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REGISTER DEVICE

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This invention relates to register devices of the type in which the operation of a motor magnet is effective to actuate a ratchet mechanism for actuating a counting device.

In certain telephone systems, for example, as is well known, each telephone line is connected at the exchange to a registering device of the type above mentioned for registering the subscriber's call.

In such devices, however, applicant discovered that faulty registration of the calls were due to the failure of the driving pawl to properly engage the teeth of the ratchet wheel and the failure of the check pawl to prevent the reverse movement of the ratchet wheel and thereby that of the unit counting wheel upon the return stroke of the driving pawl caused by the sticking of these pawls on their pivots and that the removal of these devices from their mounting frame for repairs and replacement of parts was rendered difficult and costly due to the fact that the bracket supporting the counting wheels of the register was formed or secured to the supporting bracket of the motor magnet in such a manner that the removal of the register for repair and adjustment necessitated also the removal of the motor magnet from the supporting frame with the consequent breaking of the soldered connections, such operation being particularly difficult due to the close proximity of these registers on their supporting frame and, therefore, that of their connecting wires.

The object of the invention is to improve the construction and operation of such a register.

According to the invention, a driving mechanism is provided in which a specially formed star-wheel mounted on the shaft of the counting device is engaged by an anchor-shaped piece pivoted on the register mounting, the anchor piece being formed with the magnet armature with means provided for yieldingly holding the anchor piece and the armature carried thereby in retracted position relative to the motor magnet, the operative relation of the anchor piece and the star-wheel being such that faulty operation of the register is effectively avoided. Means is provided for securing and removing the register from a common supporting plate without interference with the motor magnet, with means whereby the adjusted relation of the register and its operating armature with respect to the motor magnet is readily determined.

Other features and advantages of the invention will appear from the following description and by the claims appended thereto, reference

being had to the accompanying drawing, in which

Fig. 1 is a top view showing the motor magnet and the counting device in assembled relation on their mounting plate, the armature being shown in its operated position;

Fig. 2 is a side view showing the mounting plate and the register mounting in section;

Fig. 3 is a front view;

Fig. 4 is a partial assembly view showing the armature in its released position; and

Fig. 5 is a partial view of the supporting plate.

The register device of the invention consists of a mounting plate 10 having a substantially L-shaped cross-section for mounting motor magnets 11, only one of which is shown, this magnet being held securely thereon at both ends by a nut 12 threadedly engaging the screw threaded portion 13 of the core 14 and a screw 15 threadedly engaging the spool head SH of the motor magnet, as shown in Figs. 1, 2 and 3. The plate 10 forms a part of the magnetic circuit for all the registers mounted thereon.

The vertically extending portion *x* of mounting plate 10 is provided with clearance holes 16 and 17 in which pass the wire terminals 18 and 19 of the motor magnet and the horizontally extending portion *y* of this mounting plate is provided with a slot 20 for permitting the assembly and removal of the motor magnet in an axial direction without the necessity of removing screw 15 from the spool head SH of the magnet. Thus a small turning movement of screw 15 will be sufficient to firmly secure this end of the motor magnet to the mounting plate subsequent to the tightening of nut 12 in the ordinary manner.

On the horizontally extending portion *y* of mounting plate 10 there is secured a U-shaped, supporting frame 24 provided for mounting a register device consisting of a shaft 35, the counting wheels CW₁, CW₂, CW₃, and CW₄, together with their transfer wheels TW₁, TW₂, and TW₃ which are mounted on shaft 36. The unit counting wheel CW₁ is operated by a driving mechanism comprising the toothed or star-wheel 21 carried by the unit wheel CW₁ and an anchor member 22 having an armature portion 25 and portions for successively engaging diametrically opposed teeth of the toothed wheel 21 upon the energization and release of motor magnet 11, as will be hereinafter described in detail.

The anchor member 22 is pivotally mounted on shaft 23 in turn journaled in the U-shaped supporting frame 24.

The anchor member 22 is formed as above mentioned with an armature portion 25 having weight portions W and W₁ used for balancing this member on its supporting shaft 23, the armature portions being disposed in attractable relation with the front end of the core 14 and a spring 26 which is hooked to the armature and to an arm 27 carried by one of the vertical sides of the U-shaped supporting frame 24 serves for retracting the armature to normal non-operated position and thereby cooperates with the motor magnet 11 for actuating the toothed wheel 21 of the register through the engagement of the anchor member with this wheel.

The U-shaped mounting frame 24 is provided at its underside with dowel pins 28 and 29 having a diameter corresponding to the larger width of slot 20 for readily locating this frame and the armature portion 25 of anchor member 22 in adjusted position with respect to motor magnet 14, where this frame may be securely held by a screw 30. The advantage of this construction is that it permits the removal of the U-shaped support, the counting device and its actuating anchor piece as a unit without removing the motor magnet from its mounting plate and thereby avoiding the consequent breaking of its soldered connections with the line circuit to which it may be connected while the abutment of dowel pin 29 at the end of the largest width of slot 20 readily and positively positions the armature 25 in adjusted relation with the front end of core 14.

A front plate 41 is provided with an opening 40 through which the number registered by the counting device may be read, this plate being held in adjusted position on the U-shaped frame 24 by side members 41a and 41b provided at their free ends with hook portions 50 shown in Fig. 1 for engaging the rear disposed edges of the U-shaped support 24.

In the operation of the register device of the invention, the energization of the motor magnet 11 is effective to attract its armature and to move it from the position shown in Fig. 4 to the position shown in Figs. 1 and 2 against the resistance of retractile spring 26 and thereby actuating the anchor member 22 for engaging its point P with the tooth T₁, for example, of toothed wheel 21 for rotating this wheel and the unit counting wheel carried thereby one-twentieth of a turn, the deenergization of the magnet and the subsequent release of its armature 25 permitting the retractile spring 26 to move this armature from the position shown in Figs. 1 and 2 to the position shown in Fig. 4 wherein the point P₂ of the anchor piece engages the diametrically opposite tooth T₂ for rotating it as above mentioned one-twentieth of a turn and thereby positioning the successive figures of the counting device in regis-

try with the opening 40 of the front plate 41, the movement of the unit counting wheel CW₁ being imparted to the tenth counting wheel CW₂ by the transfer wheel TW₁ in the well known manner.

This driving mechanism has been found in actual use to operate a relatively great number of times without requiring subsequent adjustment and replacement of parts and is positive in operation while the mounting of the register, its operative mechanism and armature on a frame forming a single unit which may be removed from the mounting plate without requiring the removal of the motor magnet and the consequent breaking of its soldered connections, has been found to be convenient and to effect considerable saving in time and expense.

What is claimed is:

1. In a register, a mounting plate, a magnet secured to said mounting plate at oppositely disposed points, a counting device having an operating member, an armature for said magnet carried by said member, an independently removable mounting frame for said counting device and said operating member supported by said mounting plate, and a plurality of cooperating registering means carried by said plate and said frame for readily positioning said armature in adjusted position with respect to said magnet and for facilitating the removal of said frame from said plate independently of said magnet.

2. In a register, a mounting plate, a magnet, a plurality of means for securing said magnet at both ends on said plate, a counting device, a supporting frame for said device, means for securing said frame on said plate, an operating mechanism for said device, said mechanism comprising a toothed wheel carried by the unit wheel of the counting device and an anchor-shaped member pivoted on said frame and engaging said toothed wheel, an armature carried by said member and a plurality of means carried by said supporting frame and said plate for facilitating the positioning of said frame and said armature in adjusted relation with respect to said magnet and their removal therefrom.

3. In a register, a mounting plate, a magnet, a plurality of means for securing said magnet at both ends on said plate, a counting device having an operating member, a frame for mounting said device, an armature for said magnet carried by said operating member, means for securing said frame on said supporting plate, said plate having guiding members engaging with a plurality of means carried by said frame for readily locating said armature in adjusted relation to said magnet and for facilitating the removal of said frame from said plate independently of said magnet.

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