United States Patent

[11] **3,580,246**

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[54] **MOTOR OPERATED VIBRATOR HAVING SOLAR TYPE MOTION**
3 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **128/36,** 128/26, 128/57
[51] **Int. Cl.** **A61h 1/00**
[50] **Field of Search** ..... 128/32-—36, 26, 46, 57

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ABSTRACT: Motor driven apparatus, for inducing vibratory action into a person's body, comprised of a housing having a shaft rotatably journaled therein by spaced apart bearing means. Spaced apart eccentric weights placed near each bearing means and rigidly affixed to the shaft induces a circular vibratory motion in the extremities of the housing while the center of the housing remains relatively quiescent. A motor located apart from the housing rotatably drives the shaft by means of a flexible coupling member.

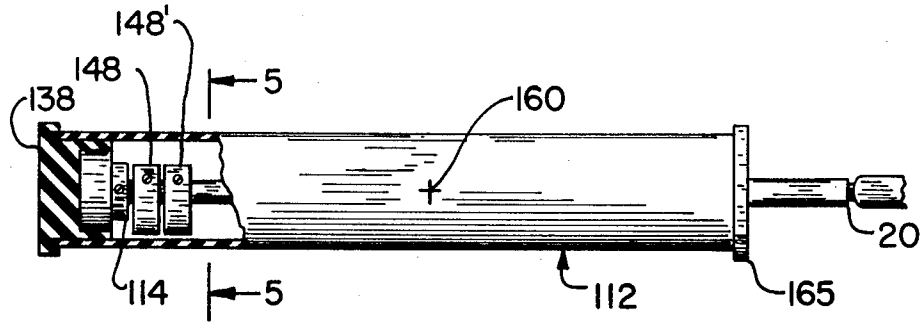


FIG. 1

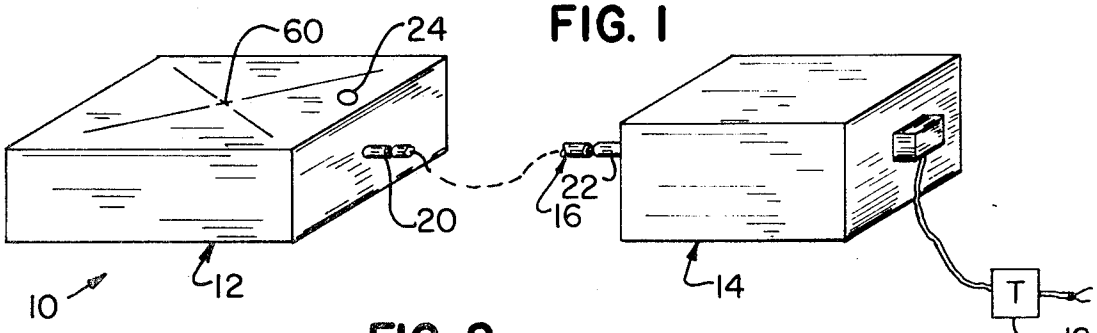


FIG. 2

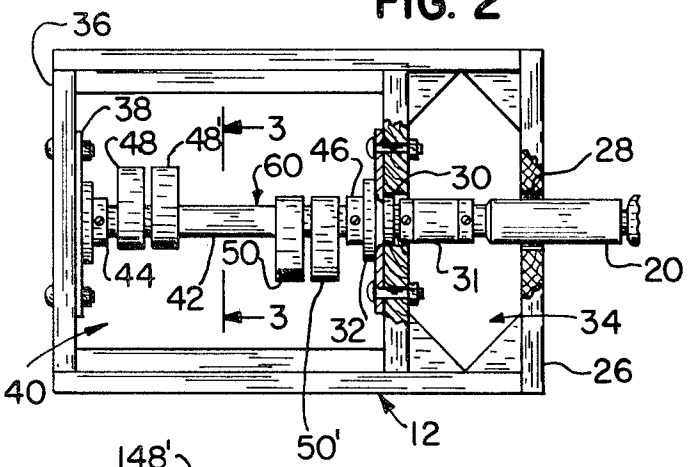


FIG. 3

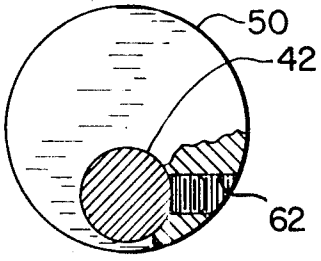


FIG. 4

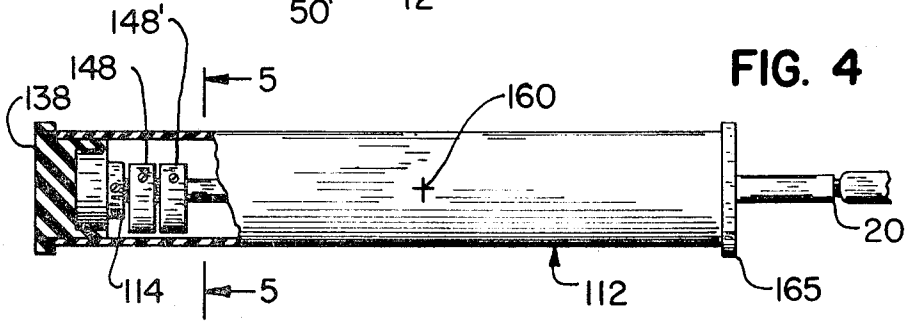
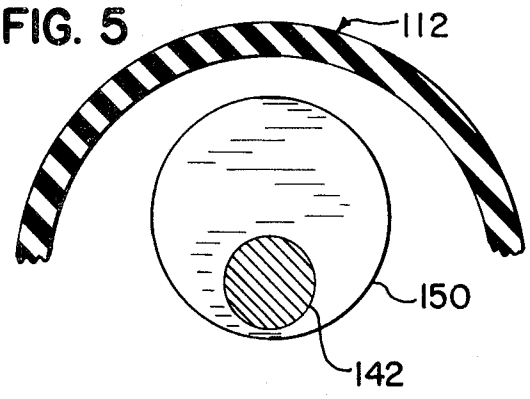


FIG. 5



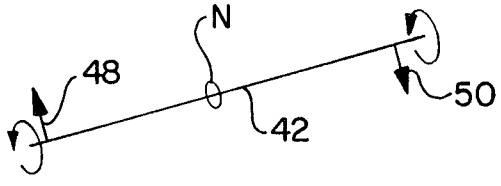


FIG. 6

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MOTOR OPERATED VIBRATOR HAVING SOLAR TYPE MOTION

BACKGROUND OF THE INVENTION

Various apparatus for inducing vibratory motion into the human body are known. Some of these devices are attached to the back of one's hand thereby inducing vibratory motion into the hand as it massages the body. Other devices are known which employ an electric motor having an eccentric weight attached to the shaft thereof. Still other electrical devices of this nature include a transformer having a portion of the core arranged in a manner which causes it to vibrate.

These prior art devices have proven to be an invaluable aid in providing stimulus for certain regions of the body, and are successful in stimulating or increasing the blood circulation. However, it is often desirable to stimulate circulation in order to provide treatment of a local area which is extremely sensitive to pressure or any other type disturbance. This is especially so with arthritic persons, and particularly when the arthritis is localized in a joint of the limb. Joint inflammation of this type caused by arthritis is generally sensitive and usually includes pain, stiffness, swelling, limitation of motion, and fatigue from action; accordingly, any disturbance of the joint produces extreme pain. In order to treat such a local area with vibratory motion, it is generally necessary for a professional masseur to manipulate the area surrounding the sensitive joint. It is difficult for hand manipulation of such an area to provide the necessary deep stimulus required to produce increased circulation within the joint itself.

Therefore it is desirable to be able to stimulate the circulation about the surrounding area of a particular location of the body.

It is furthermore desirable to induce a particular type of vibration into the anatomy which stimulates circulation well below the surface of the skin. It is also desirable to enable individuals to apply the stimulus to themselves, thereby avoiding the expense of professional masseurs.

SUMMARY OF THE INVENTION

The present invention teaches the construction of an apparatus which induces vibratory action into a person's body by the provision of a motor driven apparatus having a shaft which is received within spaced apart journals, with spaced apart weights being located adjacent to the journals and spaced apart from each other. The spaced apart weights are eccentric in configuration so as to induce an imbalance into the rotating shaft and into the enclosure which houses the moving parts. Each eccentric weight is imbalanced with respect to one another by placing the center of mass of the weights where they are diametrically opposed to each other and accordingly, between each eccentric weight there is an area of minimum vibration.

One form of the invention is enclosed within a housing which provides a flat surface against which a portion of the body may be held in contact in order to induce vibratory forces thereinto. Another form of the invention is embodied in a resilient tubular housing having journals located in each extremity thereof to thereby provide a vibrator which may be held in the hands . The magnitude of the vibrational energy is controlled by the position of ones hand upon the tubular housing.

It is therefore a primary object of this invention to provide a vibrator which describes a circular vibrational pattern about a neutral midpoint.

Another object of the present invention is to provide an elongated tubular vibrator having spaced apart eccentric weights located on a shaft for inducing a maximum vibration at the location of each of the weights and a minimum amount of vibration at a point located along the shaft midway between the weights.

A further object of the present invention is the provision of a means by which a vibrator can be placed directly upon a sensitive portion of the body and which will stimulate circulation in the surrounding area adjacent to the sensitive portion.

Still a further object of the present invention is the provision of a vibrator which can be held in the hands whereby the magnitude of the vibration imparted into the hands is controlled by the location at which the hands are placed upon the vibrator.

Still a further object of the present invention is the provision of a vibrator which is lightweight, rugged in design, economical to manufacture, and which produces vibrational motion in a toroidallike pattern.

The above objects are attained by the provision of a vibrator having the various components thereof fabricated essentially as outlined in the above summary.

These and other objects of the present invention will become apparent to those skilled in the art while studying the following detailed description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view showing one form of a motor driven vibrator which has been fabricated in accordance with the present invention;

FIG. **2** is an enlarged top plan view of part of the device seen in FIG. **1**, with the top closure member being removed therefrom so as to disclose the various parts contained inside thereof, and with some parts being cut or broken away and removed in order to better illustrate the invention;

FIG. **3** is an enlarged partial cross-sectional view taken along line **3–3** of FIG. **2**;

FIG. **4** is a side elevational view of another embodiment of the invention, with some parts being broken away and some of the remaining parts being shown in section;

FIG. **5** is an enlarged partial cross-sectional view taken along line **5–5** of FIG. **4**; and

FIG. **6** is a schematical representation illustrating the type of vibration produced by the foregoing illustrated device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the embodiment of FIG. **1**, the arrow at numeral **10** indicates an apparatus for inducing vibratory action or motion and includes an enclosure **12** which constitutes the vibratory portion of the apparatus. A motor is housed within enclosure **14** and is operatively connected to a flexible shaft or cable which is contained within a flexible housing **16**. Power is supplied to the motor by the illustrated electrical conduit having timer **18** located therein. The housing of the flexible shaft is provided with end connectors **20** and **22**, each of which is received within an end wall of each of the two enclosures. An access hole **24** enables the connector **20** to be removed from the vibrator.

As seen in FIG. **2**, in conjunction with FIGS. **1** and **3**, a front wall **26** is provided with a tunnel **28** for receiving the beforementioned connector end. A second tunnel **30** is provided within the illustrated inner wall to enable U-joint **31** to interconnect the flexible cable with the journal **32**. The journal is in the form of a conventional bearing which is rigidly affixed to the inner wall by the illustrated bolts. The inner and front walls cooperate together with the top and bottom to provide a small chamber **34**. A rear wall **36** has a rear journal in the form of a bearing housing **38** attached thereto by the illustrated bolts and cooperates with the remaining structure to form a large chamber **40**. Shaft **42** is received within a hollow boss **44** while the opposite end of the shaft continues through boss **46** to where it is received and rigidly affixed within the U-joint. Bearing portions **44** and **46** are journaled within the illustrated bearing housings.

A first eccentric weight comprised of two adjacent circular pieces of metal **48, 48'** are firmly secured to the shaft by the illustrated setscrews. A second eccentric weight comprised of circular pieces of metal **50, 50'** are likewise rigidly secured to the shaft and spaced apart from the first eccentric weight. Each eccentric weight is made into the configuration best seen in FIG. **3**. The first and second eccentric weights are oppositely disposed with respect to each other in the illustrated manner of FIG. **2**.

The details of FIG. 4, in conjunction with FIG. 5, illustrates a handheld vibrator having a housing **112** within which is located two pair of eccentric weights. One pair of which is seen at **148, 148'**. The weights are journaled within the bearing **144**, and the shaft is driven by a flexible drive cable **20**. Plug **138** has the illustrated bearing molded therewithin and also serves as a closure member for the resilient housing. Plug **165** is identical to plug **138** with the exception of the provision of a tunnel therethrough for the drive cable. With the exception of the shaft length, the eccentric weights are arranged essentially as seen in the foregoing FIGS.

FIG. **6** illustrates in a diagrammatical manner an analysis of the motion which is imparted into the housing containing the spaced apart eccentric weights which produces the vibratory motion of the present invention. As seen in FIG. **6**, eccentric weights **48** and **50** are spaced apart from a point of neutrality N and each eccentric weight tends to swing the shaft **42** in opposite directions with each end of the shaft describing the illustrated circular motion. The point of neutrality N corresponds to the indicated area **160** of FIG. **4** or **60** of FIG. **2**.

OPERATION

In operation the motor enclosure **14** is best set upon the floor in close proximity of the user of the vibrator **12** so as to enable the vibrator to be placed upon any desired portion of the body. Where the area to be treated by the vibrator is extremely sensitive to touch, the neutral point **60** can be placed thereon since the magnitude of the energy imparted into the body increases in a radial direction away from the point of neutrality. This action causes circulation to be stimulated, much like a toroid, at all points about the neutral point. With the timer T set for a specific period of time, and with the motor properly energized by a suitable source of current, the flexible cable turns within its housing thereby driving shaft **42**. Since the shaft is journaled to the rear and inner wall, and since the eccentric weights **48** and **50** are diametrically opposed with respect to each other, a vibratory motion will be imparted into the enclosure as illustrated in FIG. **6**.

The motor located within the enclosure **14** is preferably a one-third horsepower, 1725 r.p.m., 120 volt AC motor. Where it is desired to use a higher frequency of vibration a lower horsepower motor producing 3450 r.p.m. can be used after removing eccentric weights **48'** and **50'**. However, both weights together with the 1725 r.p.m. motor is preferred because the high speed motor is noisy and sets up a very light vibration pattern. A one-third horsepower motor is more than adequate to attain the desired results of the present invention. It is possible to use a smaller motor, however, the cost between a one-fourth horsepower and one-third horsepower motor is negligible. The larger motor permits various size weights to be used in order to change the amplitude of the vibration.

The flexible cable **16** is conventional and is preferably a three-fourths inch flexible shaft having couplings thereon which readily mate to the U-joint **31**, with the U-joint in turn being attached to a three-fourths inch shaft **42**. Weights **48** and **50** are cut from three-quarter inch thick mild steel and is provided with a one and one-half inch diameter. The shaft hole at **42** in FIG. **3** is cut slightly oversize so as to slidably receive the shaft therethrough with close-fitting tolerance. The shaft is preferably undercut so as to receive the fastener located within the threaded apertures **62**, all as seen in the manner of FIG. **3**. The shaft hole at **42** is located near the outer periphery of the eccentric weight leaving at least one-eighth inch of metal at the thinnest portion.

It should be noted that the area of neutrality, assuming each of the eccentric weights are adjacent the bearing members, is located halfway between the weights. The weights may be moved along the shaft in order to achieve different vibrational characteristics, when desired.

The embodiment of FIG. **4** includes a resilient housing, preferably 18 inches in length and 3½inches in diameter, with the shaft being journaled within bearings which are molded within rubber or rubberlike closure members. The embodiment of FIG. **4** can be held in the hands, with the palms placed in an upward direction to thereby enable the user thereof to utilize the apparatus while at the same time manipulating the arms in a manner similar to weight lifting. Furthermore, the apparatus can be rubbed or rolled along the stomach and chest cavity while carrying out the exercise. The resilient housing enables the apparatus to conform to the chest cavity and stomach during its use, yet the housing cannot be deformed sufficiently to cause the eccentric weights to contact the inside peripheral wall surface thereof. With the hands adjacent each other and in close proximity to the neutral axis **160**, a minimum of vibration is imparted thereinto; but with the hands extended to an area adjacent to the spaced apart pairs of weights, the maximum amount of vibration is received by the hands.

The particular motion imparted by the spaced apart diametrically opposed eccentric weights causes the enclosure to vibrate or move in a multiplicity of directions, which is sometime referred to as "solar radiation" since it is directed in a number of directions much like a solar compass.

While the above is a description of two different embodiments of the present invention, what I desire to secure by Letters Patent is as follows:

I claim:

1. An apparatus for inducing vibratory action into an area of a person's body comprising;

a motor, a shaft, spaced-apart journal means, an enclosure, a first and second eccentric weight; means connecting said motor to said shaft to thereby impart rotational motion into said shaft;

said shaft being mounted within said enclosure by said journal means;

means affixing said first and second eccentric weights to said shaft, said first and second weights being spaced apart from each other with each said eccentric weight being located a spaced-apart distance along said shaft and between said journals;

said enclosure being in the form of a resilient elongated housing having said shaft axially aligned therewith; and

closure means at a terminal end of said enclosure for mounting said journal to said housing.

2. The apparatus of claim **1** wherein said closure means for mounting said journal includes resilient plugs within which said journal is located.

3. The improvement of claim **1** wherein said motor spaced apart from said enclosure with said shaft being connected to said motor by a flexible cable located within a protective housing.