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VIBRATING MASSAGE DEVICE WITH WOBBLING MAGNET

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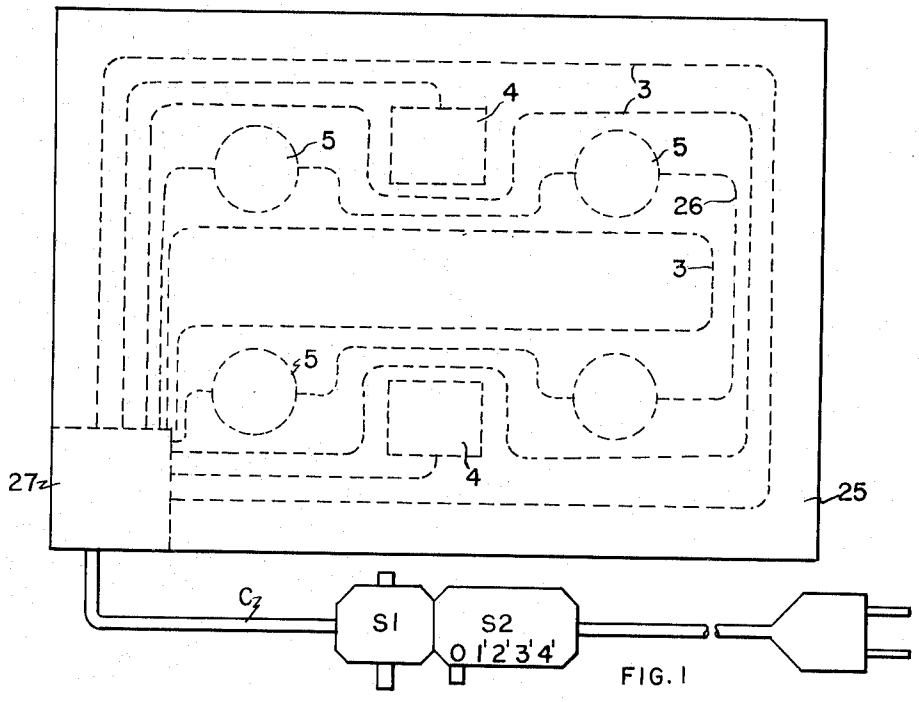

FIG. 1

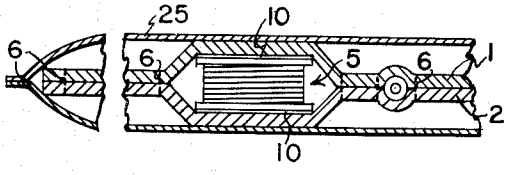

FIG. 2

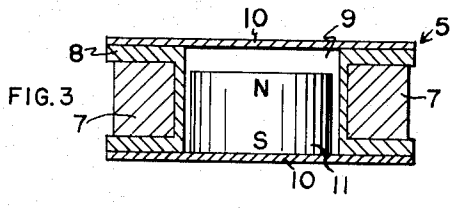

FIG. 3

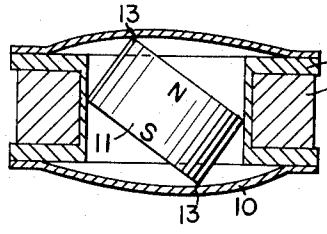

FIG. 3A

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VIBRATING MASSAGE DEVICE WITH WOBBLING MAGNET

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This invention relates to therapeutic devices and especially relates to body massage devices. In the preferred form of the invention, massage devices are utilized in electric heating pads.

The known heating and massage devices have various disadvantages. As a rule, the heating elements are located in a rigid casing which also accommodates the massage vibration generators, or the heating elements are arranged in front of the vibrating elements casing the massage motion. In both cases, the heating elements, which are under a high thermal strain, are subjected to massage motion so that their service life is shortened and their reliability is impaired. Also, the conventional devices do not permit a minimum thickness of the total pad and do not have the degree of flexibility that is desirable. Furthermore, the known devices usually have a massage action on only one side of the pad.

The present invention can provide a safe, essentially flat but flexible, inexpensive heating and massage pad. The inventive pad can be designed for application to a large surface area while still being of light weight.

In one form of the invention, two soft felt-like, or fabric, cover sheets enclose and anchor the heating elements, their thermal switches and the electro-magnetic massage motion units, in side-by-side relationship in the plane of the pad.

The massage motion units generate mechanical motion impulses in a direction which is essentially perpendicular to the plane of the pad. The motion units can be designed to generate motion impulses independent of the weight of the contacting limb or body of the user. This is particularly desirable for a heating device since for example, a sick person does not have to pay attention to the particular position of the pad.

In one embodiment of the invention, the electro-mechanical massage units include a preferably iron-free flat coil wound on a tubular frame defining a bore, said frame having flanges at each end of the bore. The ends of the bore can be covered by vibratable disks or diaphragms, which diaphragms can be perforated or neck-like if desired, and said diaphragms can be disposed on the exterior sides of said flanges. In the bore, that is, interior of the coil, there is loosely disposed a high performance permanent magnet, which in its stationary position, has its respective poles facing the two sides of the pad. This magnet is adapted to make a see-saw, wobbling motion when an alternating current is passed through the coil. The extent of these vibratory see-saw wobbling or reeling motions is limited by contact with said diaphragms so that the magnet can only go through a rotary angle of less than 180°. This see-saw action of the magnet has the advantage that it produces a tapping or patting action on the diaphragms which is extremely pleasant to the user and which intensifies the heating action due to the heating elements. Moreover, the specific points or places at which the patting takes place vary constantly as the magnet wobbles. The frequency of the patting motion can be lower than the frequency of the alternating current, which is very advantageous. The frame or main body of the coils supports the adjacent body pressure of the user so that the mobile permanent magnet can move absolutely

freely within the bore and be independent of the weight exerted on the pad. Furthermore, the motion of each magnet is restricted and kept away from the portion of the pad containing the heating elements so that the pad is safer to operate.

The diaphragms, which otherwise are employed, can be dispensed with by using the cover sheets to serve the function of the diaphragm in addition to their regular heat-distributing and padding function.

By providing a rigid closure on one side of the coils, the tapping or patting action can be restricted to the other side. This can be very advantageous if the massage device is in the form of a hand implement, or for example, if the massage unit is to be provided with a handle. Thus, with a handle, the massage device can be used to work cosmetic and facial creams into the skin. Such devices can be made at moderate expense.

The invention is further illustrated by several specific embodiments, including a preferred embodiment, which is shown in the accompanying drawings wherein:

FIGURE 1 is a top diagrammatic view illustrating the layout of the massage units and heating elements in a pad.

FIGURE 2 is a view, partly in section, of portions of a heating pad incorporating the massage units of the invention.

FIGURE 3 is a cross-sectional view of a coil and magnet of a massage unit in an inactive position.

FIGURE 3A is a cross-sectional view of the coil and magnet of FIGURE 3 at the end of a tapping stroke caused by current flowing through the coil.

Referring to the drawings, flexible inner fabric cover sheets **1** and **2**, of soft felt or thick flannel, are disposed within the outer cover **25**. Heating elements **3** of the conventional resistance type, for example asbestos-covered high resistance wire, are provided along with the temperature regulating thermostat units **4** and can be arranged as shown in FIGURE 1. Conventional type wiring, not shown in detail but of conventional type, connect elements **3** and units **4** to a conventional type power cord C through a junction section **27**. Massage units, indicated generally at **5**, are electrically connected by conventional wiring **26** to the junction area **27** and then to the power cord C. The covers **1** and **2** are joined in sewed or adhesively formed seams **6**, by means of which the members **3**, **4** and **5** are securely anchored in their proper spatial positions in side-by-side relationship in the plane of the total pad.

Each of the patting or vibratory massage units **5**, includes an iron-free coil **7** wound around the rigid non-ferrous tubular, flanged frame **8**, defining the cylindrical bore **9**.

The frame **8** supports the weight or pressure of the adjacent portion of the user's body. The hollow center or bore **9** is covered at both ends by elastic or resilient diaphragms **10** whose annular outer edges are fixed or secured to outer sides of the annular flanges of said frame **8**. The diaphragms **10** transmit the patting or vibratory motion caused by the oscillations of the permanent cylindrical magnet **11** to the cover sheets **1** and **2**, as the magnet **11** oscillates back and forth under the influence of the rapidly changing magnetic fields generated by passage of alternating current through the coil **7**. At the same time, the diaphragms **10** also serve to limit the movement of the magnet **11** which is striking against said diaphragms **10**. The dimensions of the magnet **11** and of the bore **9** in which it is mounted for free movement are such that the magnet **11** can turn through an appreciable angle but which is less than 180°. The points of impact, for example **13** of FIGURE 3A will constantly shift.

The electric cord C of the pad includes the off and on massage switch S1 and the heat regulating switch S2 having an off position indicated at O, and various heat regulating stations **1'**, **2'**, **3'** and **4'**. Such switches, of

course, are conventional. Thus, the pad can be separately operated for massage or heat, or for both.

Referring back to FIGURE 2, it will be appreciated that if cover **2** is rigid, say for example it is made of molded rigid plastic or pressed wood, while cover **1** is flexible, say cover **1** is of felt, then the vibratory massage motion is transmitted only to cover sheet **1** and in turn to the outer cover **25**.

I claim:

1. An electrical body massage pad comprising top and bottom sides, at least one of said sides being flexible whereby vibratory motion can be transmitted to the body of the user; a rigid body-supporting frame anchored between said sides and defining a bore perpendicular to the portions of said sides of said pad immediately adjacent said frame; electrical coil means wound on said frame around said bore; and a permanent magnet loosely mounted within said bore and unattached to said sides and said frame, said magnet having a height less than the height of said bore whereby said magnet can move within said bore independent of the adjacent body pressure of the user which may be disposed on said frame, said magnet being movable in said bore to impart a vibrating tapping action against the sides of said pad immediately adjacent said frame in response to the passage of alternating current through said electrical coil means.

2. A pad according to claim **1**, wherein one of said sides is flexible and the other of said sides is rigid.

3. A pad according to claim **1**, wherein said top and bottom sides are both flexible and are fabric cover sheets.

4. A pad according to claim **3**, wherein flexible diaphragms are secured to said frame so as to cover the ends of said bore, said diaphragms being between said fabric cover sheets.

5. A pad according to claim **1**, wherein flexible diaphragms are mounted on said rigid frame and extend over the ends of said bore, said diaphragms limiting the movement of said magnet during vibratory movements of said magnet to thereby prevent said magnet from rotating in said bore about an axis transverse to the longitudinal axis of said cylindrical magnet.

6. A pad according to claim **1**, which also includes heating elements and control elements, said heating elements and control elements being anchored in said pad between said sides whereby said heating elements and said rigid frame are in side-by-side relationship in the plane of said pad.

7. A heating and massage pad comprising a pair of flexible inner fabric cover sheets; heating wires extending through said pad and anchored between said cover sheets by seams; a plurality of vibratory massage units disposed between said cover sheets and between said heating wires, said massage units being anchored between said cover pads by seams; each of said massage units comprising a

tubular rigid frame having top and bottom annular flanges and defining a bore perpendicular to the adjacent portions of said fabric cover sheets, an electrical coil formed on said frame around said bore and between said annular flanges, diaphragms having their outer portions secured to said flanges and covering said bore and a permanent magnet loosely mounted within said bore and unattached to said diaphragms and said frame, said magnet having a height less than the height of said bore and a diameter less than the diameter of said bore whereupon the passage of alternating current through said coil imparts an oscillating wobbling movement to said magnet, the extent of said wobbling movement being limited by contact with said diaphragms whereby a pulsating or knocking is transmitted to said diaphragms and through the adjacent portions of said cover sheets.

8. A pad according to claim **7** wherein said massage units are spaced in said pad so that said pad can be folded along lines between said massage units.

9. An electrical body massage pad comprising top and bottom sides, at least one of said sides being flexible, a relatively rigid coil means secured between said sides, said coil means defining a bore perpendicular to that portion of said sides immediately adjacent said coil means, and a permanent magnet loosely mounted within said bore and unattached to said sides and said coil means, said magnet having a height less than the height of said bore whereby said magnet can move within said bore independent of the adjacent body pressure of the user which may be disposed on said coil means, said magnet being movable in said bore to impart a vibrating tapping action against the sides of said pad immediately adjacent said coil means in response to the passage of alternating current through said coil means.

10. A massage unit comprising a rigid body-supporting frame defining a bore having an upper end and a lower end, flexible diaphragms secured to said frame so as to cover said ends of said bore, a permanent magnet loosely mounted within said bore and unattached to said frame and said diaphragms, said magnet having a height less than the height of said bore, an electrical coil means formed on said frame around said bore, said permanent magnet being movable in said bore to impart a vibrating tapping action against said diaphragms in response to the passage of alternating current through said electrical coil means.

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