A. E. ELLIS.

MASSAGE VIBRATOR.

APPLICATION FILED MAY 7, 1906. RENEWED JULY 24, 1909.

976,993. Patented Nov. 29, 1910.

Fig. 3.

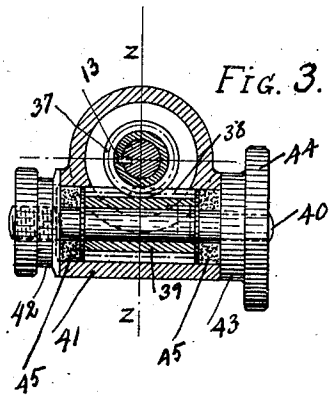


Fig. 4.

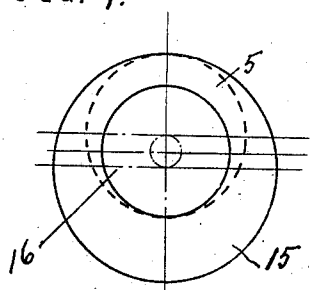


Fig. 5.

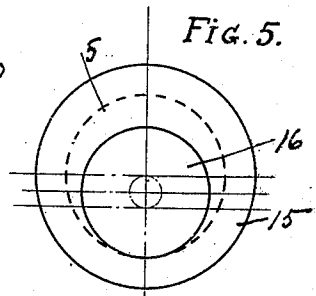


Fig. 1.

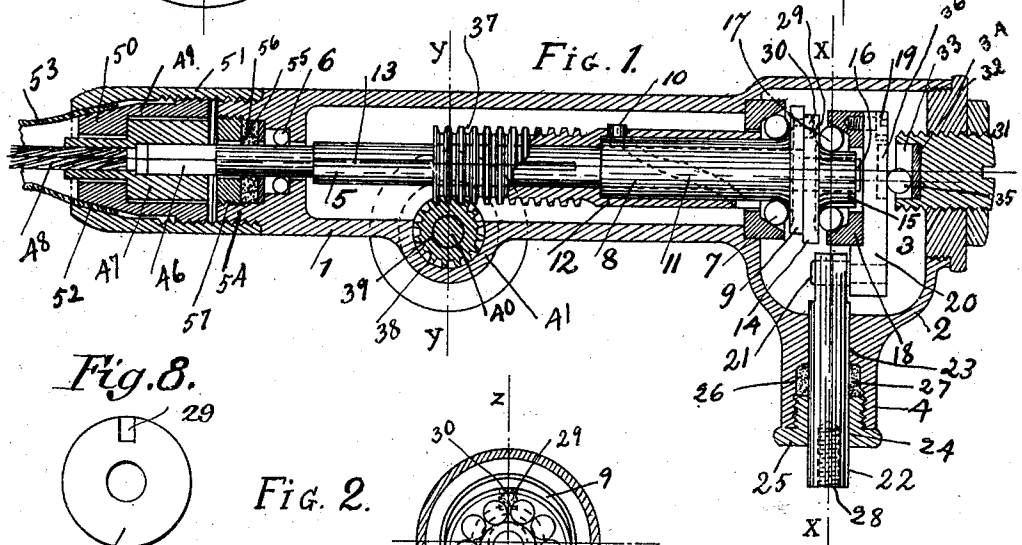


Fig. 8.

Fig. 2.

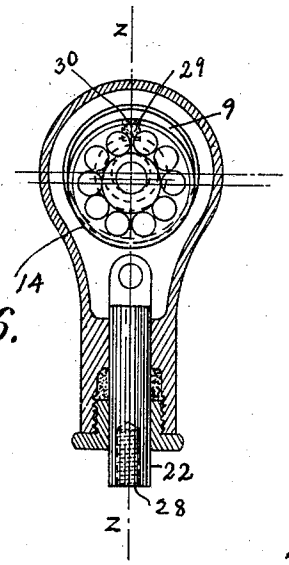


Fig. 6.

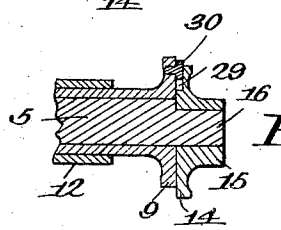
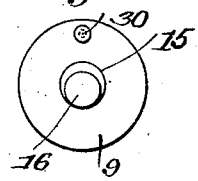


Fig. 7.



WITNESSES:

William P. Richards

Mary A. Kinney

INVENTOR.

Axel E. Ellis,

By his Attorney,

P. Mark Anderson

UNITED STATES PATENT OFFICE.

AXEL E. ELLIS, OF QUINCY, MASSACHUSETTS.

MASSAGE-VIBRATOR.

976,993. Specification of Letters Patent. Patented Nov. 29, 1910.

Application filed May 7, 1906, Serial No. 315,477. Renewed July 24, 1909. Serial No. 509,449.

To all whom it may concern:

Be it known that I, AXEL E. ELLIS, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Massage-Vibrators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to vibrators for use in massage treatment.

It has been found in practice that it is very desirable to be able to adjust the stroke of the vibrator while in operation and attempts have been made to secure this result.

It has been proposed heretofore to adjust the stroke of the vibrator by means of a longitudinally movable eccentric cylinder, which was adjustable to vary the stroke, and when once adjusted was set by means of a set screw, but it is obvious that the adjustment must be made while the device is not in use, for it is necessary to loosen the set screw, move the eccentric cylinder longitudinally to vary the throw of the vibrator, and then set up the set screw to maintain the adjustment, and this could not be done while the vibrator was operating against the body.

The object of the present invention is to provide means whereby, while the vibrator is operating upon the body, its stroke may be adjusted without varying the speed thereof.

A further object of the invention is to provide improved anti-friction adjustable bearings facilitating the ease of running of the apparatus.

To the above ends the present invention consists of the devices and combinations of devices which will be hereinafter described and claimed.

The present invention is shown in the accompanying drawing, in which:—

Figure 1 shows a longitudinal sectional view through the device on the line *z*—*z*, Fig. 2. Fig. 2 shows a vertical sectional view taken on the line *x*—*x*, Fig. 1. Fig. 3 is a sectional view taken on the line *y*—*y*, Fig. 1. Figs. 4 and 5 are diagrammatic views illustrating the adjustment of the stroke from the maximum to the minimum. Fig. 6 shows a detail of the construction to be referred to. Figs. 7 and 8 represent respectively face views of the disks 9 and 14.

Similar reference characters will be used throughout the specification and drawings to designate corresponding parts.

In the drawing 1 represents the casing or handle which supports the operating parts, and which at its forward end is provided with a head 2 having a chamber 3 and a depending nose 4. Mounted to rotate in the casing or handle 1 is a shaft 5 which is supported by a ball bearing 6 at its rear end and a ball bearing 7 at its forward end. Mounted upon the shaft 5 at its forward end is a sleeve 8 provided at its right hand end within the chamber 3 with a disk 9. The sleeve 8 is provided with a pin or stud 10 which takes into a spiral groove 11 (see dotted lines Fig. 1) formed in a tube or sleeve 12 supported upon the shaft 5 and at its forward end surrounding the sleeve 8.

The sleeve 12 is connected to the shaft 5 to rotate therewith by means of a spline 13, but as will be hereinafter explained, the sleeve 12 is free to be moved along the shaft 5 so that by means of the spiral groove 11 and the pin or stud 10 to turn the sleeve 8 for a purpose which will be hereinafter described.

Arranged in close contact with the disk 9 of the sleeve 8 is a disk 14 carrying a short sleeve or cone 15 and mounted upon a crank pin 16 formed upon and projecting eccentrically from the forward end of the shaft 5. As shown in Figs. 2, 4 and 5, the bore formed in the disk 14 and its cone 15 is arranged eccentric to the axis thereof. The sleeve or cone 15 forms one member of a ball bearing 17, the other member being formed by a hardened cup 18 attached by means of screws 19 (one only being shown) to a link 20.

The link 20 is pivotally connected at its lower end by means of a stud 21 to a plunger 22 arranged to reciprocate in a bearing 23 formed in the nose 4, and a bearing 24 formed in a threaded block 25. Below the bearing 23 is formed a chamber 26 in which may be placed a lubricating packing 27 held in place by the plug 25. The lower end of the plunger 22 is suitably arranged, as by means of the threaded socket 28, to receive any of the usual and well known forms of vibrating tools.

The disk 9 is provided with a stud 29 (see Figs. 1 and 2) which takes into a radial slot 30 formed in the disk 14 and the disks 9 and 14 are held in close contact with each other and the bearings 7 and 17 properly adjusted,

by means of the adjusting plug 31 tapped into a cap 32 closing the open end of the chamber 3. The plug 31 at its inner end is provided with a seat or socket 33 in which is placed a hardened plate 34, against which bears a ball 35, the ball in turn bearing against a hardened plate 36 inserted in the face of the link 20.

From the foregoing description it will be seen that a rotation of the shaft 5 will cause a rotation of the sleeve 12, which by means of the stud 10 and slot 11 will rotate the sleeve 8, thus rotating the disks 9 and 14, and imparting vertical reciprocations to the plunger 22.

In Fig. 5 there is shown such an adjustment of the eccentric cone 15 with relation to the eccentric pin 16 as to bring the periphery of the cone 19 concentric with the axis of the shaft 5 (the shaft being shown in a broken line Fig. 5), and therefore no movement will be imparted to the plunger 22 by the rotation of the shaft. In Fig. 4, however, the eccentric cone 15 bears such an adjustment with relation to the eccentric stud 16 and the axis of the shaft 5 that the maximum stroke of the plunger 22 will be imparted by the rotations of the shaft 5. Between these two adjustments it is obvious that there are many which can be made varying the stroke of the plunger 22.

The adjustment of the eccentric cone 15 is secured by the turning of the sleeve 8 on the shaft 5 and as the disk 9 on the sleeve 8 and the disk 14 of the eccentric cone 15 are held together by the stud 30 and slot 29, the turning of the sleeve 8 will turn the disk 14 and the eccentric cone 15 about the crank pin 16.

As above explained, the turning of the sleeve 8 is accomplished by the longitudinal movement of the sleeve 12 along the shaft 5, such movement causing the spiral slot 11 in the sleeve 12 to turn the sleeve 8 by means of the stud 10.

I have arranged a suitable mechanism which can be engaged by the thumb of the operator as he grasps the casing or handle 1, whereby the sleeve 12 can be moved along the shaft 5 while the device is in operation, thus providing for the adjustment of the stroke of the vibrating tool without the necessity of stopping its operation or removing it from contact with the body.

To secure the above result the sleeve 12 at its inner end is provided with the parallel annular ribs or threads 37 and these ribs or threads are engaged by the longitudinal ribs or threads 38 formed on a sleeve 39 mounted upon and splined to a shaft 40 mounted in a transverse bearing 41 at the under side of the casing or handle 1.

The shaft 40 is held in its bearing by means of the check nut 42 and the hub 43 of the thumb wheel 44 arranged in suitable position to be engaged by the thumb of the operator, whereby the shaft may be turned to cause the turning of the sleeve 39 and thus through the parallel ribs or teeth 38 engaging the parallel ribs or teeth 37 move the sleeve 12 backward or forward along the shaft 5. As the teeth 37 and 38 are parallel, it is observed that there will be little or substantially no friction caused by the rotation of the sleeve 12.

If desired to provide for the easy turning of the shaft 40 and its sleeve 39, suitable lubricating packings 45 may be provided in the bearings of the shaft 40.

The shaft 5 at its rear end is provided with a polygonal stem 46 arranged to engage a polygonal recess in a block 47, which block 47 is connected with a suitable flexible shaft 48 whereby it will be rotated and, by means of its connection with the shaft 5, rotate the shaft. The block 47 is mounted to turn freely in a socket 49 which is tapered at its inner end as shown at 50, and at its forward end has a threaded connection with a thimble or coupling 51, which at its rear end is provided with an interior taper 52 cooperating with the taper 50 of the socket 49 to clamp the tubular covering 53 of the flexible shaft. The handle or casing 1 at its rear end is provided with a threaded projection 54 arranged to be engaged by the internal threads of the thimble or coupling 51, thus to connect the vibrator with the flexible shaft. The projection 54 of the handle or casing 1 is provided with a chamber 55 to receive a lubricating packing 56 which is held therein by a threaded ring 57. It is of course obvious that the flexible shaft 48 is connected with a suitable engine or source of power, usually an electric motor.

It is thought that the operation of my invention has been sufficiently described in the foregoing description of its construction and organization and that a further description thereof is unnecessary.

Having described my invention I claim as new and desire to protect by Letters Patent of the United States:—

Claims.

1. In combination, a reciprocating plunger, a rotating shaft, a crank pin carried by said shaft, an adjustable eccentric mounted on said crank pin, and means for adjusting the eccentric while the shaft is in rotation, substantially as described.

2. In combination, a reciprocating plunger, a rotating shaft, a crank pin carried by the shaft, an adjustable eccentric mounted on the crank pin, a sleeve mounted on the shaft to turn thereon, connections between the sleeve and eccentric and means for turning the sleeve to adjust the eccentric, substantially as described.

3. In combination, a reciprocating plunger, a rotating shaft, a crank pin carried by

the shaft, an adjustable eccentric mounted upon said crank pin, a sleeve mounted upon the shaft and connected with the adjustable eccentric, and a longitudinally movable sleeve splined to said shaft and having a spiral slot engaging a pin on the first mentioned sleeve, substantially as described.

4. In combination, a reciprocating plunger, a rotating shaft provided with a crank pin, an adjustable eccentric mounted upon said crank pin, a longitudinally movable sleeve splined to said shaft, means to move said sleeve along said shaft, and connections between the sleeve and eccentric whereby the longitudinal movement of the sleeve will adjust the eccentric on the crank pin, substantially as described.

5. In combination, a reciprocating plunger, a rotating shaft carrying a crank pin, an adjustable eccentric mounted on said crank pin, a longitudinally movable sleeve splined to said shaft, a thumb wheel and connected mechanism for moving said sleeve along said shaft, and connections between said sleeve and the adjustable eccentric for adjusting said eccentric, substantially as described.

6. In combination, a reciprocating plunger, a rotating shaft, an adjustable eccentric connecting said plunger and shaft, a longitudinally movable sleeve splined to said shaft and provided with parallel annular ribs or threads, a transversely arranged shaft provided with parallel longitudinal ribs engaging the ribs on the sleeve, a thumb wheel for turning the transversely arranged shaft and connections between the sleeve and the adjustable eccentric whereby the movement of the sleeve along the shaft adjusts the eccentric, substantially as described.

7. In combination, a reciprocating plunger, a rotating shaft, a sleeve mounted on said shaft and provided at one end with a disk, an adjustable eccentric mounted upon a crank pin carried by the shaft and provided with a disk arranged to contact with the disk on the sleeve, a pin and slot connection between the disks of the sleeve and the eccentric, a suitable ball bearing supporting the sleeve and shaft, an eccentric strap, a suitable ball bearing interposed between the eccentric and the eccentric strap, and an adjustable ball bearing engaging the eccentric strap, substantially as described.

8. In combination, a reciprocating plunger, a rotating shaft carrying a crank pin, an adjustable eccentric mounted upon said crank pin, a sleeve mounted upon and arranged to turn on said shaft, a pin and slot connection between said sleeve and said adjustable eccentric, a stud carried by said sleeve, a longitudinally movable sleeve splined to the shaft and surrounding the first mentioned sleeve and a spiral groove carried by the longitudinally movable sleeve engaging the stud on the first mentioned sleeve, substantially as described.

9. In combination, a handle or casing provided at its forward end with a chamber, a shaft mounted in the handle or casing, adjustable eccentric mechanism mounted in the chamber, a plunger connected with the adjustable eccentric mechanism, a removable cap closing the chamber, and an adjustable device mounted in said cap to adjust the bearings of the eccentric mechanism, substantially as described.

10. In combination, a handle or casing, a rotating shaft mounted therein, a chamber at its forward end, adjustable reciprocating mechanism in said chamber, a plunger operated by said mechanism, a transversely arranged adjusting mechanism mounted in said handle or casing for adjusting the eccentric, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

AXEL E. ELLIS.

Witnesses:
T. HART ANDERSON,
MAY A. KENNEY.