

April 5, 1938.

P. E. ERICKSON

2,113,444

VIBRATING MOTOR

Filed Sept. 26, 1936

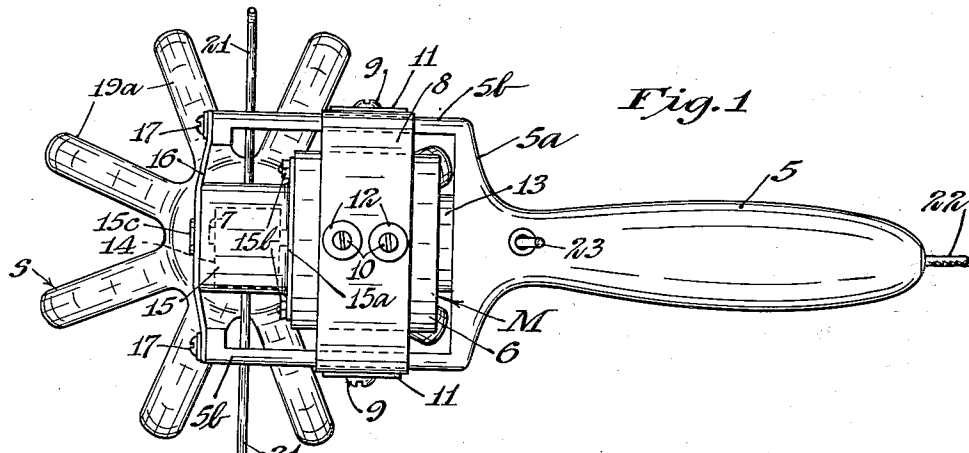


Fig. 1

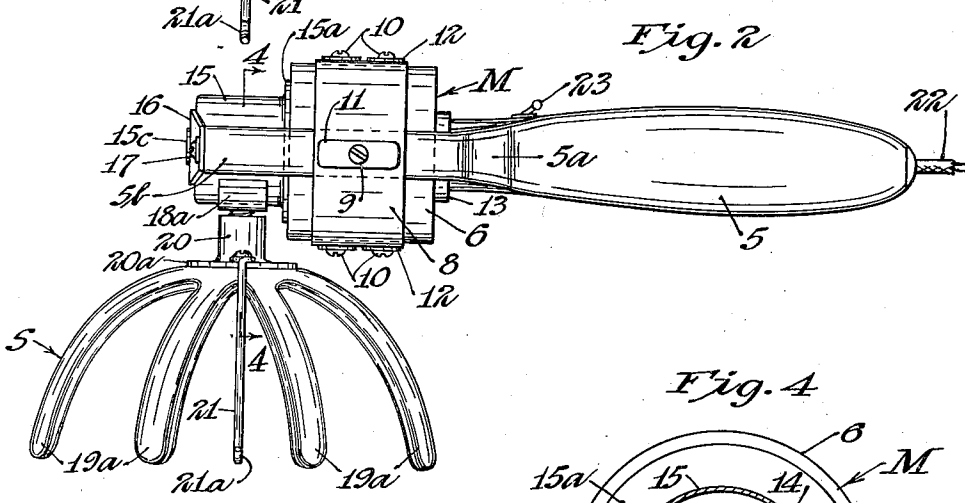


Fig. 2

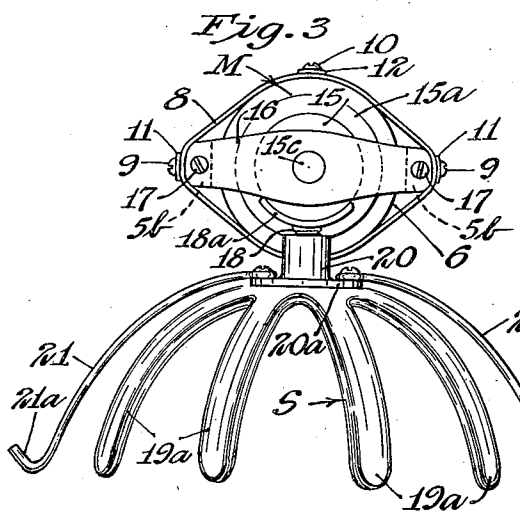


Fig. 3

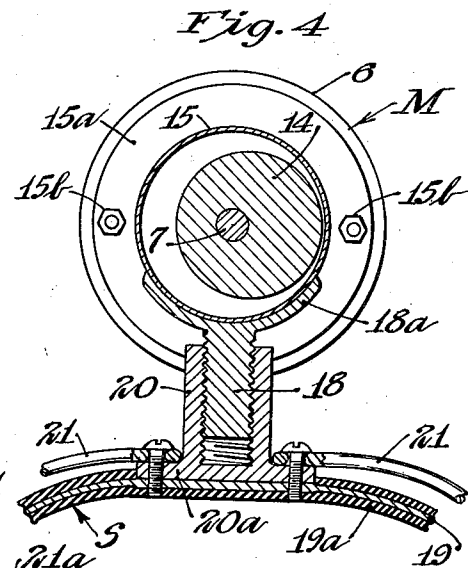


Fig. 4

Inventor  
Prentis C. Erickson  
By Williamson & Williamson  
Attorneys

# UNITED STATES PATENT OFFICE

2,113,444

## VIBRATING MOTOR

Prentis E. Erickson, Minneapolis, Minn., assignor  
to James B. Bradshaw, Minneapolis, Minn.

Application September 26, 1936, Serial No. 102,782

### 1 Claim. (Cl. 128—36)

My invention relates to vibration producing apparatus and particularly to apparatus for imparting vibration to a vibratory tool.

According to common practice many vibratory tools are driven by followers reciprocated by cams, by cranks or eccentrics connected to the tool by connecting rods, or by armatures of electric buzzer devices. All of such tool driving means produce vibratory movement of a substantially reciprocatory or rectilinear nature and also are subject to more or less wear which, after a time, tends to render the device excessively noisy.

A general object of my invention is to provide apparatus for imparting to a vibratory tool a motion including lateral as well as projective and retractive components of movement.

Another object of my invention is to provide such vibratory tool driving apparatus of a rotary nature and yet of such construction as to obviate the need for motion converting means such as cam followers, connecting rods and the like.

A more specific object is to provide a vibration producing mechanism utilizing an eccentrically rotating weight as the vibration producing element.

Still another object is to provide such mechanism wherein a resiliently supported motor is vibrated as a unit by an eccentric weight carried by the shaft of the motor.

A further object is to provide such apparatus of simple, rugged, compact, inexpensive and relatively wear-free construction.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawing, wherein like reference characters refer to the same or similar parts throughout the various views, and in which:—

Fig. 1 is a top view of an apparatus incorporating an embodiment of my invention,

Fig. 2 is a side view,

Fig. 3 is a front view, and

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 2 as indicated by the arrows.

Referring to the drawing, I have illustrated my invention by showing an embodiment thereof incorporated in a scalp massaging device.

Essentially, my vibration producing apparatus consists of a member journaled in a suitable bearing element so as to be rotatable about a predetermined axis, said member having a center of mass disposed eccentrically of said axis and said bearing element being mounted on supporting means therefor of a yieldable nature so

as to be resistingly permissive of lateral displacement of said bearing element and said member. Rotation of the eccentrically weighted rotatable member of such a combination will cause said yieldably supported bearing element to non-rotatively move in an annular path whereby an object connected to said bearing element will be vibrated. A manner in which the above broadly described essential elements may be embodied in a scalp massaging device is as follows.

The illustrated device includes a handle 5, having a radially enlarged portion or head 5a at its forward end carrying forwardly projecting parallel similar extensions 5b spaced from and at respectively opposite sides of the longitudinal axis of the handle 5. The handle 5, head 5a and extensions 5b comprise a support for elements to be described.

Structure including a member journaled in suitable elements is supported from the above described support between and inwardly spaced from the extensions 5b thereof. Preferably the supported structure consists of an electric motor M having a casing or frame 6 and an armature shaft 7. The motor M is supported from the extensions 5b in a manner permissive of movement of the motor M in directions radial thereof relative to the extensions 5b. An endless band 8, of elastic material such as rubber, encircles the extensions 5b and the motor M so as to bear against the outer sides of the extensions 5b and points at right angles thereto on the periphery of the case 6 of the motor. The band 8 is secured to the extensions 5b and the motor case 6 at its points of contact therewith by suitable means such as the screws 9 and 10. If desired washers 11 and 12 may be placed between the heads of the respective screws 9 and 10 and the band 8.

A spacing block 13, formed of elastic and resilient material such as sponge rubber or the like, is interposed between the handle head 5a and the rear end of the motor M.

To form a motor driven vibration producing unit, an element 14, preferably of cylindrical form and constructed from relatively heavy material, is eccentrically mounted on the motor shaft 7, as shown in Fig. 4, whereby the rotating parts of the motor M and the element 14 together comprise a member having a center of mass disposed eccentrically of the axis of rotation of such member. The axis of rotation referred to obviously consists of the longitudinal axis of the motor shaft 7 which is, in a well known manner,

confined to rotation about such axis by shaft bearings (not shown) of conventional form included in the structure of the motor M in accordance with common practice.

5 A cup-like enclosure or housing 15, having a radially outwardly projecting annular flange 15a thereon, is placed over the eccentrically mounted weight element 14 and shaft 7 in enclosing and spaced relation thereto and is mounted on the 10 front end of the casing 6 of the motor M by suitably securing the flange 15a to the motor M as by means of nutted studs 15b. The outer end of the enclosure 15 projects a short distance 15 5b and carries a centrally located forwardly projecting boss 15c. A strap 16, of elastic material such as rubber, has an apertured medial portion fitting closely about the periphery of the boss 15c and secured at its ends to the outer ends 20 of the respective extensions 5b by suitable means such as the screws 17.

The band 8 and strap 16 constitute elastic connections between the motor M and the extensions 5b of the supporting structure such as to 25 restrain the case 6 of the motor M from bodily rotation through any appreciable angle and yet resistingly permit deflection of the motor M within limits in any direction substantially normal to the axis of the motor shaft 7. With such 30 yielding supporting means for the motor, operation of the motor and consequent rotation of the eccentric weight element 14 will result in a reaction tending to move the motor M bodily in an annular path generally normal to the shaft 35 7. Such movement of the motor M is, of course, not accompanied by rotation of the motor case 6 about the axis of the shaft 7. The motor M and the housing 15 move together and, in effect, constitute a single body moving annularly as 40 described relative to the motor M.

Means is provided for connecting the above mentioned annularly moving body to any object to be vibrated. To this end an arcuate plate 18a, on which a depending, externally screw-threaded 45 attachment stud 18 is mounted, is secured to the lower side of the enclosure 15 as shown in Fig. 4.

To illustrate one application of my vibration producing apparatus to a vibratory tool or appliance, a scalp massaging appliance S is shown 50 screw threadedly mounted on the attachment stud 18 in operative relation therewith. The massaging appliance S is substantially the same as that shown in my U. S. Patent No. 2,049,434 on "Scalp massaging apparatus" issued August 55 4, 1936, and includes a spider-like series of resilient fingers 19 having rubber coverings 19a and

mounted on the flange 20a of a flanged internally screw-threaded sleeve 20 adapted for mounting on the stud 18 of my device as shown. Curved elements 21 formed into hooks 21a at their outer ends are secured at their inner ends 5 to the flange 20, as shown and are adapted for attachment thereto of a suitable retaining strap passing under the chin of a person on whose head the appliance S is disposed.

The motor M is provided with an electric cord 10 22 extending through a suitable passage within and disposed longitudinally of the handle 5 and adapted to be connected to a source of electrical energy. A switch 23, conveniently mounted in the handle 5, is connected in the circuit of the 15 cord 22 for use in turning the motor M on and off.

The motion applied to the appliance S by the annularly moving motor M is obviously such that the appliance will be vibrated both vertically and 20 horizontally and will hence produce both a rubbing action and a varying pressure on the head of the user.

It is apparent that I have invented a novel, 25 simple, compact, effective and inexpensive vibration producing apparatus wherein structure subject to wear and productive of friction is minimized and which is capable of producing vibration including components of vibratory motion 30 in various directions.

While my vibration producing apparatus has been illustrated and described as applied to a 35 scalp massaging appliance, it should be obvious that the apparatus is readily adapted for use with many other types of appliances and tools. 35

It will, of course, be understood that various changes may be made in the form, details, proportions and arrangement of the parts, without departing from the scope of my invention, which, 40 generally stated, consists in a device capable of carrying out the objects above set forth and in the novel parts and combinations of parts disclosed and defined in the appended claim.

What is claimed is:—

Vibration producing apparatus comprising, a 45 motor having a frame and a power delivery shaft projecting outwardly thereof, supporting structure for said motor, resilient means connecting said motor to said structure, an element mounted on said shaft and having a center of mass disposed 50 eccentrically of said shaft, means secured to said frame and enclosing said element and said projecting portion of the shaft, and an element carried by said enclosing means and adapted to be connected to an object to be vibrated. 55

PRENTIS E. ERICKSON.