33 in the reverse way. Furthermore, in case it is desired to increase the speed or the cycle of the spot-pressure actions of the means 27, this end is achieved by turning the speed-change handle 34 in the desired direction, whereupon the speed-change ratio of the speed-change gear 13 changes to alter the rotational speed of the rotary member 20, and thus the expansion-contraction speed of the longitudinally expandable means 27 can be freely changed as desired. By an appropriately combined manipulation, as described, of the speed-change handle 34 and the pressure-adjustment handle 33, the user can obtain a desired sensation of spot-pressure treatment in a manner required by the user such as (a) strong but slow, (b) strong and quick, (c) weak and slow, and (d) weak but quick.

As has been described, the apparatus of the present invention provides resilient and rhythmical spot-pressure treatment in an effective manner substantially throughout the required areas of the muscles, and enables the user to be relieved of his fatigue during a limited period of time while the user is relaxing on the chair. The apparatus of the present invention also provides an outstanding advantage that a greater range of spot-pressure treatment effect can be obtained by changing the material with which the spot-pressure heads are made and by changing their shape as required. The present invention has further advantages that its entire mechanism is relatively simple in structure and arrangement, and that it can be applied not only to such armchair as has been described but also to various kinds of articles such as beds, mattresses and cushions by incorporating appropriate numbers of the longitudinally expandable means therein and also that the apparatus of the present invention can be modified to comply with any posture of the user as required so as to meet the individual purposes. Furthermore, in the event that it is desired to give spot-pressure treatment simultaneously to a number of persons in an institution such as a large factory, as is called "industrial massage," the invention is advantageous in that it can utilize the compressed air which is routinely used in the factory so that a large number of spot-pressure application apparatuses in the form of, for example, armchair and containing no air compressors may be installed side-by-side relations and in rows. Thus, the present invention which utilizes fluid pressure can be termed as a most reasonable and ideal invention.

In the embodiment illustrated, the longitudinally expandable means 27 consist of bellows-type expandable cylinders. It is to be understood, however, that the cylinders 27 may be substituted by operative cylinders of other type utilizing fluid pressure such as air pressure and oil pressure, or they may consist of expandable air-tight bags

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made of a material such as rubber and vinyl. It is further to be understood that various modifications of the invention may be made by those skilled in the art without departing from the spirit of the present invention.

I claim:

1. A therapeutic apparatus for applying spot pressure message resembling finger massage to a patient body comprising means having a substantially rigid base and a layer of a resilient cushioning material having through-holes therein on the rigid base for resiliently receiving and supporting thereon a patient, said cushioning layer being compressible from its normal thickness under unloaded state to substantially reduced thickness under loaded state, a plurality of axially expandable bellows members extending through said through-holes in said cushioning layer and having their bottom faces secured to said rigid base, said bellows members having on their faces secured to said rigid base, said bellows members having on their free top faces spot pressure application heads each having a substantially smaller cross-sectional area, each of said bellows members being normally of such an axial dimension that the spot pressure application head is positioned substantially at the same level as the top surface of the cushioning layer under unloaded state, each bellows member being compressible by the body of the patient to such an extent that the spot pressure application head is positioned substantially at the same level as the top surface of the cushioning layer under loaded state, there being provided such bellows members of such number and arrangement that the spot pressure application heads of the bellows members are disposed in opposite relationship with at least a part of a total of so-called treatment points scattered substantially throughout the surface of a human body excepting the head and the front face of the body, means for generating fluid pressure, and means being always in communication with said pressure generating means and being connected to said bellows members through fluid passage lines, the lastly-mentioned means distributing the fluid pressure to said bellows members in such a manner that each of said bellows members is intermittently and cyclically supplied with the fluid pressure whereby, upon supply of the fluid pressure, said bellows members expand axially beyond their normal dimensions to cause their spot pressure application heads to urge substantially perpendicularly against the surface of the patient body at the corresponding treatment points.

2. A therapeutic apparatus as claimed in claim 1, in which said fluid pressure distributing means comprise an outer member having a cylindrical inner surface and an inner rotary member having a cylindrical outer peripheral surface in fluid-tight but sliding engagement with said cylindrical inner surface of said outer member, said inner member being adapted to be rotated with respect to said outer member at a predetermined speed, said outer member having therein a plurality of circumferentially spaced rows of ports each of which rows consists of a plurality of axially spaced ports extending through the wall of said outer member, said ports being connected to said bellows members through fluid passage lines such as hoses and pipes, said inner member having therein a fluid distributing passage extending axially therewithin and having a fluid inlet at one end of said inner member which is always in communication with said fluid pressure generating means, said fluid distributing passage having fluid supplying orifices extending radially through the material of said inner member between said fluid distributing passage and the outer peripheral surface of said member, said orifices being identical in number and axial arrangement with said ports in each of said rows in said outer member, said inner member also having therein at least one fluid discharge passage axially extending within said inner member and opening at the other end thereof, said discharge passage having fluid discharge orifices extending radially through the material of said

inner member between the discharge passage and the outer peripheral surface of said inner member, said fluid discharge orifices being identical in number and axial arrangement with said ports in each of said rows in said outer member, whereby rotation of said inner member with respect to said outer member successively brings said fluid supplying orifices of said fluid distributing passage into register with the ports in successive rows in said outer member to permit the fluid under pressure to flow from said fluid distributing passage through said fluid supplying orifices to said ports and thus to the corresponding bellows members, the fluid discharge passage in said inner member following said fluid distributing passage with a predetermined phase maintained therebetween to successively bring said fluid discharge orifices into communication with the lastly fluid-supplied bellows members for allow-

ing the fluid under pressure therewithin to be discharged through said fluid discharge orifices and said fluid discharge passage in said inner member.

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L. W. TRAPP, Primary Examiner

U.S. Cl. X.R.

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