Nov. 17, 1953 S. F. JAMES ET AL 2,659,784

VIBRATOR

Filed Feb. 12, 1952

FIG. 1

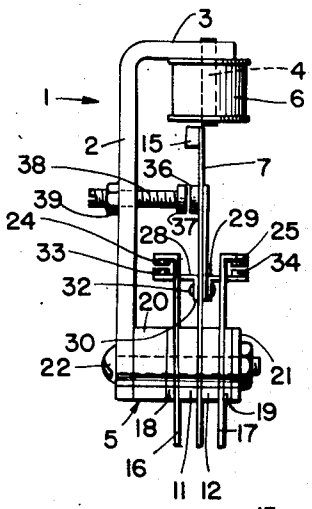


FIG. 2

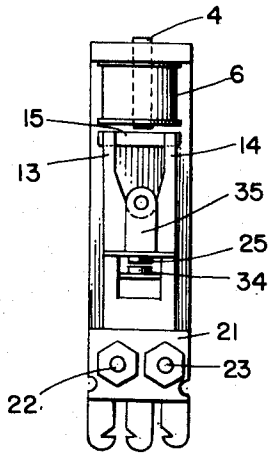


FIG. 3

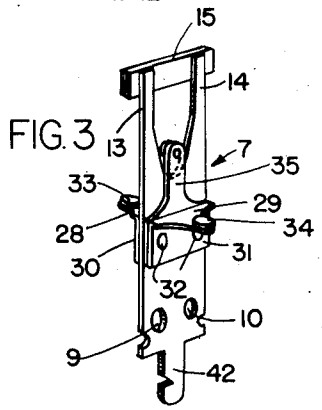


FIG. 4

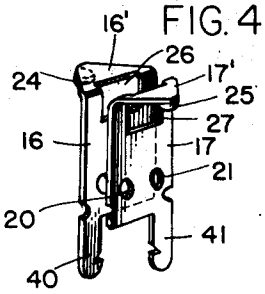
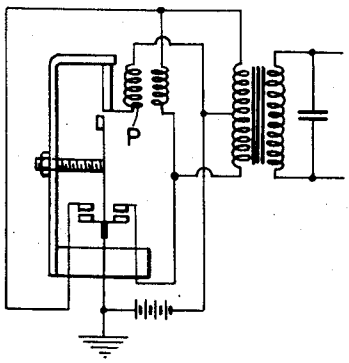


FIG. 5



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VIBRATOR

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3 Claims. (Cl. 200—90)

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This invention relates to improvements in vibrators, and is an improvement on the construction of our Patent No. 2,536,748 issued January 2, 1951, and application for Patent Serial No. 79,143 filed March 2, 1949, now abandoned.

The main objects of this invention are to provide a new and improved vibrator which is simple in construction, more compact and smaller in design, inexpensive to manufacture and will operate for long periods of time without attention; to provide a vibrator of the character having a relatively short reed; to provide a vibrator of this type which is free of the usual contact bounce; to provide a vibrator of this type wherein the contact arms do not traverse any portion of the arc traversed by the reed; to provide a vibrator of this character having a reed provided with contact arms extending at right angles thereto and a pair of stationary contact arms positioned closely adjacent the reed, parallel thereto and each having a contact thereon outwardly extending at right angles to the arm to which it is attached; to provide a vibrator of this character wherein the stationary contact arms are each provided with an opening through which the right-angled contact arms of the reed may pass and thereby allow closer positioning of the stationary contact arms to the reed.

An illustrative embodiment of this invention is shown in the accompanying drawings in which:

Figure 1 is a side elevational view of the vibrator of our invention.

Fig. 2 is a front view of the device of Fig. 1 and as viewed from the right of Fig. 1.

Fig 3 is a perspective view of the reed.

Fig. 4 is a perspective view of the two stationary contact arms and contacts.

Fig. 5 is a circuit diagram.

Referring in detail to the drawings, the frame 1 comprises a vertically disposed arm 2, a horizontally disposed arm 3, a vertically disposed pole piece 4 depending from the horizontal arm 3 and is in a plane parallel to the plane of the arm 2; and a horizontally extending stack 5.

An electromagnet 6, wound with the usual energizing and de-energizing coils is attached to the said pole piece 4, in the usual manner.

The base or bottom portion of reed 7 is provided with a pair of spaced apertures 9 and 10 and is secured in the stack 5 between insulators 11 and 12. The reed 7 is preferably constructed of high grade spring steel and is cut away at its upper ends to form a pair of legs 13, 14. An armature or weight 15, which preferably is formed of a metal of semihigh retentivity, is secured to the upper ends of the legs 13—14 in the usual manner.

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Stationary inverted L-shaped contact arms 16—17 are secured in the stack 5, one on each side of the reed base and one between the spacer insulators 11 and 18, and the other between the spacer insulators 12 and 19. The stack 5 is also provided with metal end spacers or washers 20 and 21 and both of the washers and all of the insulator spacers are provided with aligned apertures which correspond to the aligned apertures 9—10 of the reed and 20—21 of the stationary contact arms, whereby to receive the bolts 22—23 which, when drawn up, will hold the stack together as one compact unit.

It will be noted that the upper ends of the stationary contact arms 16—17 extend outwardly in a horizontal plane and at right angles to and away from the reed 7, one on each side of said reed. Contacts 24—25 are affixed to the under side of the legs 16' and 17' of the stationary contact arms 16—17 respectively in any suitable manner, such as is well known in the art. The stationary contact arms 16 and 17 are provided with enlarged apertures or openings 26—27 respectively, the purpose of which will hereinafter be described.

The movable contact arms 28—29 are each provided with downwardly extending legs or portions 30—31 respectively which are positioned one on each side of the reed 7, directly above the stack 5 and each is provided with aligned apertures therein corresponding to apertures in reed 7, whereby rivets 32 may be threaded therein and secure the legs 30—31 to the reed 7. Each contact arm 28—29 is provided with contacts 33—34 respectively and which are affixed to the upper face thereof in any suitable manner, such as is well known in the art. As clearly shown in the drawings, the contact arms 28—29 extend through the openings 26—27 of the stationary contact arms 16—17 respectively. It should be noted that by this arrangement, the normal width of the usual vibrator as well as that of my aforesaid patent, is greatly reduced, thereby making an extremely small but efficient vibrator.

The two pairs of contact arms 16—17 and 28—29 are horizontally arranged and parallelly disposed to each other and are spaced away from each other. The contacts 24 and 25 are positioned directly above contacts 33 and 34 respectively and are slightly spaced away from each other, whereby the contacts 24 and 25 are adapted to be engaged alternately by contacts 33 and 34 respectively.

As will be seen from Fig. 1 of the drawing the contacts **24**—**33** and **25**—**34** are positioned in cooperative relationship to each other, and because of this arrangement the contacts **24** and **25** may be very readily adjusted and spaced independently of each other so as to be in axial alignment and proper spacing with their respective contacts **33**—**34**.

As shown in Figs. 1 and 3, the reed **7** is provided with a driving contact which is used for starting the reed and consists merely of an upstanding contact arm **35** secured to the reed **7** by the same rivets **32** that secure the contact arms **30** and **31** thereto. The contact arm **35** is provided with the usual contact **36**, and is axially disposed in operative relationship with the contact **37** secured to the end of a threaded bolt **38**. The bolt **38** is arranged to be inserted through a suitably threaded aperture in the leg **2** of the frame **1** and locked in position by the lock nut **39**.

In the diagrammatic view of Fig. 5, we have illustrated the wiring diagram and show how the driver contact **36**—**37** is connected across the primary P of the pole piece **4**. Since anyone skilled in the art may readily understand the wiring diagram, it is believed to describe it in detail would be redundant.

It will now be apparent that when the reed **7** moves to the right in either Fig. 1 or 5, contacts **24**—**33** will be engaged and when the reed **7** is moved to the left, the contacts **25**—**34** will be engaged.

For convenience of connecting lead wires, the stationary contacts **16**—**17** and reed **7** are each provided with downwardly extending integrally formed legs **40**, **41** and **42** respectively.

It is to be understood that some of the details shown herein may be altered without departing from the spirit of the invention as defined by the following claims.

We claim:

1. In a vibrator, an inverted L-shaped frame, a pole piece depending from and secured to the horizontal leg of said frame, an electromagnet attached to said pole piece, a stack, a reed anchored in said stack, an armature-weight carried by the free end of said reed, a pair of relatively rigid oppositely extending movable contact arms attached to said reed adjacent said stack and extending at right angles to said reed, a contact on the free ends of each of said arms extending upwardly therefrom, a pair of cooperating relatively rigid stationary contact arms anchored in said stack and each having an oppositely extending leg, extending in a plane parallel to the plane of said movable contact arms, and a contact on the free ends of each of said legs depending therefrom, said stationary contact arms each provided with an opening through which said movable contacts extend.

2. In a vibrator, an inverted L-shaped frame, a pole piece depending from and secured to the horizontal leg of said frame, an electromagnet attached to said pole piece, a stack, a reed anchored in said stack, an armature-weight carried by the free end of said reed, a pair of relatively rigid oppositely extending movable contact arms attached to said reed adjacent said stack and extending at right angles to said reed, a contact on the free ends of each of said arms extending upwardly therefrom, a pair of cooperating relatively rigid stationary contact arms, each having an oppositely extending leg, extending in a plane parallel to the plane of said movable contact arms, and a contact on the free ends of each of said legs depending therefrom, said stationary contact arms each provided with an opening through which said movable contacts extend.

3. In a vibrator, a frame comprising an upright, a stack and a pole piece; an electromagnet attached to said pole piece; a vibrating reed rigidly anchored at one end in said stack, an armature-weight anchored to the free end of said reed; a pair of relatively rigid contact arms anchored to said reed adjacent to and above said stack and each extending oppositely at right angles to said reed; a pair of contacts for said arms, one attached to the upper side of the free end of each contact arm; a pair of inverted L-shaped relatively rigid stationary contact members, the vertical leg anchored at one end in said stack at opposite sides of said reed, the horizontal leg being arranged to extend in a plane parallel to said reed arms and positioned above and aligned with said reed arms; a pair of contacts for said horizontal legs of said stationary contact members, one attached to the underside of the free end of each of said horizontal legs and in alignment with said reed arm contacts, and insulating spacers interposed in said stack, one between said upright of said frame and said stationary contact members and one between said reed and each of said stationary contact members, said stationary contact members each provided with an opening through which said reed arms extend.

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