F. G. HOFFINE.

VIBRATOR.

APPLICATION FILED APR. 10, 1919.

1,352,894. Patented Sept. 14, 192

Fig. 1

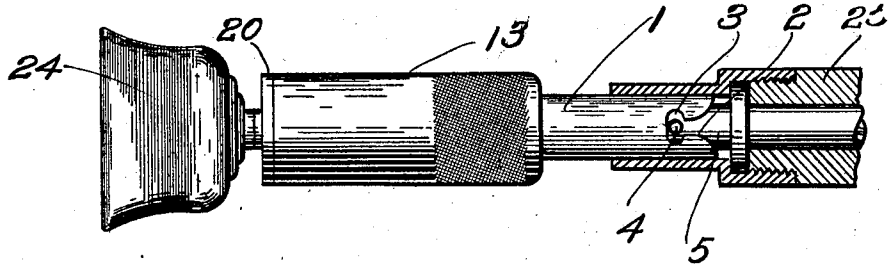


Fig. 2

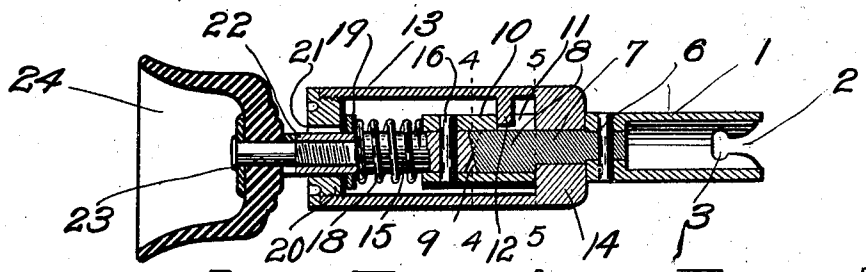


Fig. 3

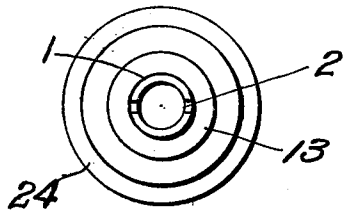


Fig. 4

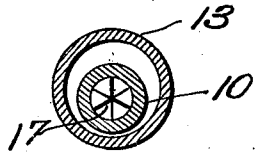


Fig. 5

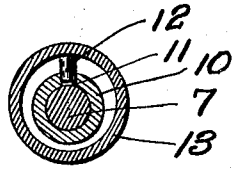


Fig. 6.

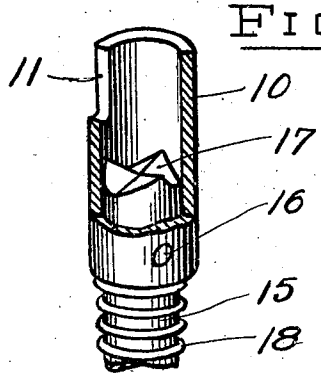
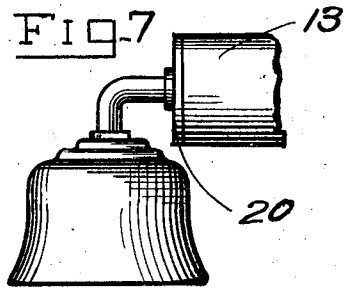


Fig. 7



Inventor.

Fred. G. Hoffine

UNITED STATES PATENT OFFICE.

FRED G. HOFFINE, OF KANSAS CITY, MISSOURI.

VIBRATOR.

1,352,894. Specification of Letters Patent. Patented Sept. 14, 1920.

Application filed April 10, 1919. Serial No. 289,031.

To all whom it may concern:

Be it known that I, FRED G. HOFFINE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Vibrators; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to a vibrator mechanism in which a rotary motion is converted into a reciprocatory motion or an oscillatory motion and one of the objects thereof is to provide a simple, durable and efficient device adapted, through the conversion of movement, to impart the necessary number of beats to an applicator whereby highly beneficial results may be attained.

It is well known that in order to obtain the best results in dissipating congestion in the human body and stimulating circulation, the vibration should be of relatively high frequency and it is not always practicable to attain these results by the mechanism now in use. I have provided means, however, whereby motion from a relatively low speed may be converted into relatively high frequency vibrations in an efficient manner.

In the drawings,

Figure 1 is a side elevational view of a vibrator constructed in accordance with my invention.

Fig. 2 is a vertical longitudinal sectional view through the same.

Fig. 3 is an end view looking from the end of the shaft.

Fig. 4 is a sectional view on the line IV—IV of Fig. 2.

Fig. 5 is a sectional view on the line V—V of Fig. 2, and

Fig. 6 is a fragmentary perspective view of the reciprocatory shaft and its sleeve, and

Fig. 7 is a modified form of applicator shank.

In carrying out my invention I provide a shaft-receiving socket 1, which is provided with a slotted end 2 communicating with shaft pin receiving seats 3, the edges of the slot being flared to permit the pins 4 of the shaft 5 to be guided into the seats 3. The shaft 5 and pins 4, together with the slot 2 and seats 3 are so constructed that when the pins are in the seats 3. the socket 1 and shaft 5 are clutched together so that the socket and the operating mechanism will be rotated in any direction the shaft turns.

Keyed to the socket member 1 by a pin 6 is an eccentric shaft 7 having a cam portion 8 and a cam faced end 9, the cam portion of the member 7 being received within the sleeve 10, which is provided with a longitudinal slot 11 to receive a pin 12 on the housing 13, which is provided with an end 14, one face of which abuts against the shoulder formed by the eccentric portion 8 of the shaft 7 and the other face of which abuts against the socket member 1, as best seen in Fig. 2.

The sleeve is free from the member 7 but is fast to a reciprocatory shaft or plunger 15 which is connected thereto by a pin 16, as best seen in Figs. 2 and 6. The end of the shaft 15 is provided with cam faces 17 complementary to the cam end 9 of the member 7. In Fig. 6 I have shown the end of the shaft 15 as being provided with three cam projections 17 so that for each rotation of the member 7 there will be three vibrations of shaft 15.

Bearing against one end of the sleeve 10 is a spring 18 coiled about the shaft 15 and having its other end bearing against a plate 19 on the screw plug 20, which is screwed into the open end of the housing 13, the plug 20 being provided with an opening 21 slightly greater in diameter than the outer diameter of the socketed end 22 of the shaft 15. The socketed end 22 of the shaft 15 is internally threaded to receive a threaded shank 23 of the applicator 24.

When the parts are assembled and a rotary motion is imparted by the shaft 5 to the socketed member 1, the cam shaft 7 will be rotated therewith. If the housing 13 is grasped by the operator, the cam shaft 7 will rotate independently of the housing and as a result, its cam face 9 will ride over the cam projections 17, imparting a reciprocating motion to the shaft 15 because the expansion spring 18 will always have a tendency to move the projections 17 into contact with the end 9. The cam portion 8, at the same time, will impart a wabbly or

oscillatory motion to the sleeve 10 and consequently to the shaft 15, which is keyed thereto.

It is to be understood, of course, that the sleeve 10 has a reciprocating motion with respect to the shaft 7 but it cannot rotate with respect thereto because it is held by the pin 12 against rotation, as heretofore explained. The multiplicity of cam projections 17 will cause a multiplication of the vibratory movements, for example, if the shaft 5 is traveling at 600 revolutions, there will be 1800 movements in one direction imparted to the applicator 24.

If it is not desired to operate the device in the manner just described, the operator may let go of the casing 13 and may grasp the sleeved handle 25 of the shaft 5 whereupon the housing will be rotated at the speed of the shaft 5 and consequently, the speed of the applicator 24 will be that of the shaft 5.

From the foregoing, it will be apparent that the device is simple of construction, easily operated, and that it is readily accessible for inspection and repairs, it being only necessary to remove the plug 20 with a spanner wrench or similar tool, remove the sleeve 10, and shaft 15 with its spring; the cam shaft 7 being adapted to be removed by taking out the pin 6 which may be simply put in place by a drive fit. It will also be apparent that the device may be easily assembled, and that the liability of derangement in operation will be reduced to a minimum if not wholly avoided.

In Fig. 7 I have shown the applicator at right angle to shaft 15 so that a rubbing motion will be imparted to the applicator; otherwise, the construction is the same as heretofore described.

What I claim and desire to secure by Letters-Patent is:

1. A vibrator comprising a casing, a cam shaft rotatable in the casing and having an eccentric portion, a spring-pressed applicator shaft in line with the eccentric portion of the cam shaft and rotatable therewith, and means on the applicator shaft cooperating with the cam shaft to cause reciprocation of the applicator shaft in opposition to the spring.

2. A vibrator comprising a casing, a cam shaft rotatable in the casing and having an eccentric portion, a spring-pressed applicator shaft in line with the eccentric portion of the cam shaft and rotatable therewith, and movement-multiplying means on the applicator shaft and coöperating with the cam shaft to cause reciprocation of the applicator shaft in opposition to the spring.

3. A vibrator comprising a casing, a cam shaft rotatable in the casing and having an eccentric portion, a spring-pressed applicator shaft in line with the cam shaft and rotatable therewith, and a plurality of cam projections on the applicator shaft and cooperating with the cam shaft to cause reciprocation of the applicator shaft in opposition to the spring.

4. A vibrator comprising a casing, a cam shaft rotatable in the casing, an applicator shaft longitudinally movable in one direction, opposed cams on the respective shafts, a socket on the applicator shaft and sleeved upon the cam shaft, the sleeve being provided with a slot, and a pin in the casing and projecting into the slot.

5. A vibrator comprising a casing having an inwardly directed projection, an applicator shaft, a spring for moving it in one direction, a cam shaft for moving it in the opposite direction, and a socket on the applicator shaft, sleeved on the cam shaft and provided with a longitudinal slot engaged by the projection in the casing.

6. A vibrator comprising a casing having an inwardly directed projection, an applicator shaft projecting through one end of the shaft, a cam shaft projecting through the other end of the casing and in line with the applicator shaft, a sleeve connecting the two and provided with a slot engaged by the projection in the casing, and a spring to maintain the cam ends of the two shafts in contact.

In testimony whereof I affix my signature.

FRED G. HOFFINE.