SURGE-PRODUCING SCALP-TREATING DEVICE

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My invention relates to a device for treating the scalp and is concerned with the application of controlled temperatures to the scalp accompanied by pulsatile massage. The primary purpose of my invention, therefore, is to provide a single, compact device which will accomplish this result.

Another object is to provide means whereby oil and the like may be applied to the user's scalp during such massaging operation without the necessity of removing the device from the head of the user.

A further object is to provide a single control device which will vary the temperature to be applied to the scalp as well as the frequency of the massaging pulsations. Ancillary objects will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a pictorial view of the head of a user of my device, showing elements of an embodiment of my invention in positions of use;

Fig. 2 is a view similar to Fig. 1, showing the helmet of my invention in place on the user's head, ready for use;

Fig. 3 is an enlarged view of the said embodiment of my invention in use position, the control unit forming a part of the invention being illustrated somewhat diagrammatically, and parts being shown in section;

Fig. 4 is a plan view of one of the elements of my control unit taken substantially on line 4—4 of Fig. 3 looking in the direction of the arrows;

Fig. 5 is a plan view of another of the elements of my control unit taken substantially on line 5—5 of Fig. 3 looking in the direction of the arrows;

Fig. 6 is a sectional view through said control unit taken substantially on line 6—6 of Fig. 3 looking in the direction of the arrows;

Fig. 7 is an end elevation of a part of my control unit as viewed from the right of Fig. 3; and

Fig. 8 is a longitudinal sectional view through another of the elements of my control unit taken substantially on line 8—8 of Fig. 6 looking in the direction of the arrows.

Referring more particularly to the drawings, in Figs. 1 and 2 I have shown the manner of placing my device upon the head of the user, preparatory to use.

As is most clearly shown in Fig. 3, I have provided a helmet 10, of relatively thin, rigid material. Nested within said helmet is a concavo-convex, flexible bladder 11 comprising a concave wall 12 and a convex wall 13, said walls being brought into sealing engagement in a rim 14. Preferably, but not necessarily, a pair of cushions 15 and 16 of soft, resilient material are placed between the bladder rim 14 and helmet rim 17, said cushions being diametrically disposed near the front and back of the helmet rim 11 to act as rests for helmet 10 upon the user's head prior to commencement of the treatment. Throughout the remainder of the rim portions, bladder rim 14 is fixed to helmet rim 17 in any suitable manner, as by the use of an adhesive, or the like.

Spaced about the periphery of helmet 10 between the rim 17 and the apex 18 thereof, are a series of ports 19 penetrating the helmet wall. A duct helmet 20 passes through each such port and sealingly engages a registering port 21 in the convex bladder wall 13. Substantially rigid conduit means 22 connects each duct element 20 to a common junction fitting 23, according to the preferred embodiment of my invention; though I do not consider it essential that the conduits 22 shall be rigid.

Near the apex 18 of the helmet 10 in an aperture 24 through the wall of helmet 10. The walls of bladder 11 are perforated as at 25 to register with aperture 24, and the rims of the bladder perforations are brought into sealing engagement by any suitable means. As shown, a grommet element 26 of any desired construction is passed through aperture 24 and perforations 25 and fixedly secures the rims of perforations 25 to the rim of aperture 24. In my illustrated embodiment, I have shown this grommet element 26 as comprising a headed stud member 27, having an axial bore 28 therethrough, the head portion thereof bearing against the rim of aperture 24. A nut 29 is threadedly received on the end of member 27 opposite the head portion, to clamp the rims of perforations 25 to the rim of aperture 24. It will be seen that this arrangement provides a means for applying oils and the like to the scalp of the user of my device during treatment, without the necessity of removing the helmet from the user's head.

At this point, I should bring out the fact that the bladder 11 is preferably formed of any of a number of flexible materials which are both water resistant and impervious to oil.
From the above-described structure, it will be seen that the placing of the grommet element 25 at the apex of helmet 10 not only serves as a means to facilitate application of oils to the user’s scalp, but also renders the cavity 30, between the duct walls 12 and 13, annular. Since the duct elements 20 are spaced radially about cavity 30, as clearly shown in Figs. 2 and 3, and since bladder wall 13 is held against outward distortion by the rigid helmet 10, fluid under pressure, entering cavity 30, will exert a “clamping” action on the head of a user disposed within the bounds of the annular cavity 30. Now, if this fluid pressure is released and the fluid is allowed to escape from cavity 30, the “clamping” action will diminish. Obviously, relative rapid changes of pressure will produce the desired pulsating massaging action.

To increase the effectiveness of the resultant massaging action, as described above, I have provided pad means of special configuration to be placed between the concave wall 12 of bladder 11 and the user’s scalp 35. This means comprises two allochirally related pads 31 and 32, most clearly shown in Fig. 1. Each pad comprises a base portion 33 and a series of digital projections 34 along one edge thereof. The pads are placed on opposite sides of the base portion lying along the temple part of the head and the digital projections converging toward the longitudinal median plane thereof. Thus, as the bladder is inflated and deflated, the digital projections will provide a massaging effect very similar to that provided by the human hands.

In addition to the massaging action referred to, I have found that additional benefits may be had by applying varying temperatures to the scalp during the massaging thereof. This aids in the stimulation of blood flow to the scalp and also activates the pores therein, to facilitate the absorption of oils and the like. To this end, I have provided a relatively simple control device which will control both the pressure and temperature changes in bladder 14.

Referring to Figs. 3 to 8, a base block 35 has provided therein a pair of inlet ports 38 and 39. One of said ports is connected through a flexible conduit 38 to a source of hot water under pressure and the other of said ports is connected through a similar conduit 39 to a source of cold water under pressure. Valve means, such as a rotary valve 40, is mounted in a suitable seat 40’ in block 35 and is traversed by a pair of angularly related, axially spaced passages 41 and 42. In one position of valve 40, passage 41 will register with port 37 while port 39 will be blocked; and when valve 40 is turned through 90°, passage 42 will register with port 39 while port 37 will be blocked. Thus, it will be obvious that liquid may flow alternatively from ports 38 and 39 to a common passage 43 in block 35. A pin 44 projects axially from valve 40 outside block 35 to provide means whereby valve 40 may be rotated.

Block 35 also has provided therein an outlet port 45 and a waste port 46. A flexible conduit 47 connects port 45 to the common junction fitting 23; and a flexible conduit 48 may lead from waste port 46.

Valve means, such as a second rotary valve 49, is mounted in a seat 50 in block 35 and has therein an axial bore 51, a passage 52 traversing bore 51, another passage 53 therein intersecting and terminating in the junction of passage 52 and bore 51, and still another passage 54 therein intersecting and terminating in bore 51. In one position of valve 49, passage 52 will register with the common passage 43 and port 45 while port 46 will be blocked; and when valve 49 is turned through 90° in a clockwise direction as viewed in Fig. 8, passage 53 will register with port 45 and passage 54 will register with port 46 while common passage 43 will be blocked. Thus, it will be seen that, in one position of valve 49, liquid may flow from the common passage 42 to port 45 by way of passage 43, while in the second position of said valve, liquid may flow from port 45 to port 46 by way of passage 54, bore 51 and passage 54. A pin 55 projects axially from valve 49, outside block 35, to provide means whereby valve 49 may be rotated.

Obviously, the valves 40 and 49 could be manipulated manually to obtain the desired temperature and pressure control. In some instances this might be desirable, but it has been found more effective to provide automatic means for this purpose. To this end, I have provided a pair of frames 56 to drive a pair of cam elements 71 and 72. Each cam has associated therewith an electric switch 73 having a cam follower button 74 engaging the peripheral surface of one of the cams. One of switches 73 controls current flow to solenoid 55 and the other switch 73 controls current flow to solenoid 51. Each position of each button 74 will, of course, open and close its switch 73.

I presently believe the most advantageous results will be obtained by rapid pulsation of liquid pressures in bladder 11. To this end, I provide a series of closely spaced teeth 74 in the peripheral edge of cam 71. This results in relatively rapid, intermittent energization of solenoid 51 and, thus, an equal rapidly oscillating flow of valve 49, resulting in intermittent flow of liquid through valve passage 52 from common passage 43 to outlet port 45 and, hence, to bladder 11 by way of the flexible conduit 47.

From an inspection of Fig. 6, it will be seen that when valve 49 is in the position to block flow from the common passage 43 to bladder 11, it will, at that time, allow liquid to drain from the bladder through flexible conduit 47, port 45, passage 53, bore 51, passage 54, waste port 45, and flexible conduit 48, to waste.

I presently believe also that the most advantageous results will be obtained by relatively rapid changes of temperature in bladder 11 from hot to cold and then a sustained period of hot temperature. To this end I provide a series of relat-
tively closely spaced high and low surfaces about substantially half of the periphery of cam 12, and a low surface about the remaining portion thereof. Thus, it will be seen that during the rotation of cam 12 there will be a relatively rapid change of liquid temperatures from hot to cold followed by a relatively long period of hot temperature. Obviously, the operation of any of said periods of hot or cold temperatures may be changed by changing the shape of cam 12.

In order that excessive pressures cannot be applied to the scalp, I have provided a pressure-relief valve 17 connected to bladder 11 through flexible tubing connecting said bladder to sources of hot and cold liquid under pressure.

2. A scalp massage device comprising a helmet of relatively thin, rigid material having a plurality of ports therein, a concavo-convex flexible bladder fixed near the rim thereof to the rim of said helmet and having a like plurality of ports in the convex wall thereof registering respectively with said helmet ports, and individual conduit means communicating with each of said bladder ports, said individual conduit means converging outside said helmet in a single flexible conduit for connecting said bladder to sources of hot and cold liquid under pressure.

3. The device of claim 1 including a liquid flow-control device connected with said single conduit, said device including valve means and automatic drive means thereof, said valve means, when actuated by said drive means, intermittently passing and blocking flow of liquid therethrough to said bladder and permitting the liquid in said bladder to drain from said bladder through said flow control device during the period of blocking.

4. The device of claim 1 including a liquid flow-control device connected with said single conduit, said device including valve means and automatic drive means therefor, said valve means, when actuated by said drive means, intermittently passing and blocking flow of alternatively hot and cold liquid therethrough to said bladder and permitting the liquid in said bladder to drain from said bladder through said flow control device during the period of blocking.

5. The device of claim 1 including a pair of allochirally related pads for interposition between the concave wall of said bladder and the user's scalp, each pad having a base portion substantially registrable with a lateral edge of said bladder and a series of digits projecting toward the median plane extending from front to rear of said bladder.

6. The device of claim 1 including pressure-relief valve means in said bladder.

7. The device of claim 1 in which said helmet has an aperture therethrough near the apex thereof, the concave and convex walls of said bladder each having a perforation therein registering with said helmet aperture, the rims of said bladder perforations being brought into sealing engagement, thereby rendering the cavity within said bladder substantially annular.

8. The device of claim 7 including a grommet through said helmet aperture and said bladder perforations clamping the rim of said bladder perforations tightly against the rim of said helmet aperture.

9. The device of claim 1 in which said bladder is formed of water resistant material impervious to oil.

10. A fluid control device comprising a base block having a pair of inlet ports, an outlet port, a waste port, and a common passage, a pair of manipulable valve means carried in said block, one of said valve means controlling said inlet ports for alternate flow from one or the other of said ports to said common passage, and the other of said valve means controlling said outlet port and said waste port for flow therefrom through alternately, either from said common passage to said outlet port or from said outlet port to said waste port, and means for manipulating each of said valve means.

11. The device of claim 10 in which said manipulating means comprises a motor, a pair of cams rotatably driven by said motor, a pair of switches each having a cam follower engaging one of said cams for actuation thereof, and a pair of solenoids each electrically connected to one of said switches and each having its armature drivingly engaging one of a pair of mechanisms for manipulating one of said valve means.

12. The device of claim 11 in which each of said mechanisms comprises a lever pivoted between its ends, one end thereof being drivingly connected to one of said solenoid armatures for oscillation thereby about its pivotal axis, a gear segment carried on the other end of said lever, and a pinion gear carried by one of said valve means meshing with said gear segment.

13. A scalp massage device comprising a helmet of relatively thin, rigid material, a concavo-convex, flexible bladder fixed near the rim thereof to the rim of said helmet, and fixed thereto near the rim thereof, a series of ducts through said helmet wall communicating with the cavity within said bladder, conduit means connecting said series of ducts to a common junction fitting, a fluid flow control device comprising a base block having a pair of inlet ports, an outlet port and a waste port therein, valve means carried in said base block controlling said inlet ports for alternate flow from one or the other of said inlet ports, through said valve means, to a common passage in said base block, a second valve means carried in said base block controlling said outlet port and said waste port for alternate flow either from said common passage through said valve means to said outlet port or from said outlet port through said valve means to said waste port; a relatively flexible conduit connected between said outlet port and said common junction fitting, means for connecting a source of cold liquid with one of said inlet ports, means for connecting a source of hot liquid with the other of said inlet ports, material, a concavo-convex flexible bladder fixed to said helmet, and pressure-relief valve means in said bladder.
with said common passage when said valve is rotated to another position, said second valve means comprising a second rotary valve having an axial bore therein, a first passage through said valve traversing said bore, a second passage into said valve intersecting and terminating in said bore, and a third passage into said valve intersecting and terminating in said bore, said first passage being registrable with said common passage and with said outlet port when said second valve is in one position, and said second and third passages being registrable respectively with said outlet port and with said waste port, when said second valve is rotated to another position.

15. The device of claim 13 in which said control means comprises a motor, a pair of cams rotatably driven by said motor, a pair of switches, each having a cam follower engaging one of said cams for actuation thereby, and a pair of solenoids each electrically connected to one of said switches and each having its armature drivingly engaging one of a pair of mechanisms for manipulating one of said valve means, each such mechanism comprising a lever pivoted between its ends, one end thereof being drivingly connected to one of said solenoid armatures for oscillation thereby about its pivotal axis, a gear segment carried on the other end of said lever, and a pinion gear carried by one of said valve means meshing with said gear segment.

16. The device of claim 13 including pressure-relief valve means in said bladder.

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References Cited in the file of this patent

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