

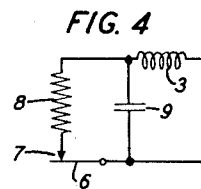
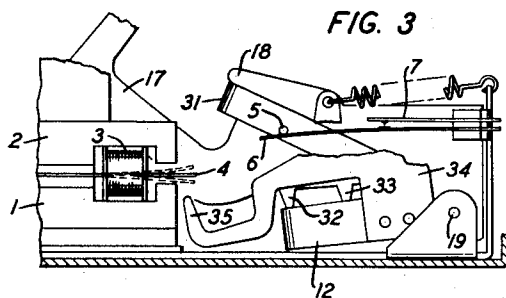
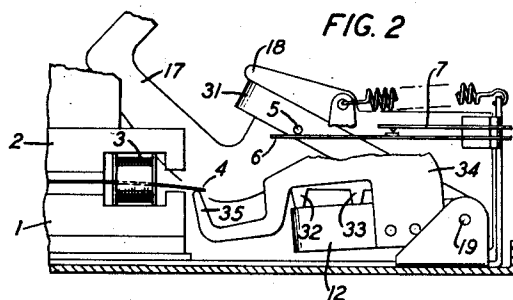
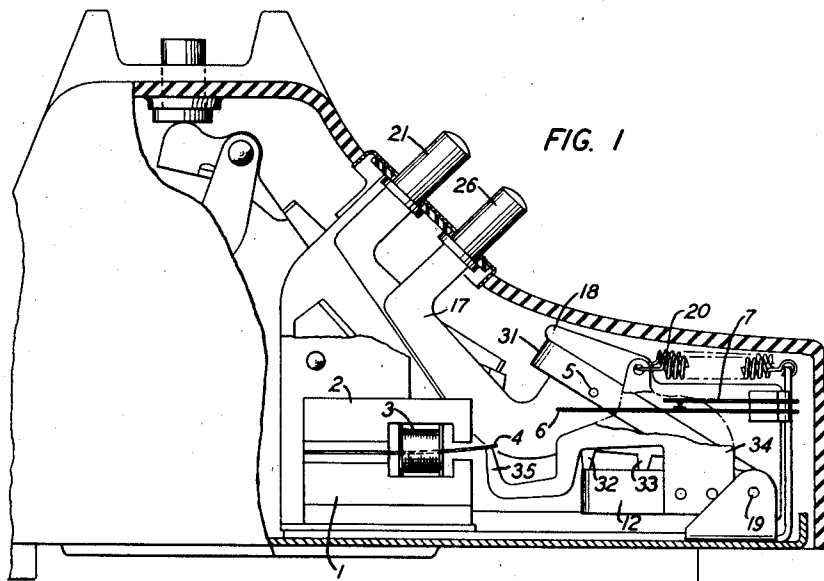
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ALTERNATING CURRENT GENERATOR

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ALTERNATING CURRENT GENERATOR

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This invention relates to signaling means and particularly to alternating current generators of the type used in telephones for generating alternating current dialing signals representing telephone station designations.

The object of the invention is to provide a simple and efficient means for producing signals which will be characterized by purity of tone. The alternating current generators usually employed for these purposes consist essentially of interlinked magnetic and electrical circuits with a plurality of reeds as the mechanically movable elements. It is usual to employ a plurality of reeds each of a different dimension whereby a plurality of alternating currents of different frequencies may be generated and which may be transmitted either singly or in combination and in permutation codes representing different telephone designations.

Usually the reed generators used for these purposes are of what are known as the balanced type in which no flux threads the reeds while at rest. The magnetic circuit consists of one simple circuit comprising essentially a horseshoe magnet with a small air-gap between the poles. The reed passes through this air-gap. Therefore when the reed is set in vibration in effect another magnetic circuit comprising two branches is set up each including the reed and one pole of the horseshoe magnet and the flux in these two branches changes as the reed vibrates. A winding about the reed acts as a pick-up coil and the terminals of this coil act as the terminals of the generator.

Mechanical means for setting these reeds in vibration has been provided. Such means are termed plucking mechanisms and act to selectively pluck the separate reeds. These mechanical plucking mechanisms take a variety of forms but no one device has yet been produced which will set the reed into vibration in such manner that the purest tone possible is produced. It is therefore an object of this invention to employ other than mechanical means for plucking the reeds of these generators. Magnetic plucking in some one or another form produces superior results since the reed when released vibrates in a simpler manner and thus produces a purer tone.

In accordance with the present invention a combination of mechanical selection and magnetic plucking is employed. Each reed is held in a damped position by selecting fingers and selection is made by moving such fingers from contact with that reed or those reeds which are to be plucked. Thereupon the reed or reeds which have been freed are magnetically stressed and then released to vibrate freely.

A feature of the invention is a reed generator provided with a plucking mechanism comprising selectively operable dampers and an electrical

circuit which will operate to magnetically pluck undamped reeds.

Another feature is a plucking mechanism for reed generators comprising a plurality of keys, code bars operated by said keys for selecting combinations of said reeds for operation and common contact means for controlling the magnetic plucking of the selected reeds.

Another feature is the combination of mechanical individual selecting means and a common non-mechanical actuator.

Still another feature is the combination of individual means for preparing the reeds of a generator for vibration and a common means for starting the prepared reeds into vibration.

Other features will appear in the following description.

The drawing consists of a single sheet having four figures as follows:

Fig. 1 is a side elevation, partly in section, showing a telephone handset cradle with a plurality of push-buttons for operating the reeds of an alternating current generator for signaling purposes;

Fig. 2 is a fragmentary view showing the operation of the generator when one of the push-buttons is only partially depressed;

Fig. 3 is a similar fragmentary view showing the condition established when the push-button has been fully depressed, and depicting the plucked reed as freely vibrating; and,

Fig. 4 is a circuit diagram showing how the electrical circuit operates.

The device here shown operates much in the manner of the device disclosed in the Patent 2,147,710, granted February 21, 1939, to R. F. Mallina but embodies an improvement thereover for reasons pointed out and which will be set forth in the appended claims.

There are a plurality of push-buttons, usually ten to represent the ten digits used in telephone designations. Only two, those designated 21 and 26, are here shown. Each button is mounted on a lever such as 17 and all are pivoted on a shaft 19. The spring 20 normally holds the button 26 in the position shown in Fig. 1. Each lever has a finger 18 so that when any one push-button is depressed a common bar 31 will be rotated about the axis formed by the shaft 19 in a counter-clockwise direction. The common bar 31 has a pin 5 which will bear against the contact spring 6 and when the button 26 has been fully depressed will cause spring 6 to break contact with spring 7, as clearly illustrated in Figs. 1, 2 and 3.

Each lever is provided with a pair of lugs such as the lugs 32 and 33 with which the lever 17 is provided. There are five V-shaped bars such as the bar 12, all pivoted on the shaft 19. Since each lever has its two lugs at different points these five bars are operated in different com-

binations, a permutation code being used. Thus the lever 17 operates the bar 12 and another not shown, and the remaining three are not operated by the button 26. Each bar has attached to it another lever such as the lever 34 indicated as being riveted to the bar 12. The lever 34 terminates in a finger 35 which normally stresses the reed 4 upwardly as shown in Fig. 1.

The alternating current generator of the present invention consists essentially of a magnetic circuit including two permanent magnets 1 and 2 and a plurality of reeds such as the reed 4 of magnetic material. As in the Mallina patent above noted, there will be five reeds each tuned to a different natural period of vibration. Each reed is operated by a different one of the five levers such as 34.

When the button 25 is depressed the finger 35 moves downwardly. The coil 3, which is effectively wound about all five reeds, is included in the line circuit of the telephone substation and the line current flows through the coil 3, the resistance 8 and the contacts 7 and 6 in series. This line current will cause the reed 4 which has been freed by the downward movement of the finger 35 to be attracted to the pole of the magnet 1. Shortly thereafter the contact between springs 6 and 7 will be broken and the reed 4 being released from the magnet 1 will freely vibrate between the poles of both magnets 1 and 2. An alternating current of the same frequency as the natural period of vibration of the reed 4 will be induced in the coil 3 and will be delivered through the condenser 9 to the associated telephone line for signaling purposes.

When the push-button 25 is released the vibration of the reed 4 will be damped and the condition pictured in Fig. 1 will be reestablished.

What is claimed is:

1. In an alternating current generator comprising interlinked magnetic and electrical circuits and movable mechanical magnetic elements in the form of a plurality of reeds each having a different natural period of vibration, a reed plucking mechanism comprising a selector member individual to each said reed and magnetic means common to said reeds for starting selected reeds into vibration.

2. In an alternating current generator comprising interlinked magnetic and electrical circuits and movable mechanical magnetic elements in the form of a plurality of reeds each having a different natural period of vibration, a reed plucking mechanism comprising a mechanical selecting member individual to each said reed, magnetic means common to said reeds for starting selected reeds into vibration, and means for selectively operating said individual and common means simultaneously.

3. In an alternating current generator comprising interlinked magnetic and electrical circuits and movable mechanical magnetic elements in the form of a plurality of reeds each having a different natural period of vibration, a reed plucking mechanism comprising a damper individual to each said reed, magnetic means common to said reeds for starting selected reeds into vibration and selectively operated means for first operating said dampers and then said common means in a single operating movement.

4. In an alternating current generator comprising interlinked magnetic and electrical cir-

cuits and movable mechanical magnetic members in the form of a plurality of reeds each having a different natural period of vibration, a reed plucking mechanism comprising a plurality of push-buttons and a set of code bars operated by said push-buttons for plucking said reeds in combinations, a damper individual to each said reed for normally preventing its associated reed from vibrating, and magnetic means for placing selected reeds whose dampers have been retracted under stress and for then suddenly releasing such strained reeds to vibrate freely, said push-buttons and code bars being constructed and arranged so that a single operation of one of said buttons results in the sequential operation of first the dampers of the selected reeds and second said magnetic means.

5. In an alternating current generator comprising interlinked magnetic and electrical circuits and movable magnetic elements in the form of a plurality of reeds each having a different natural period of vibration, a reed plucking mechanism comprising a selector member individual to each said reed, magnetic means common to said reeds for straining said reeds from their natural positions, and means common to said selector members for removing the stress applied to said reeds.

6. In an alternating current generator comprising interlinked magnetic and electrical circuits and movable magnetic elements in the form of a plurality of reeds each having a different natural period of vibration, a reed plucking mechanism comprising a selector member individual to each said reed normally acting to strain its associated reed to one side of its natural position, magnetic means common to said reeds for straining each reed whose associated selector member has been moved to the other side of its natural position, and means common to said selector members operable whenever any one of said members approaches its operated position for removing said magnetic stress, whereby said reeds vibrate freely about their natural positions.

7. In an alternating current generator comprising interlinked magnetic and electrical circuits and movable magnetic elements in the form of a plurality of reeds each having a different natural period of vibration, a reed plucking mechanism comprising a selector member individual to each said reed having a finger for straining its associated reed to one side of the natural position of said reed when said selector member is in its normal position and for freeing its associated reed when said selector member is in its operated position, a direct current circuit normally closed through the said electrical circuit whereby said reeds are strained to the other side of their natural positions during the operating movement of their associated selector members, a common circuit controlling switch operated by said selector members near the end of the operating movement thereof, circuit connections controlled thereby for opening said direct current circuit whereby said reeds strained to the said other sides of their natural positions are relieved to vibrate freely and an alternating current circuit rendered effective during the open period of said direct current circuit.

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