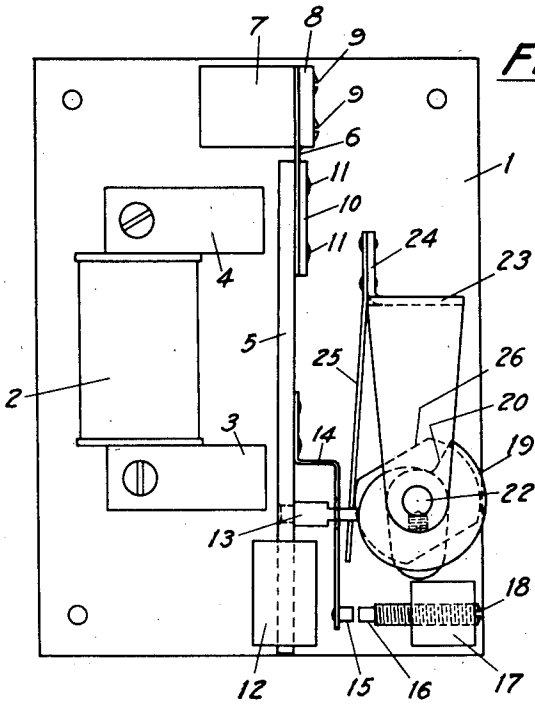
Jan. 29, 1935. R. E. BATES 1,989,076

ELECTRIC SWITCH

Filed Dec. 2, 1931

Fig. 1



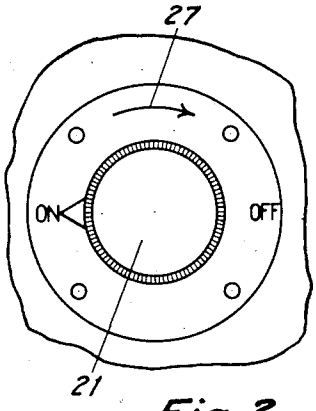
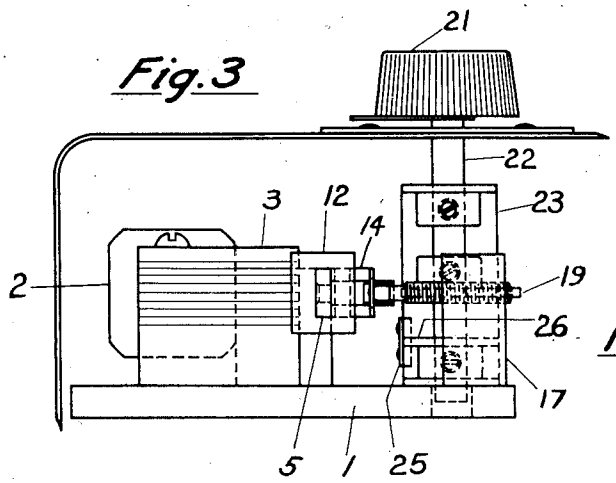


Fig. 2

Fig. 3



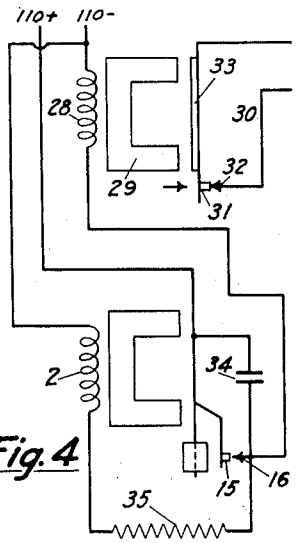


Fig. 4

INVENTOR
Ralph E. Bates
BY Ezekiel Wolf
ATTORNEY

Patented Jan. 29, 1935

1,989,076

UNITED STATES PATENT OFFICE

1,989,076

ELECTRIC SWITCH

Ralph E. Bates, West Medford, Mass., assignor to Submarine Signal Company, Boston, Mass., a corporation of Maine

Application December 2, 1931, Serial No. 578,479

5 Claims. (Cl. 200—90)

The present invention comprises an electric switch to produce a make and break of an electric circuit at a definite frequency. The make and break of the circuit might be impressed upon any circuit in which current variations of the desired frequency are used and preferably in the present invention is used in connection with a radio frequency meter in which the interrupted makes and breaks are impressed upon a circuit carrying a carrier wave.

The invention more specifically relates to a device that is used to start and stop the continuously operating or vibrating switch which forms a part of a further operating circuit.

The present invention finds particular application in the production of an interrupted or modulated radio frequency transmitter at a definite low audiofrequency and particularly in a a circuit or signaling system used for the transmission of a distress alarm system. In systems of this nature it is quite essential that the vibration of the reed establishing the modulating or interrupting frequency in the transmitting circuit be established definitely and in a uniform fashion in such a manner that successive manual operations will not affect the adjustment or the tuning of the vibratory system. Besides this the vibrator must be positively and definitely commenced at a certain time and likewise must be stopped at a desired time. It is these features and others which the present invention overcomes.

The mechanism itself will be more fully described in connection with the drawing in which Figure 1 shows a plan view of the switch; Figure 2 shows a view of the portion of the top of the case containing the operating dial; Figure 3 shows an end view of the elements shown in Figure 1; and Figure 4 shows a view of the circuit employed in operating a radio frequency transmitter.

In the present invention there is mounted on a proper plate 1 an electromagnet 2 of a U-shaped form having aligned poles 3 and 4 beside which is placed the armature 5 carried as a part of a vibrating reed. The complete reed consists of a thin strip of spring metal 6 preferably spring steel which is supported at one end on a base 7 by means of the clamp 8 and the clamping screws 9 holding securely the flexible strip 6 in position. The armature 5 is fastened to the spring element 6 by means of the plate 10 through which are placed the rivets 11—11 riveting together the spring 6, the armature 5 and the plate 10 forming a unitary vibratory structure. At the end of the armature 5 is a weight 12 by which the vibrating system may be tuned. Adjacent to the position of the weight 12 is a stud 13 rigidly riveted to the armature 5 and extending outward perpendicular thereto. Mounted also on the armature 5 is the spring contact element 14 which is bent in the form of a rectangular spring riveted to the armature 5. At the end of the bent arm 14 is a contact element 15 adapted to contact through the motion of the reed with the contact 16 adjustably positioned in the block 17 by means of the screw 18. The stud 13 passes through a hole in the bent spring 14 and the end of it rides upon a cam 19 which is shaped to force the stud and the armature 5 to the left when the cam is rotating.

The cam has an abrupt shoulder 20 which during the movement of the cam comes in place before the end of the stud 13 at which time the stud is suddenly released and the reed allowed to move its full motion to the right. The cam 19 is operated by means of the handle 21 by which the shaft 22 may be turned. The shaft 22 carrying the cam 19 is mounted in a fork bearing provided by the element 23 fastened to the plate 1, not shown in the drawing.

Plate 23 has a side extension 24 to which is riveted a spring 25 normally positioned somewhat parallel to the armature 5. The spring 25 rides upon a cam 26 also rigidly fixed to the shaft 22. The cam 26 is circular in shape but has removed therefrom two parallel segments. The switch as positioned with one of the segments resting against the spring 25 is in the "off" position as indicated by the legend in Figure 2. With the other segment resting against the surface of the spring 25 the switch is positioned in its "on" position. The switch easily assumes in its turning one of these two positions and the handle or knob 21 is always rotated in the same direction, as indicated by the arrow 27.

In the operation of the device the operator turns the knob 21 from, let us say, the "off" position to the "on" position. In this case the shoulder 20 of the cam 19 rides to a position just above the upper edge of the stud 13 in the clockwise rotation of the arrow 27. When this point has been reached the armature which has been moved over to the left as far as possible is suddenly released and following this the reed swings over to the right making a contact between the contacts 15 and 16. This completes the circuit through the electromagnet 2, as indicated in Figure 4, and thereby energizes it to draw the armature to it and break the contact between the

electrodes 15 and 16 whereby the electromagnet 2 becomes deenergized and the reed swings again to the right. As indicated in Figure 4 the making of the contact between the electrodes 15 and 16 completes the circuit through the coil 28 of the electromagnet 29 and operates to interrupt the relay circuit 30 made between the contacts 31 and 32 by moving to the right the contact 31 mounted on the armature 33.

The relay circuit 30 is connected to the radio frequency transmitter. The vibrating system is adjusted to a definite low frequency and by means of the present invention the reed is operated with the minimum possibility of a change in this frequency in a simple manner. The spring element 14, it may be remarked, provides a yielding but positive connection between the contacts 15 and 16 and allows the reed to swing without its motion being affected. As indicated in Figure 4 a condenser 34 may be provided across these contacts to prevent arcing, if desired. The coil 2 may be connected directly to 110 volt line if it is of low resistance by placing a resistance 35 in series with it.

Having now described my invention, I claim:

1. An electric switch of the kind described comprising a magnet and an armature formed as a tuned reed, means for establishing and stopping the vibration of the reed comprising a cam formed to force the reed into a tensioned position and suddenly release the same and means setting said cam in said tensioned position.

2. An electric switch of the kind described comprising a magnet and an armature formed as a tuned reed, rotatory means adapted to be rotated one half turn to start and a further half turn to stop the vibration of the reed.

3. An electric switch of the kind described comprising a magnet and an armature formed as a tuned reed, a contact switch, means connecting said contact switch in circuit with said magnet, said contact switch having one contact on said reed and adapted to open the magnet circuit when attracted by it, a cam operatively positioned with respect to said reed, means for rotating said cam one half revolution to start and a further half revolution to stop the vibration of said reed.

4. An electric switch of the kind described comprising a magnet and an armature formed as a tuned reed, a contact switch, means connecting said contact switch in circuit with said magnet, said contact switch having one contact connected with said reed and adapted to open the magnet circuit when attracted by it, a shaft having a handle, said shaft positioned adjacent to said reed, a cam carried by said shaft and means operating therewith to force said reed into a tensioned position and release the same for operation, a second cam mounted on said shaft and having a spring contacting an extended surface of the same in the position of operation and non-operation of the vibrating reed.

5. An electric switch of the kind described comprising a magnet and an armature formed as a tuned reed, a contact switch, means connecting said contact switch in circuit with said magnet, said contact switch having one contact connected with said reed and adapted to open the magnet circuit when attracted to it, a stud carried by said reed, a cam on which said stud rides said cam being formed to force said reed into a tensioned position by movement of said stud and free said reed by the release of the stud on a portion of said cam carrying a periphery adapted to be positioned parallel thereto.

RALPH E. BATES.