Jan. 30, 1951 W. L. WETTLAUFER 2,539,712

VIBRATORY THERAPEUTIC CUSHION

Filed Oct. 5, 1948 3 Sheets-Sheet 1

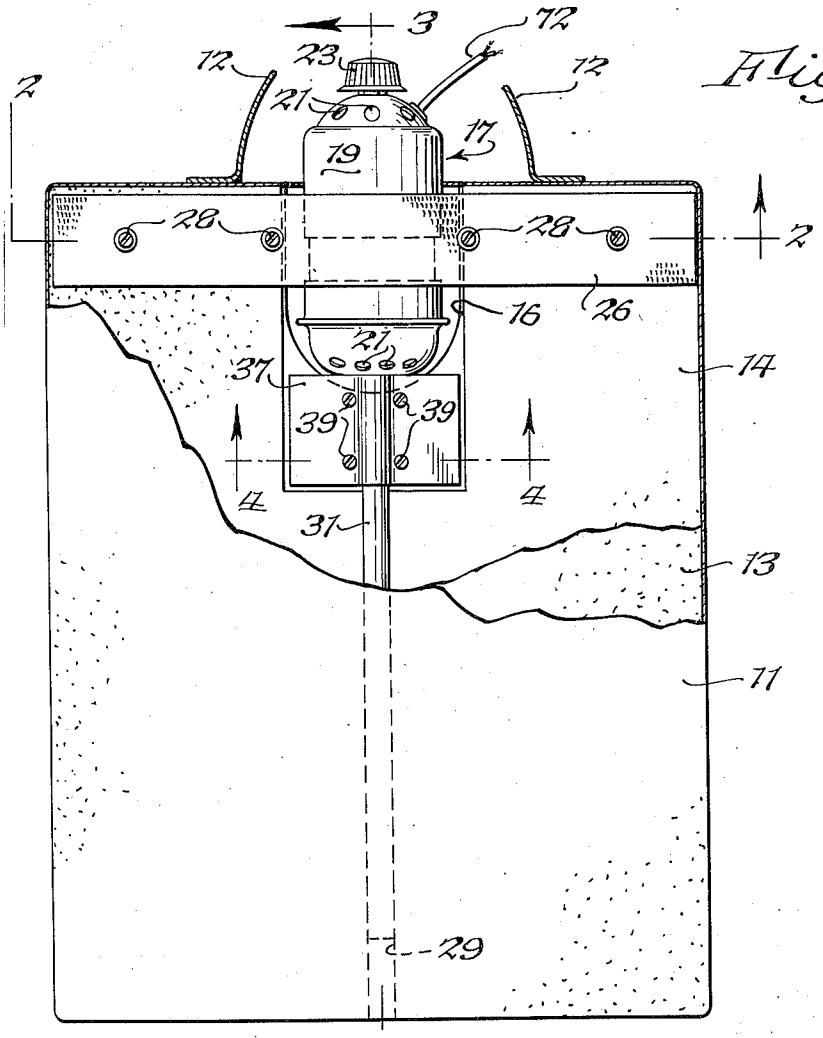


Fig. 1.

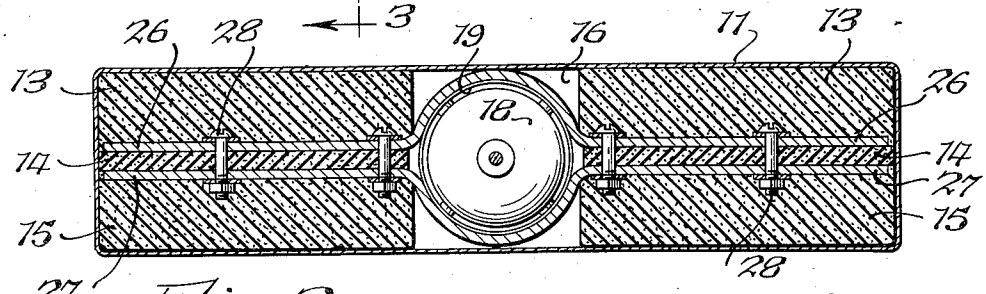


Fig. 2.

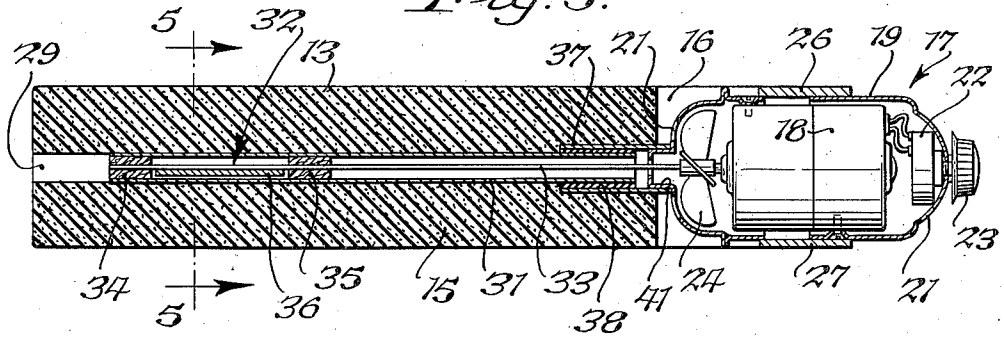
INVENTOR.
William L. Wettlaufer
BY
Albert R. Henry
Attorney.

Jan. 30, 1951 W. L. WETTLAUFER 2,539,712

VIBRATORY THERAPEUTIC CUSHION

Filed Oct. 5, 1948 3 Sheets-Sheet 2

Fig. 3.



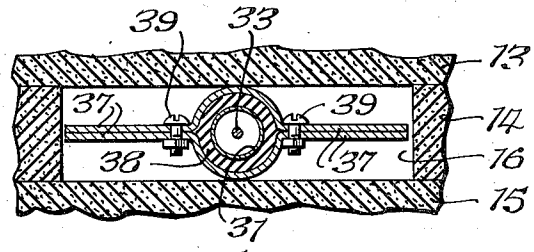
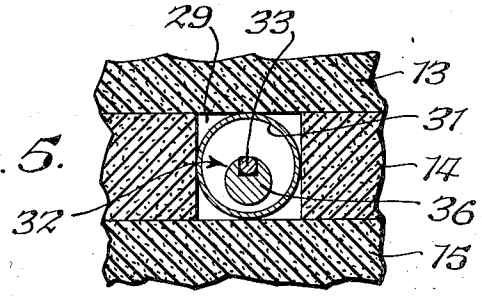


Fig. 4.

Fig. 5.



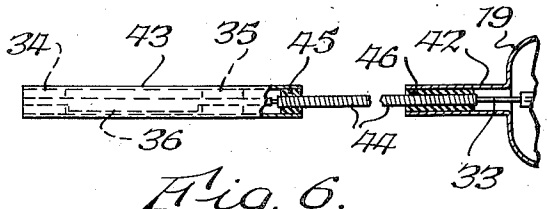


Fig. 6.

INVENTOR.
William L. Wettlaufer
BY
Albert R. Henry
Attorney.

Jan. 30, 1951 W. L. WETTLAUFER 2,539,712

VIBRATORY THERAPEUTIC CUSHION

Filed Oct. 5, 1948 3 Sheets-Sheet 3

Fig. 7.

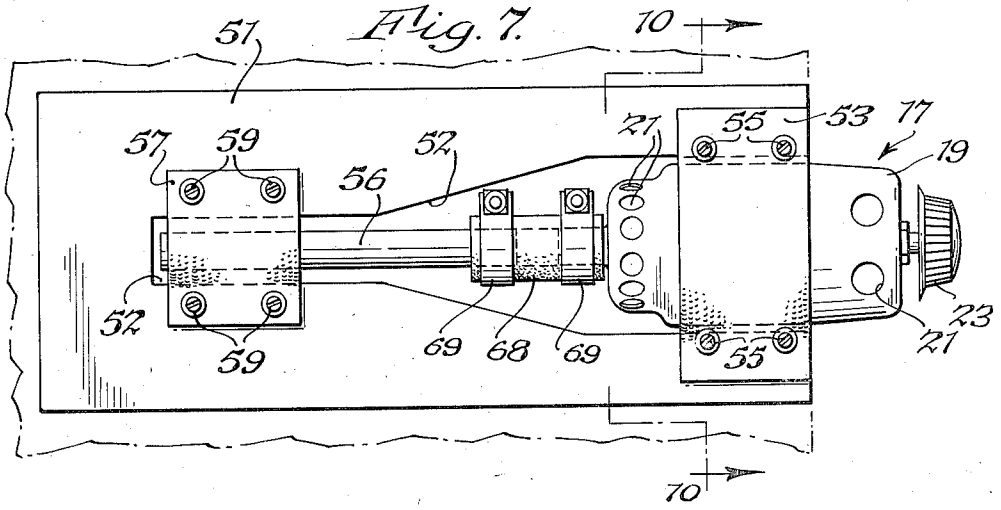


Fig. 8.

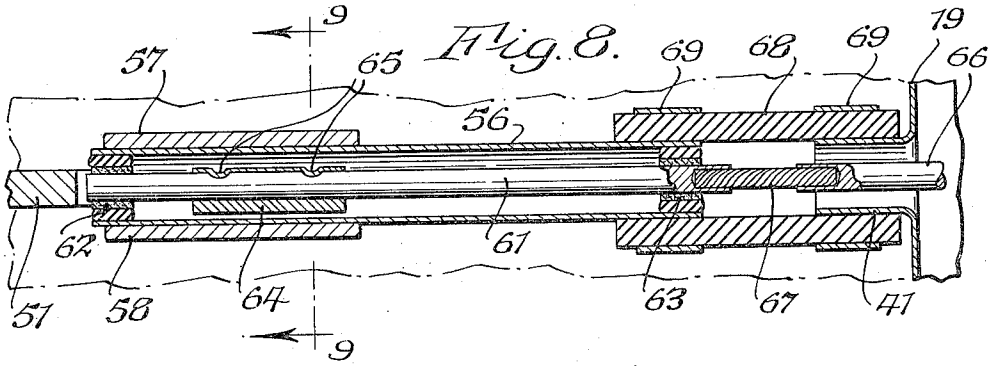


Fig. 9.

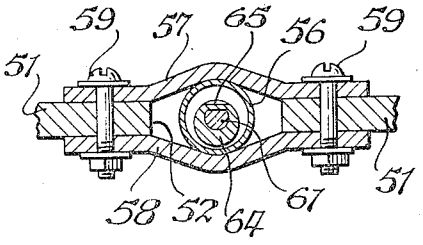
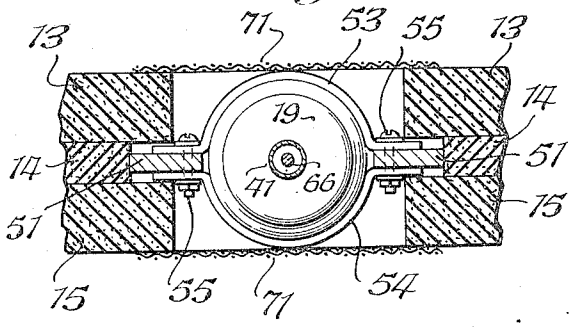


Fig. 10.



INVENTOR.
William L. Wettlaufer
BY
Albert R. Henry
Attorney.

Patented Jan. 30, 1951 2,539,712

UNITED STATES PATENT OFFICE

2,539,712

VIBRATORY THERAPEUTIC CUSHION

William L. Wettlaufer, Buffalo, N. Y.

Application October 5, 1948, Serial No. 52,839

7 Claims. (Cl. 128—33)

1

This invention relates to a vibratory cushion or pillow, and it has particular reference to the provision of a comparatively small and easily portable cushion in which is incorporated a vibratory member, whereby the article may be employed for therapeutic purposes.

It has heretofore been proposed to provide chairs and tables with vibration generators competent to create oscillatory vibrations which, when transmitted to the user, may impart a beneficial massaging action. Such pieces of furniture, however, are generally found in the offices of physicians and physiotherapists, and they are accordingly available only to those who call for treatment. The present invention contemplates the provision of a useful vibration generator in the form of a cushion or pillow which can be used in a variety of ways, either statically or dynamically, and which the user may enjoy in his own home or office as the need arises. Such pillow may be readily transported, and its size and comparative cheapness are additional advantages tending to increase its field of usefulness.

The invention will be further described by reference to practical embodiments thereof, shown in the accompanying drawings, wherein:

Fig. 1 is a plan of one form of the cushion, with portions broken away to show the internal structure;

Figs. 2 to 4 are views taken on the correspondingly numbered section lines on Fig. 1, and drawn on an enlarged scale;

Fig. 5 is a section on the line 5—5 of Fig. 3, drawn on an enlarged scale;

Fig. 6 is a fragmentary view, partly in section, of a modified form of driving connection;

Fig. 7 is a plan of another form of motor and vibrator assembly which may be incorporated in the cushion;

Fig. 8 is a longitudinal section through the vibrator structure of Fig. 7; and

Figs. 9 and 10 are sections on the correspondingly numbered lines of Figs. 8 and 7 respectively.

As shown in Figs. 1, 2, and 3, the cushion comprises a generally rectilinear body of soft supporting material encased in a cover 11 of fabric, leather, or the like. In the embodiment illustrated, the cushion is made of a size which can be conveniently used on a chair seat or back, or as a foot rest, say about sixteen inches long, a foot wide, and two to three inches thick. A strap 12 secured to one end provides a means for carrying the cushion, or anchoring it in a desired position on a chair or divan. Within the cover are layers of sponge rubber, respectively designated

2

by the reference numerals 13, 14, and 15, which are advantageously cemented together along their contacting surfaces.

Along its upper end, as viewed in Fig. 1, and at substantially the median plane, the layers of rubber are cut away a few inches to form a pocket 16, into which extends a small electric motor assembly 17. This assembly, in turn, includes a motor 18 mounted within a casing 19, which is generally slightly spaced from the motor shell. The casing 19 is formed with apertures 21 for the free circulation of air, and it also contains rheostat control switch 22 whose control knob 23 projects beyond the casing. The motor shaft carries a small fan 24, which creates a draft of air through the casing when the motor is energized. It will be seen that one end of the pocket 16 is open to the atmosphere, and that the apertures 21 at one end of the casing 19 are also exposed. Effective air circulation to cool the motor is therefore obtained, and this feature eliminates a cause of failure which would exist if the motor were embedded in the cushion.

The motor and casing assembly is retained in the pocket 16 in spaced relation thereto by a pair of flexible straps 26 and 27, which encircle the casing and extend transversely thereof on either side of the layer 14. Machine screws or rivets 28 extend through the straps and rubber sheet 14 to anchor them together. The material employed for the straps, as shown in the instant embodiment of the invention, is preferably a woven fabric, such as webbing, belting or pieces of trunk strap, but other materials, such as light gauge sheet metal, may also be employed. As previously noted, the layers of rubber are cemented together, and are contained in a cover, so that the motor assembly is securely positioned.

The central layer of rubber 14 is also cut away longitudinally and at its median plane to provide a recess 29 for a tubular casing 31, in which is mounted a vibration generator 32. The generator comprises a shaft 33, fairly light and therefore somewhat flexible, which is rotatably mounted in spaced bearings 34 and 35 pressed into the casing 31, and which extends to the shaft of the motor 18. The end of the motor shaft may be axially drilled to receive the end of the shaft 33, and the two shafts may be coupled by soldering, with a set screw, or any other desired fashion. Between the bearings 34 and 35, the shaft 33 is provided with an eccentric or unbalanced weight 36, which may take the form of a short length of longitudinally slotted drill rod brazed or otherwise secured to one side of the shaft 33. When

the shaft 33 is rotated, the eccentric 36 imparts a condition of dynamic unbalance, which sets up vibrations of undulatory form, and these are transmitted to the entire cushion.

The end of the casing 31 adjacent the pocket 16 is protected from undue gyratory movement by a pair of half round flanged clamps 37 which engage the casing end through a rubber bushing 38, and are secured to the casing and to each other through screws 39. These clamps also encircle a boss 41 on the end of the motor casing 19, thereby retaining the entire assembly in operative relation. It is desirable to provide an additional anchorage, as otherwise a condition of shaft whipping may be encountered between the motor and the bearing 35, which would lead to unsatisfactory performance.

An alternative method of protecting the shaft is shown in Fig. 6. The motor casing 19 is formed with a boss 42 through which the shaft 33 extends for connection to the motor, as previously described. The casing 43 for the eccentric is similar to the casing 31, except that it is shorter, being only slightly longer than the distance between the bearings 34 and 35. The length of the shaft between the bearing 35 and the boss 42 is encased in a tightly coiled helical spring 44 whose ends are supported in rubber bushings 45 and 46, respectively located in the end of the casing 43 and the boss 42. The shaft 33 is free to rotate within the spring, the internal wall of which damps and limits any tendency to develop a sustained flexing or whipping action.

In the form of the invention shown in Figs. 7 to 10, there is provided a somewhat more rigid mounting or chassis for the motor and generator assembly. This form of mounting may be incorporated in the three layer rubber cushion previously described, simply by making the cut out portions of the middle layer of proper size. The assembly comprises a plate 51, which may be a piece of light plywood or similar material, longitudinally cut away to provide a slot 52. The motor casing 19 is mounted in the slot, to project partially beyond the plate 51 by means of bands 53 and 54 cut from belting or like material, and having ends bolted to the board by screws 55. A shaft casing 56 is also mounted on the board by means of two flexible bands 57 and 58, interconnected by screws 59, and located at the end of the casing remote from the motor.

A drive shaft 61 is mounted in the casing 56 by means of bearings 62 and 63, located at the shaft ends, and advantageously comprising bronze self-lubricating bushings set in rubber collars. An eccentric 64 is mounted on the shaft between the bearings, and in this embodiment the connection is effected by drilling a piece of rod off center, sliding it over the shaft, and then peening its thin wall into the shaft surface, as indicated by the reference numeral 65. The connection between the motor shaft 66 and the drive shaft 61 is effected by axially drilling the shaft ends, spacing them slightly, and inserting in the drill holes a short length of flexible shafting 67, as is shown in Fig. 8. Such piece of shafting provides a flexible coupling between the motor and drive shafts in a very simple and inexpensive manner, and does not require additional space.

In order to connect the motor end of the casing 56 to the boss 41 of the casing 19, a short length of fairly stiff but flexible tubing 68, such as a two inch length of garden hose, is slipped over the boss 41 and the end of the casing 56,

and is secured in place by hose clamps 69. In view of its short length, the tubing 68 is resistant to large movement under the influences imposed by operation of the fractional horsepower motor employed, yet its inherent resilience permits very small movements in response to such forces.

As heretofore noted, the motor and generator, mounted on the plate 51, can be inserted in the rubber cushion, and be operated to generate undulatory vibrations which are transmitted to the surface. In the form of the invention first described, it was contemplated that the cover material 11 would be formed around the pocket 16 so as to conceal that part of the motor casing within the pocket. As shown in Fig. 10, layers of open mesh wire or fabric 71 are positioned over the front and back faces of the pocket, so that the air current induced by the fan 24 may circulate outwardly, as well as being returned along the side walls.

In use, the cushion may be employed statically or it may be employed dynamically to transmit to the user the physiological benefits of the vibrations. Thus, a person may sit on the cushion and supply motive power to the generator through the motor lead wire 72, or he may use it in the same way as a back or foot rest, or place it on other portions of the body. The character of the vibrations may be readily discerned, as by placing a pencil in various positions on the cover. A generally cylindrical body, such as a pencil, when placed parallel to the axis of the generator, will be seen to travel lengthwise, and also tend to rotate on its own axis. Placed transversely, the motion is more of a periodic displacement up and down on the surface. Small shot contained in a druggist's phial may be observed to rotate in a progressive or screw-like manner, thereby indicating that the vibrations are regular and periodic, and of a type considered to have beneficial therapeutic effects.

It will accordingly be seen that there has been provided an inexpensive and durable therapeutic article which lends itself to a wide variety of applications. While the invention has been described in detail with respect to certain embodiments thereof, it is not intended that it should be restricted to precise details, but that it should be accorded a scope and range of equivalents commensurate with that expressed in the following claims.

I claim:

1. A therapeutic cushion comprising a body of soft supporting material, a cover enclosing said material, a shaft casing embedded within the body of material, a rotatable vibration generator having an eccentric portion rotatably mounted in the shaft casing, a drive shaft connected to the generator and extending through the casing to a region exterior thereof, and motor means connected to the shaft to actuate the generator.

2. A therapeutic cushion comprising a body of soft supporting material, a cover encasing the material, a protective shaft casing embedded within the body of material and disposed along a central axis of the body and between the ends thereof, a rotatable eccentric vibration generator mounted in and axially of the casing, a motor positioned adjacent a marginal portion of the cushion and substantially at said central axis, supporting straps for the motor extending thereabout and into the body of material to retain said motor in position, and a drive shaft passing through the body of material and connecting the motor and generator.

3. A therapeutic cushion comprising a body of soft supporting material, a cover enclosing the body, said body being formed with a pocket at one end thereof and substantially equidistant from the sides thereof, a motor assembly positioned in the pocket in spaced relation thereto, said assembly comprising an apertured casing and an electric motor mounted therein, supporting straps encircling the motor and extending into the body, means for retaining the straps within the body to retain the motor assembly in position, a shaft casing in the body in line with the rotative axis of the motor, a generator shaft connected to the motor and extending therefrom into the shaft casing, said generator shaft having a flexible portion, spaced bearings in the casing for said generator shaft, and an eccentric member secured to the generator shaft between the bearings.

4. A therapeutic cushion comprising superimposed layers of soft supporting material, a pocket formed in the material along a marginal portion thereof, a recess formed within the body at the center thereof in line with the pocket, a shaft casing in the recess, bearings in the casing, a generator shaft rotatably mounted in the bearings and extending from the casing to the pocket, an eccentric weight mounted on the shaft between the bearings, a motor assembly including a casing and a motor mounted in the pocket, a connecting coupling between the shaft casing and motor casing to secure them to each other, and a flexible coupling between the generator shaft and the motor.

5. A therapeutic cushion comprising a body of soft resilient supporting material, a cover for the body, a pocket formed in the body along a marginal portion thereof and adjacent a central axis therethrough, a recess formed within the body along said axis, a motor assembly including an electric motor and a casing therefor in the pocket, the shaft of said motor extending in line with said axis, a shaft casing in the recess, bearings in the shaft casing, a drive shaft mounted in the bearings and extending toward the motor, straps encircling the motor casing and extending into the body to retain the motor assembly in the pocket, a resilient coupling between the shaft casing and the motor casing, a flexible coupling between the motor shaft and the drive shaft, and an unbalanced weight secured to the drive shaft between the bearings.

6. A therapeutic cushion comprising a body of soft resilient supporting material, a cover for the body, a recess formed within the body, and a vibration generator assembly mounted in the recess, said assembly comprising a plate formed with an axial slot, a motor mounted in the slot at one end of the plate, a shaft casing mounted in the slot in line with the motor, a drive shaft mounted in the shaft casing, an unbalanced weight secured to the drive shaft, and a flexible coupling between the drive shaft and the motor.

7. A therapeutic cushion comprising a body of soft resilient supporting material, a cover for the body, a plate positioned within the body, a slot formed in the plate longitudinally from an edge thereof, an encased motor positioned in the slot at said edge, straps encircling the motor and secured to the plate to retain the motor in position, a shaft casing positioned in the slot in line with the motor, straps encircling the casing and secured to the plate, bearings in the casing, a drive shaft mounted in the bearings and having an unbalanced weight secured thereto between the bearings, a resilient sleeve connecting the casing to the motor, and a flexible shaft connecting the drive shaft to the motor adjacent the sleeve.

WILLIAM L. WETTLAUFER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,872,674	Carroll	Aug. 23, 1932
2,425,655	Tompkins	Aug. 2, 1947
2,460,245	Summerville	Jan. 25, 1949