May 10, 1955 S. SADLON 2,707,949

VIBRATORY MASSAGE MACHINE

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Fig. 1.

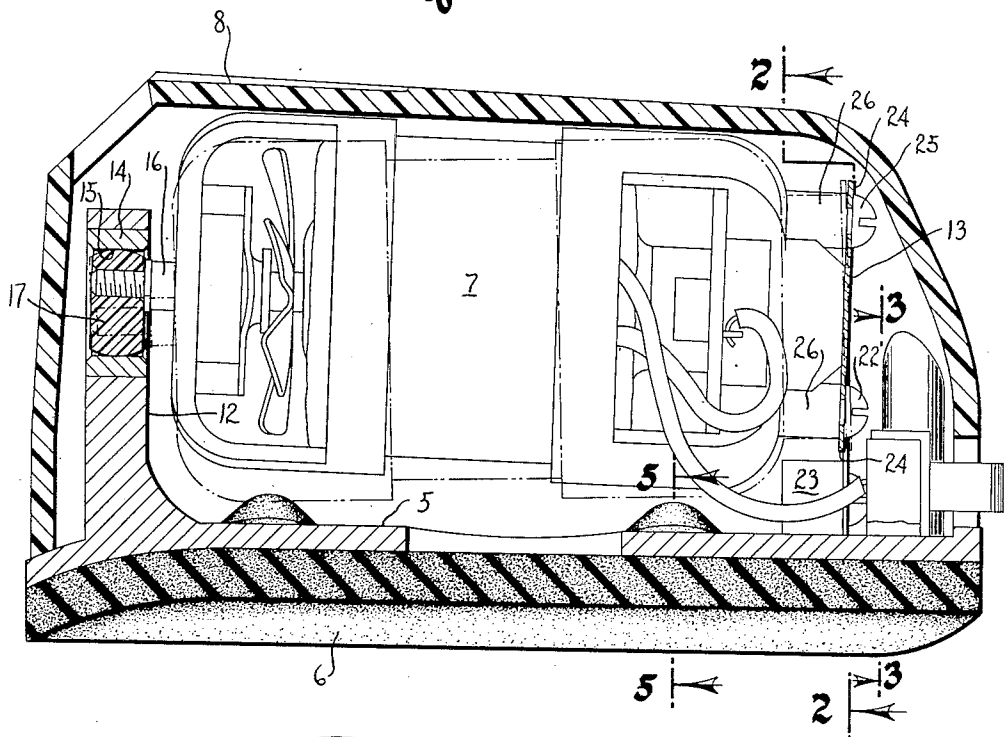

Fig. 2.

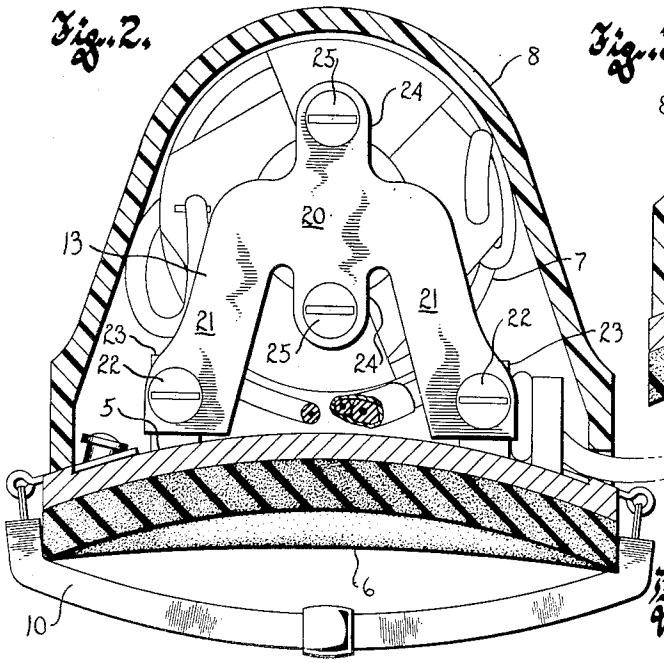

Fig. 3.

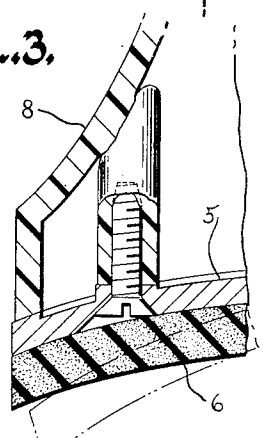

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Fig. 4.

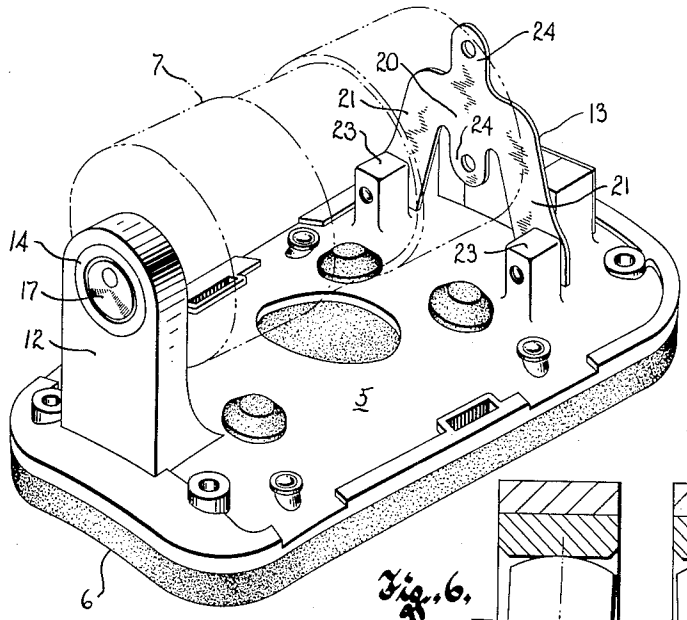


Fig. 7.

Fig. 6.

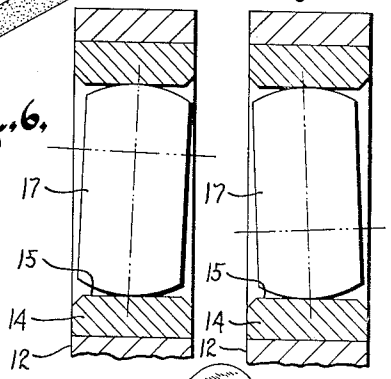
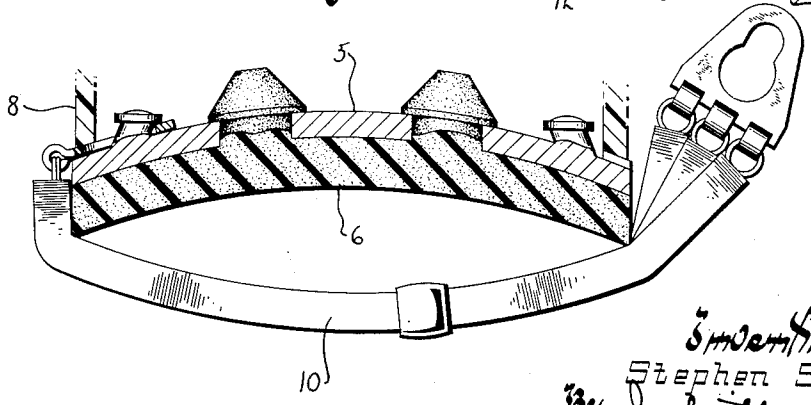


Fig. 5.



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VIBRATORY MASSAGE MACHINE

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8 Claims. (Cl. 128—36)

This invention relates to vibratory massage machines and has more particular reference to small hand vibrators of the type which when attached to the back of an operator's hand impart to the fingers thereof a vibratory movement useful for massaging purposes.

One such vibratory massaging machine is shown and described in Patent No. 2,181,282, issued to John Oster November 28, 1939. In general, such hand vibrators comprise a base which may be attached by straps to the back of the hand, and a small electric motor mounted on the base. The rapid rotation of eccentric means on the shaft of the motor causes vibratory motion to be transmitted to the base and to the fingers of the hand to which the machine is attached.

Perhaps the best known type of hand vibrator is that in which the motor is suspended between front and rear supports or standards on the base of the machine, the motor having a flexible connection with the rear support and having the eccentric means at its front end, adjacent to the front support. The vibratory motion produced by the eccentric is thus largely confined to the front of the base and the fingers of the operator's hand, but requires the rear end of the motor to be mounted for swiveling motion. In the case of the vibrator disclosed in the aforesaid patent, this swiveling motion was provided by a stiff tightly coiled spring connected axially between the rear end of the motor and the adjacent support or standard.

In most hand vibrators provided heretofore, the manner in which the vibrator motors were mounted on or suspended from the base of the machine resulted in vibrations which were apt to be quite severe and tiring to the hand of the operator. The violent lateral vibrations were not only largely undesirable from the standpoint of effective massaging but produced such a degree of discomfort to the operator that massaging treatments had to be of limited duration.

Another problem inherent in past hand vibrators and especially those employing a coiled spring to support the rear of the vibrator motor was that of undesirable vagrant vibrations. Such vibrations occurred by reason of the fact that the motor was not anchored against oscillatory motion on its axis but was permitted a limited degree of twisting or turning. This also led to creeping of the instrument forwardly along the hand of the operator in a highly vexing manner.

With these objections in mind it is the main purpose of this invention to provide a simpler and more compact hand vibrator of substantially lighter weight, and featuring a very gentle but highly effective vibratory action which is not only less tiring on the hand of the operator but has a more soothing effect in use.

In this connection it is a further object of the invention to provide a hand vibrator of the character described in which lateral vibrations are minimized without interfering with up and down vibration, the latter being most effective for massaging purposes, and in which the vibrations are confined to the front end of the machine which is located over the fingers of the operator's hand when

in use so that none of the vibrations are wasted in the heel of the operator's hand.

More specifically it is the purpose of this invention to achieve the foregoing objectives through the provision of an improved suspension for the electric motor of the vibrator and particularly through the provision of a rear motor support which comprises a substantially flat spring member carried by the base of the machine and having a flexible upper portion secured directly to the rear end of the motor to provide a flexible, swivel type mounting for the motor allowing orbital motion of the front end of the motor as a consequence of rapid rotation of an eccentric on the front end of the motor shaft.

It is a feature of this invention that the spring member which supports the rear of the motor may be readily formed as a stamping shaped and formed to have more flexibility in its up and down dimension and to be stiffer in its transverse dimension so as to yieldingly resist and exert a damping effect upon the lateral vibrations produced by the eccentric.

Still another purpose of this invention resides in the provision of a novel eccentric connection between the front end of the motor shaft and a bearing standard fixed on the front of the base and which comprises a crowned cam fixed on the front of the shaft and rotatably received in a cylindrical bore in the bearing standard to thus impart a rapid orbital motion to the front of the motor in consequence of rapid rotation of the cam. In this connection it is a further feature of this invention that the spring standard or support for the rear of the motor cooperates with the bearing standard or support for the front of the motor to not only provide an improved suspension for the motor, but also serves to prevent the cam from becoming displaced from its cylindrical bore.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a longitudinal sectional view through a hand vibrator constructed in accordance with this invention;

Figure 2 is a cross sectional view taken through Figure 1 along the line 2—2;

Figure 3 is a fragmentary sectional view taken through Figure 1 along the plane of the line 3—3;

Figure 4 is a perspective view of the machine with the housing and electric motor removed to show the end supports or standards for the motor;

Figure 5 is a detail sectional view taken through Figure 1 along the plane of the line 5—5; and

Figures 6 and 7 are diagrammatic views illustrating the manner in which the crowned vibration producing cam can tilt in the bore of its bearing during rotation of the cam.

Referring now more particularly to the accompanying drawings in which like reference characters indicate like parts throughout the several views, the numeral 5 designates the base of the vibration machine; the numeral 6 a sponge rubber pad which is secured to the underside of the base, and the numeral 7 an electric motor which is supported from the base over the top face thereof and which is adapted to impart vibratory motion to the base during operation of the machine. A housing 8

secured over the top of the base encloses the electric motor.

The base 5 is somewhat elongated and is preferably curved in its transverse dimension so that the underside of the sponge rubber pad 6 will be substantially concave to more comfortably fit the back of the operator's hand. Flexible bands or coiled spring straps 10 (see Figure 5) having their ends detachably connected to the base adjacent to its longitudinal edges provide for attachment of the massaging machine to the back of an operator's hand in a more or less conventional manner.

The electric motor 7 is suspended over the top face of the base 5, generally lengthwise with respect to the base, by means of front and rear standards 12 and 13 respectively, on the base and embracing the axial dimension of the electric motor. The front standard 12 is formed as a rigid part of the base and projects upwardly from the top face thereof, inside the housing 8. At its upper end portion, the standard is provided with a horizontal bearing sleeve 14 having a straight or cylindrical bore 15 therein. The front end of the motor shaft 16 projects into the bore 15 and has a cam or eccentric 17 fixed thereto. The cam rotatably fits the bore 15 in the bearing sleeve, and is crowned so that it may wobble in its bore during operation of the motor.

Consequently the front standard 12 supports the front end of the electric motor through the reception of the cam 17 in the bore of the bearing sleeve 14; and it will be apparent that during rotation of the motor shaft the slightly eccentric mounting of the cam on the shaft will produce an orbital motion of the front end of the motor resulting in the transmission of vibratory motion to the base 5 confined almost entirely to the front end portion thereof.

The rear end of the electric motor, as stated previously, is supported by the standard 13 which, however, is not rigid but comprises a substantially flat spring member secured directly to the rear end of the motor to afford a flexible mounting therefor permitting limited universal swiveling motion of the rear of the motor during orbital motion of its front end. As best seen in Figures 2 and 4 the spring standard 13 is generally of inverted U-shape having its bight portion 20 extending flatwise across the rear of the electric motor and opposite legs 21 projecting downwardly toward the base. Screws 22 passing through the lower ends of the legs and threaded into laterally spaced upstanding bosses 23 on the top of the base mount the spring standard in an upright position thereon with its bight portion 20 normal to the axis of the motor shaft 16 and directly alongside the rear of the electric motor.

A pair of mounting tabs 24 on the upper portion of the spring standard, formed integrally with its bight portion 20, project in opposite vertical directions therefrom to not only provide for attachment of the motor to the spring standard, but to also stiffen the bight portion 20 thereof. Screws 25 passing through the tabs and threading into suitably tapped holes in bosses 26 on the rear of the motor provide a secure connection between the motor and the flexible upper portion of the spring standard.

During rapid rotation of the cam or eccentric 17, therefore, the legs 21 of the spring standard flex flatwise during up and down vibratory motion of the front end of the motor while the bight portion 20 of the spring member flexes relative to the legs 21 during lateral vibratory motion of the front end of the motor. The spring standard thus provides in effect a swivel support for the rear end of the motor.

It is a highly important feature of this invention, however, that the spring member which comprises the rear standard 13 is formed so as to be stiffer in its transverse dimension, namely horizontally across the bight portion 20 thereof, than in its vertical dimension. In other words, the legs 21 of the spring member flex substantially freely during up and down vibratory motion of the front

end of the motor, while the stiffer bight portion thereof yieldingly resists lateral vibratory motion of the front end of the motor. The desired stiffness in the transverse dimension of the spring member is achieved partly by the reinforcing effect of the mounting tabs upon the bight portion 20 of the spring member, and partly by reason of the fact that the upright legs 21 of the spring member must be twisted in order to accommodate lateral vibratory motion of the front end of the motor.

The following is given as an example of a spring standard having the desired flexing characteristics: where flexure of the spring in the horizontal plane, by lateral vibratory motion of the front end of the motor, requires a force of about six ounces measured at the cam; while flexure in the vertical plane, by up and down vibratory motion of the front end of the motor, requires a force of only about one ounce. Obviously these are the forces which the motor must overcome during orbital motion of its front end, and which forces are so proportioned that the lateral vibrations of the motor are appreciably damped while the vertical vibrations of the motor are actually reinforced. These results are obtained by reason of the fact that the motor is caused to decelerate during its lateral motions in using its energy to overcome the larger force required to flex the bight portion 20 and twist the legs 21 of the spring standard; and accelerates during its up and down motions due to the release of the energy stored in the bight portion of the spring and in its slightly twisted legs at such times.

Thus it will be seen that the motor imparts vigorous vertical vibratory motions to the front portion of the base for desirably deep penetration of the massage effect, and very little lateral vibratory motion. Moreover, the vigorous vertical vibration may be achieved with the spring standard described without the need for having an excessively large degree of eccentricity between the cam 17 and the motor shaft. This feature is important for another reason, namely that it assures the least discomfort to an operator of the massage machine.

It is also advantageous in a hand vibrator of the type here under consideration to minimize or even eliminate vagrant vibrations which hitherto resulted from suspension of the electric motor in a manner permitting the same to turn or oscillate on its axis. Such vagrant vibrations are precluded in the vibrator of this invention by reason of the fact that the spring standard 13 is secured directly against the rear of the electric motor, and precludes even limited rotation or oscillatory motion of the motor about the axis of its shaft. In addition the spring standard 13 renders the assembly more compact than was possible in past vibrators of this type; and what is more important reduces the weight of the appliance so that it is not only less fatiguing for the operator to use but imposes less load on the electric motor.

The spring standard 13 has the further function of preventing displacement of the cam or eccentric 17 from the cylindrical bore 15 in the bearing sleeve on the front standard, while readily permitting the cam to wobble in the bore to the extent required by the eccentricity in the connection between the cam and the motor shaft. This latter condition is depicted somewhat diagrammatically in Figures 6 and 7 illustrating the positions of the cam at the upper and lower limits of the vertical vibratory strokes of the motor. It is noteworthy that only two screws, namely the screws 25, which mount the rear of the motor on the spring standard 13 are required to hold the motor properly secured between the two standards. This makes it unusually simple to assemble the motor on the base of the vibrator.

The cam or eccentric 17 is preferably of molded nylon and has a screw threaded connection with the front end of the motor shaft as seen best in Figure 1. In the event of noisy operation of the vibrator due to wearing of the crowned periphery of the cam, the motor may be readily detached from the base by removing the screws 25 from

its rear support 13, and the cam replaced with a new one without the need for expert servicing of the vibrator.

From the foregoing description taken together with the accompanying drawings, it will be readily apparent to those skilled in the art that this invention not only improves the massaging action of a hand vibrator, but results in a smaller and more compact machine which is desirably light weight.

What I claim as my invention is:

1. In a vibratory massage machine of the type having a base, an electric motor lengthwise overlying one face of the base and having a shaft, and an eccentric connection between the motor shaft and the base adjacent to one end of the motor: flexible means supporting the other end of the motor, and comprising a substantially flat spring member fixed to and extending substantially perpendicularly upwardly from the base and having a portion thereof remote from the base directly connected to said other end of the motor to provide for limited universal swiveling motion of said other end of the motor relative to the base.

2. A vibratory massage machine of the type having a base, an electric motor mounted on the base, lengthwise over one face thereof, and having a shaft, and a vibration producting eccentric on the shaft at one end of the motor: characterized by the fact that the means which mounts the other end of the motor on the base comprises a standard fixed to the base adjacent to said other end of the motor, said standard having a flexible portion perpendicular to the base secured directly to said other end of the motor at a point spaced from the base, said flexible portion of the standard providing for up and down as well as lateral tilting motion of the first designated end of the motor in consequence of rapid rotation of the eccentric.

3. The vibratory massage machine set forth in claim 2 wherein said flexible portion of the standard is stiffer in its transverse dimension than in its up and down dimension so as to yieldingly resist lateral vibratory motion while more freely permitting up and down vibratory motion of said first designated end of the motor as a consequence of rapid rotation of the eccentric.

4. The vibratory massage machine set forth in claim 2 wherein said standard comprises a substantially flat spring member extending edgewise across the base and having its lower portion fixed thereto at transversely spaced points, the flexible upper portion of said spring member being secured to the adjacent end of the motor at a distance above the anchored lower portion of said member whereby said member has most flexibility in its up and down dimension and yieldingly resists lateral vibratory motion imparted to the motor by rapid rotation of the eccentric.

5. The vibratory massage machine set forth in claim 2 wherein said standard comprises a substantially inverted U-shaped spring blade having the extremities of its legs fixed to the base at areas spaced transversely of said face thereof, and wherein the bight portion of the spring blade is secured flatwise to said other end of the motor, whereby the legs of the spring blade are free to flex flatwise in unison during up and down vibratory motion of the motor but resist lateral vibration of the motor so that said lateral vibrations are damped while the up and down vibrations are more pronounced.

6. The vibratory massage machine set forth in claim 2 wherein said eccentric is a cam fixed to the motor shaft; and further characterized by the fact that the motor mounting means includes a rigid standard fixed to the base and having a bearing in which said cam rotates.

7. A vibratory massage machine of the type having a base, spaced standards projecting upwardly from the base and fixed thereto, and an electric motor extending lengthwise between said standards and suspended thereby in a position spaced above the base, characterized by: the fact that one of said standards provides for limited universal swiveling motion of the adjacent end of the motor but restricts endwise motion of the motor; the provision of a bearing in the other of said standards, said bearing having a cylindrical bore; and the provision of a cam fixed on the motor shaft and rotatably received in said bore so that rotation of the motor shaft imparts orbital motion to the adjacent end of the motor and results in the transmission of vibratory motion to the base through said other standard, said cam having a crowned periphery which provides for tilting of the cam in the bore of its bearing during rotation of the motor shaft.

8. The vibratory massage machine set forth in claim 7 further characterized by the fact that said first designated standard is a flexible spring member having a portion spaced from the base and secured directly to the adjacent end of the motor.

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