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VIBRATOR

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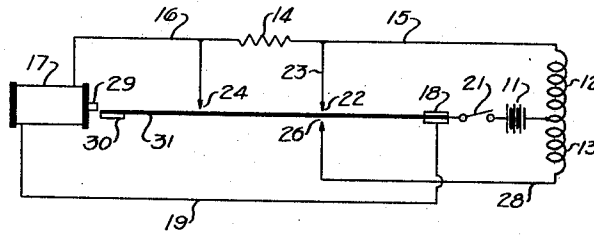


Fig. 1

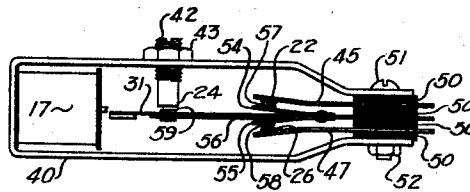


Fig. 2

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VIBRATOR

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5 Claims. (Cl. 175—365)

This invention as indicated, relates generally to vibrators and has reference more specifically to vibrators of the shunt type adapted for radio use.

One of the difficulties experienced with vibrators heretofore known is that surges are produced in the magnetic flux of the primary transformer coil and that corresponding surges are produced in the current which is inducted in the secondary coil of the transformer. A buffer condenser, connected across the circuit transformer secondary has been provided to absorb such surge effects and the capacity of such condenser has been so great as to establish R. F. interference due to charging surges in the secondary circuit.

Accordingly, the primary object of this invention is to provide a vibrator of the type described, wherein the surging effect will be maintained at a minimum and a lower capacity condenser can be used across the secondary.

A further object of this invention has been to provide a vibrator of the type described, wherein the surging will be a minimum and a low value buffer condenser can be used across the transformer secondary used in connection with the vibrator circuit.

Further objects of this invention are to provide a vibrator of the type described, which is efficient, which will have a long life, and in which the points are self-cleaning.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the structure hereinafter fully described and particularly pointed out in the claims; the annexed drawing and the following description setting forth in detail certain structure embodying the invention. Such disclosed means constitute, however, but one of the various structural forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a diagrammatical illustration of a circuit used in conjunction with this invention; and

Fig. 2 is a side elevation of a vibrator embodying this invention.

Referring more particularly to the drawing, and especially to Fig. 1, the circuit shown therein includes a source of current 11, which is connected to two primary coils 12 and 13 of a transformer. A resistance coil 14 is connected at one end by means of a conductor 15, to said coil 12, and at the other end by means of a conductor 16 to the starting coil 17. A reed support 18 communicates with said starting coil 17 by means of conductor 19 and communicates with said source of current 11 by means of a switch 21. Contact points 22 and 24 are connected on opposite sides of the said resistance coil 14 and to said conductors 15 and 16, respectively. A third contact point 26 is located oppositely from said contact

point 22 and communicates by means of conductor 28 with said primary coil 13. Said starting coil 17 has a core 29 which, when magnetically energized, attracts the metallic tip 30 of reed 31.

Referring now to Fig. 2, wherein the mechanical structure embodying the circuit, as illustrated in Fig. 1, is shown, it is to be noted that corresponding reference characters will be used as far as practical to corresponding parts of the structure.

A vibrator embodying this invention, comprises a substantially U-shaped metallic member indicated generally at 40, the base of which constitutes one point of contact for the starting coil 17 and one arm of which has a threaded hole in engagement with the thread of bolt 42, the lower end of which constitutes said contact point 24. A lock nut 43 is provided to securely position said bolt 42. Reeds 31, 45 and 47 are insulated from each other and from the U-shaped member 40 by means of insulating washers 50 and are secured to the U-shaped member by means of bolt 51 and nut 52. Surrounding said bolt 51 is a tubular insulator (not shown) which prevents electrical contact between the said bolt 51 and said reeds. Secured to the reed 31, as by means of rivets, are reeds 54, 55 and 56.

The contact point 22 is carried by said reed 45 and mating contact point 57 is carried by said reed 54. The contact point 26 is carried by said reed 47 and mating contact point 58 is carried by said reed 55. Carried by reed 56, which is more flexible than reed 31 and projecting through a hole in the latter, is contact point 59 which mates with contact point 24.

As is indicated above, one end of said starting coils 17 is connected to the base of said U 40 and the other end of said coil 17 communicates by means of conductor 19 with said reed 31. As is indicated in Fig. 1, the circuit of the vibrator construction illustrated in Fig. 2, is completed by connecting one end of said switch 21 to said reed 31 and the other end of said switch 21 to said source of current 11. One end of said coils 12 communicates with said source of electricity 11 and the other end thereof communicates with the line resistance 14 by means of conductor 15. A current conducting portion of the device indicated at 16 communicates with the other end of said resistance coil 14 and is connected to said arm of said U-shaped member 40, which carries a bolt 41, so that this arm is a part of conductor 16, which conducts the current from resistance coil 14 to starting coil 17, from which, by means of conductor 19, the current is conducted to the reed 31 and from there through the switch back to said source, to complete the starting circuit. A conductor 23 leads from conductor 15 to reed 45 and consequently to contact point 22. Also connected with said source of electricity

11 is the primary coil 13, which, by means of conductor 28 and contact point 26, communicates with reed 47.

By using a starting point the operating voltage builds up less rapidly with a consequent reduction in wear of the points. This not only increases the life of the device, but permits its use with circuits heretofore not practical.

The operation of this vibrator may be described as follows:

When the switch 21 is closed, the current from the source of current 11 flows through coil 12, conductors 15, resistance coils 14, starting coils 17, conductor 19, reed support 18 and back to the switch 21, thus energizing starting coils 17 and creating a magnetic flux in core 29 which attracts metallic tip 30 until reed 56 contacts, by means of said contact point 59, contact point 24, at which time starting coil 17 becomes shunted out of the circuit, thereby deenergizing coil 17 and demagnetizing core 29, permitting reed 31 to swing away from contact point 24. As soon as the reed 56 breaks contact with contact point 24 and moves toward contact point 26, the starting coil 17 again becomes energized and the process is repeated until the reed 31 is vibrating at such a rate that it becomes bellied. When this happens, the reed 31 contacts said contact point 24 shortly before it contacts said contact point 22, and breaks from point 22 before breaking from point 24.

Thus, although the primary coil 12 is always energized, the current flowing varies from a negligible minimum when contacts 22 and 24 are out of contact with the reed to the full working value when the contacts are engaged by the reed. This intensity is thus the greater, or at a maximum, when the current flows through contact points 22 and 57 without passing through the resistance coil nor the starting coil. It is at a minimum when the current passes through the resistance coil and the starting coil. Coil 13 is energized by establishing contact between contact points 58 and 26. It is to be noted that the direction of flow of current in the coil 12 is opposite from that in the coil 13. It is to be further noted that when the magnetic intensity of the coil 12 is at a minimum, the magnetic intensity created by the coil 13 is at a maximum and also the reverse is true, so that although coil 12 is constantly energized, there are times when this energy is completely overcome by the flux of coil 13 and the magnetic flux can be said to have changed its sign. It has been found practical to have the starting coil 17 and the resistance coil 14 of approximately 30 and 3 ohms resistance, respectively. The fact that coil 12 is never deenergized while the vibrator is in use, plus the heretofore described variations in magnetic intensity, maintains the surging at a minimum. Consequently, greater flexibility is produced in the use of such a vibrator in that a wider range of buffer condensers may be employed.

With my improved vibrator it is possible to attain a closer effective spacing of the reed and points by use of the point 24 remote from the supported end of the reed. Thus the surging effect is reduced because the reed has less effective distance to travel in its arc of movement.

When a vibrator of this type is at rest, it is to be noted that all contact points are open, so that the vibrator may be described as one whose points are normally opened. The reeds 45 and 47 are stiffer than the rest of the reeds and con-

sequently, when the points 57 and 22 and the points 58 and 26 make contact, a rubbing or wiping effect takes place between these contacting surfaces and results in a cleansing action, so that the points are self-cleaned.

Clean points make for greater efficiency and for longer life. It is thus seen that a vibrator constructed in accordance with this invention produces but little surging action and that surging action which is produced is controlled. Further, the points are self-cleansing and the vibrator is consequently able to have a longer working life at a greater efficiency.

Other modes of applying the principle of my invention may be employed, instead of the one explained, change being made as regards the structure herein disclosed, provided the means stated by any of the following claims, or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A vibrator circuit comprising a source of current, a primary transformer coil connected thereto, a starting coil, a resistance coil one end of which is connected to said starting coil and the other end of which is connected to said primary coil, a spring-like electrical conductor connected to said source adapted to be attracted by said starting coil, a conductor connecting said starting coil and said first-named conductor, and two normally opened contact points adapted to contact said first-named conductor when said conductor moves in one direction, one of said points being interposed between said starting coil and said resistance coil, and the other of said points being interposed between said resistance coil and said primary coil.

2. A vibrator circuit, as claimed in claim 1, wherein there is a second primary transformer coil connected to said source, and a third contact point communicating with said second primary coil and adapted to contact said first-named conductor when said conductor moves in the opposite direction.

3. A vibrator circuit of the type described, comprising a reed, a source of current communicating therewith, a primary transformer coil also communicating therewith, a resistance coil, a contact point interposed between said coils and adapted to contact said reed, a starting coil communicating with said reed, a second contact point interposed between said starting and said resistance coils, whereby said primary coil creates a variable magnetic flux of three different intensities.

4. In a vibrator, a constantly energized primary transformer coil, means to vary the intensity of the magnetic flux created thereby, a second primary transformer coil, each of said coils being connected to a common source of current, and means for energizing said second primary coil when said first-named primary coil is energized substantially below its maximum.

5. A vibrator comprising a metallic support, a starting coil contacting said support, three reeds insulated from each other and from said support, one of said reeds being adapted to vibrate under the influence of said coil and to alternately contact each of the remaining reeds, and a normally opened contact point contacting said support and adapted to contact said reed which is adapted to vibrate.

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