

March 30, 1943.

R. F. MALLINA

2,315,344

CALL TRANSMITTER

Filed March 22, 1940

4 Sheets-Sheet 1

FIG. 1

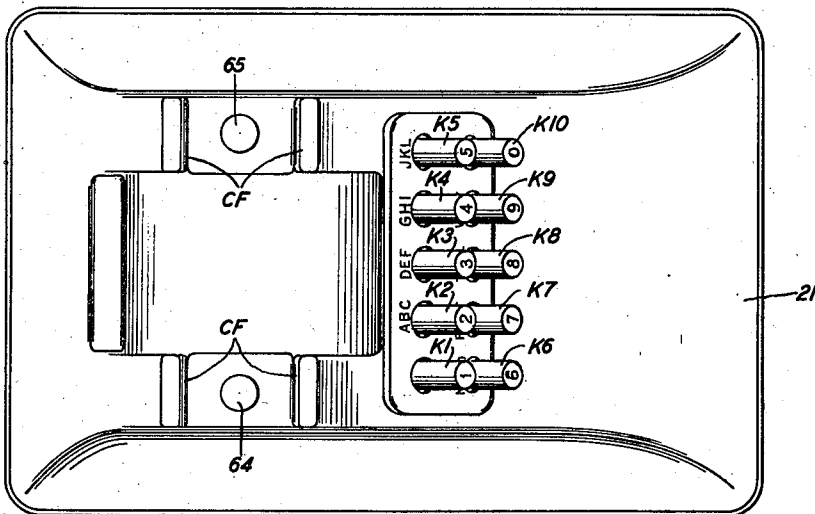
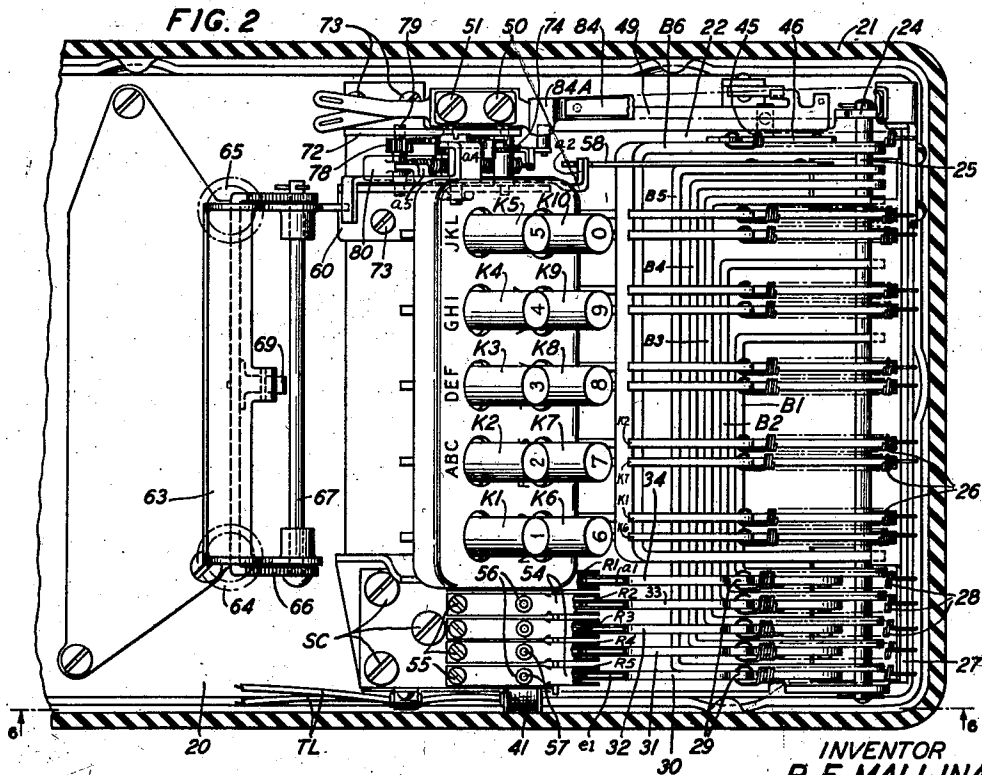


FIG. 2



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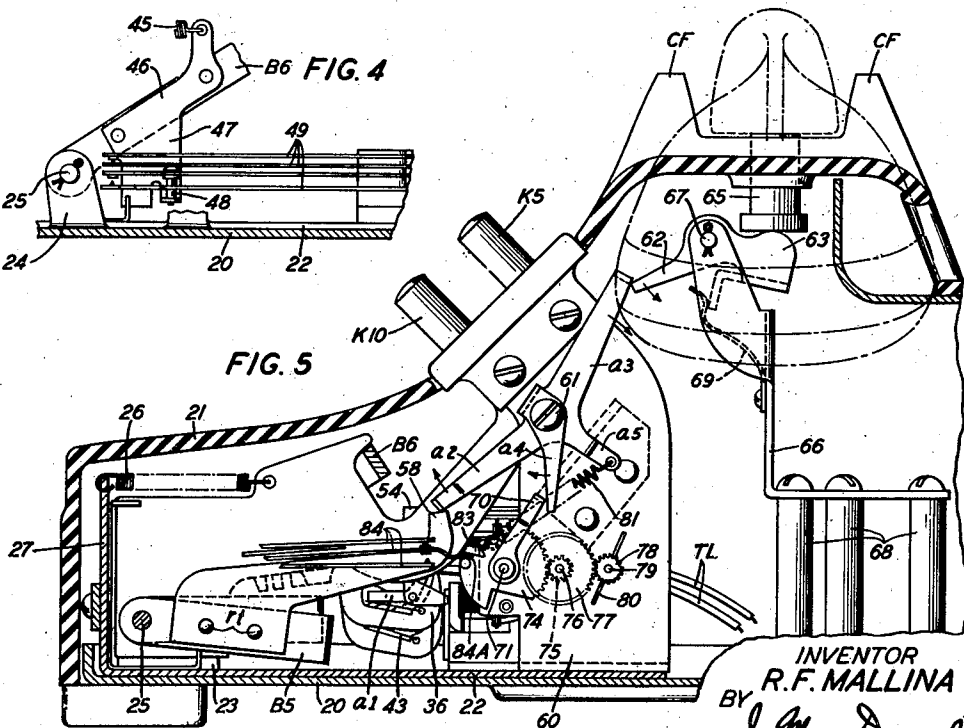
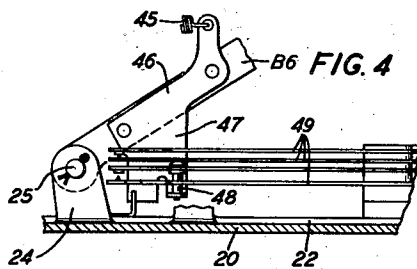
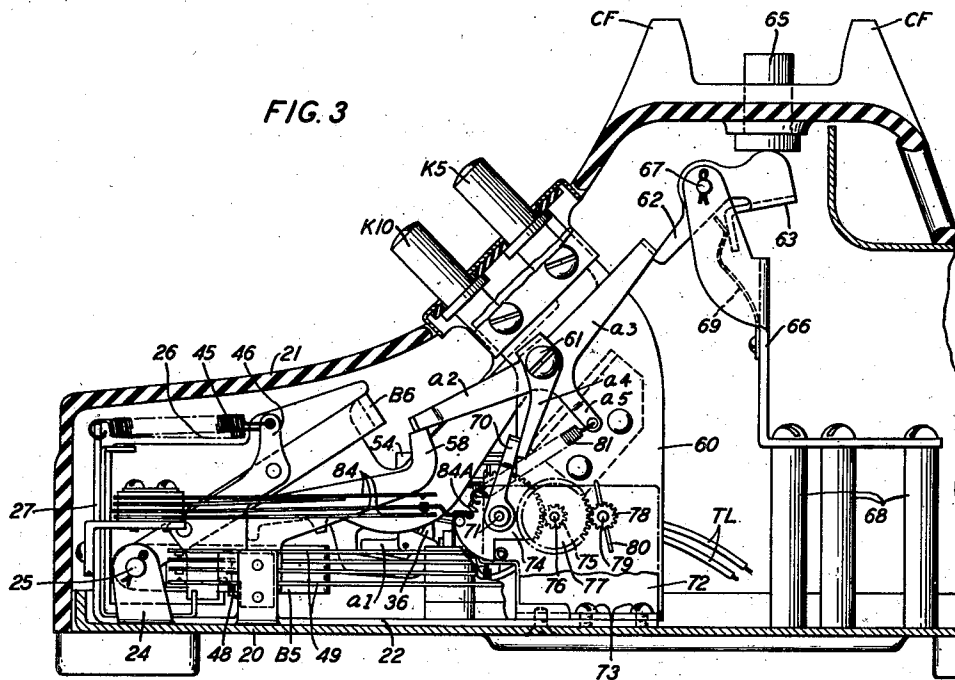
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4 Sheets-Sheet 2



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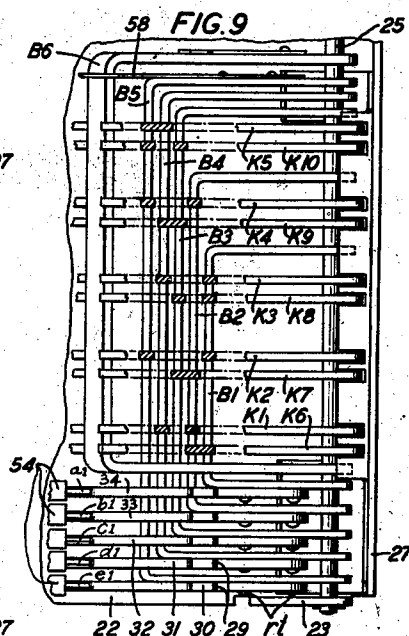
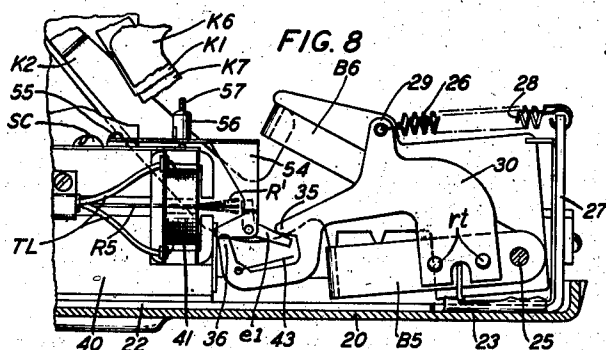
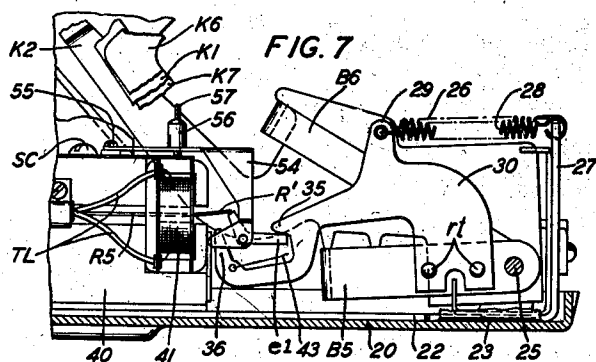
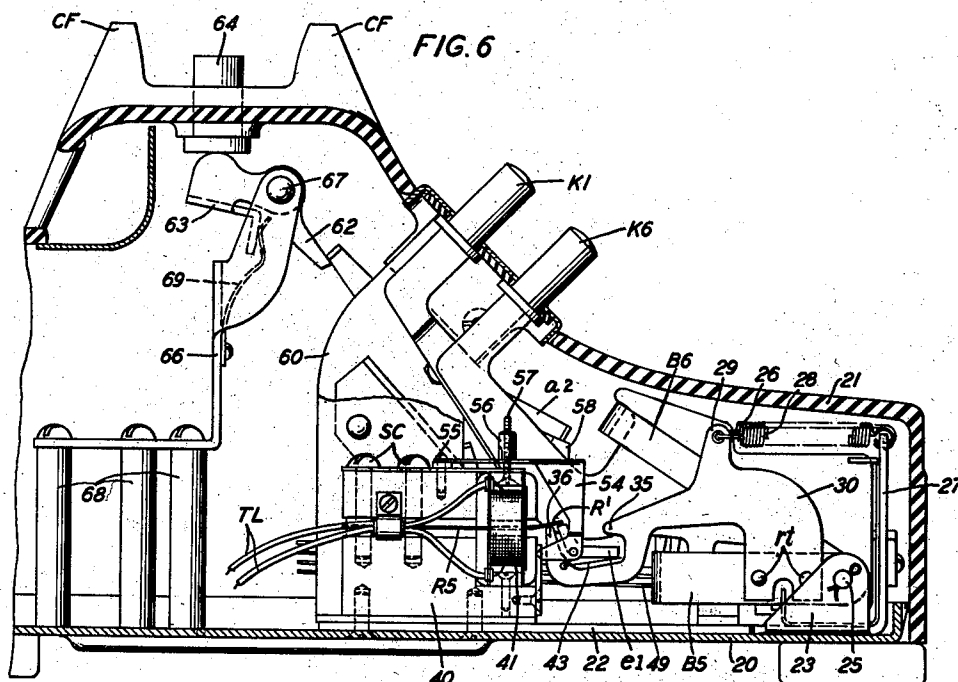
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CALL TRANSMITTER

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4 Sheets-Sheet 3



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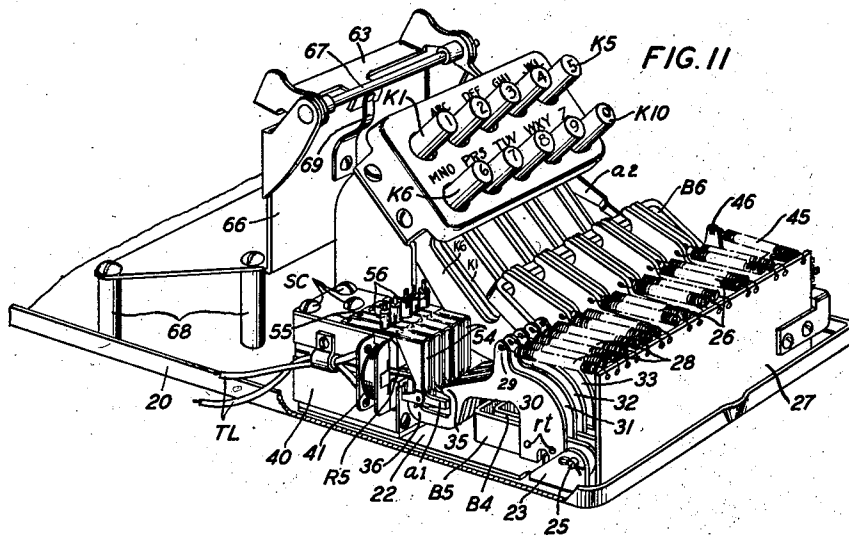
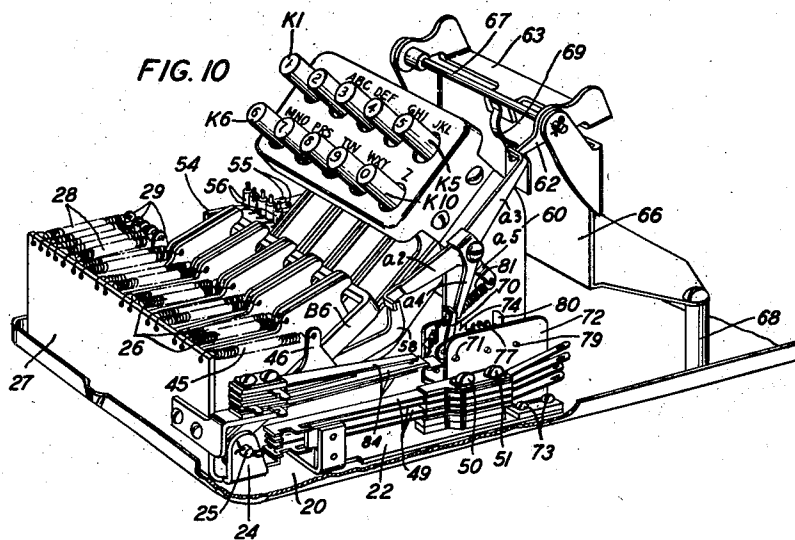
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CALL TRANSMITTER

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,315,344

CALL TRANSMITTER

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Application March 22, 1940, Serial No. 325,347

3 Claims. (Cl. 179-90)

This invention relates to call transmitter devices of the type used in automatic telephone systems, for example, for establishing talking connections.

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

According to the invention a set of numbered key members is provided for actuating a plurality of bars in predetermined combinations for operating latch members which normally hold the reeds in pretensioned positions, the operation of such latching members and the consequent release of the reeds being effective to cause the vibration of the latter in a magnetic field for generating current voltage in a coil connected to the telephone line for transmitting signals corresponding to the numbers represented by the operation of the key members.

Means operable upon the placing and removal of the telephone handset from the cradle or switchhook of the substation apparatus is provided for operating a lever mechanism, the operation of which is effective to actuate a set of switch springs and one of the key bars for causing the operation of its associated reed for transmitting a signal used for controlling the operation of switching apparatus at the telephone exchange in a manner to differentiate between the telephone call designations transmitted and the digits comprised in such designations, such lever mechanism operating a gear train under control of a governor mechanism driven by the tension of a motor spring, to introduce a delay between different call designations. Means is also provided for operating the so-called off-normal contact springs of the transmitter in timed relation to the operation of the reeds as effected by the movement of any one of the key members.

Other novel features and advantages of the invention will appear from the following description and by the claims appended thereto, reference being had to the accompanying drawings in which:

Fig. 1 is a top view;

Fig. 2 is a top assembly view shown with the casing in section;

Fig. 3 is a side elevation view shown with the base and the casing in section, the transmitter mechanism being shown in normal non-operated position;

Fig. 4 is a detail view showing the off-normal switch springs and their actuating mechanism;

Fig. 5 is a view similar to that of Fig. 3 showing the speed governor driving mechanism in the operated position and the handset shown in

dotted lines in position in the cradle of the casing;

Fig. 6 is a left side elevation view showing the reeds operating and releasing mechanism in normal unoperated position;

Fig. 7 is a fragmentary view showing one of the keys partly operated;

Fig. 8 is a view similar to Fig. 7 showing one of the keys and a latch member in the operated position, a reed being shown released;

Fig. 9 is a fragmentary view showing the operative combinations of the bars with the key members;

Fig. 10 is a perspective view showing the sets of switching springs and their actuating mechanisms in normal unoperated position; and

Fig. 11 is a perspective view showing the key members and the reeds in normal pretensioned position.

In the call transmitter of the invention as shown in Figs. 3, 5 and 6 a base 20 is provided for securely mounting a plate 22 having upward extending lug portions 23 and 24 to serve as bearings for supporting a shaft 25 on which the key members K1, K2, K3, K4, K5, K6, K7, K8, K9 and K10 and the U-shaped bars B1, B2, B3, B4 and B5 are pivotally mounted, while retractile springs such as 26 best seen in Figs. 2, 10 and 11 are hooked at one of their ends to the upright extending portions 27 of plate 22 and their other ends to the respective keys K1, K2, K3, etc., to serve for yieldably holding these keys in their normal non-operated positions as shown in Figs. 1, 2, 3, 5, 10 and 11, the U-shaped bars B1, B2, B3, B4 and B5 being in turn yieldably held in their normal unoperated positions by retractile springs 28 having one of their ends hooked to the upright extending portion 27 of plate 22 and their other ends to lugs 29 formed with lever members 30, 31, 32, 33 and 34 secured to the U-shaped bars B1, B2, B3, B4 and B5 respectively, as by rivets *rt*.

Each lever member 30, 31, 32, 33 and 34 is formed with similar lug portions 35 and 36 best seen in Figs. 6, 7, 8 and 11, provided for a purpose which will be hereinafter described in detail. On plate 22 is mounted a so-called voltage generator consisting of a permanent magnet formed of two pole-pieces 40 cooperating with a plurality of screws SC for clamping a plurality of reeds R1, R2, R3, R4 and R5 therebetween. These reeds extend through the central opening of a coil 41 connected to the telephone line in engageable relation with lugs 36 provided for moving these reeds in normal flexed position as

shown in Fig. 6, while ribbon springs as 43 carried by lever members 30, 31, 32, 33 and 34 cause the pivotal movement of pawls *a1*, *b1*, *c1*, *d1* and *e1* for moving them in position for retaining their associated reeds R1, R2, R3, R4 and R5 flexed following the partial movement of the bars B1, B2, B3, B4 and B5 as effected by the key members K1, K2, K3, etc., for a purpose which will be hereinafter described in detail, the operation of the bars B1, B2, B3, etc., by the key members K1, K2, K3, etc., being effected in the following combinations:

Key K1 actuates the U-shaped bars B1 and B2 operatively associated with the reeds R1 and R2;

Key K2 actuates the bars B2 and B3 operatively associated with the reeds R2 and R3;

Key K3 actuates the bars B1 and B3 operatively associated with the reeds R1 and R3;

Key K4 actuates the bars B3 and B4 operatively associated with the reeds R3 and R4;

Key K5 actuates the bars B5 and B3 operatively associated with the reeds R5 and R3;

Key K6 actuates the bars B2 and B4 operatively associated with the reeds R2 and R4;

Key K7 actuates the bars B1 and B5 operatively associated with the reeds R1 and R5;

Key K8 actuates the bars B1 and B4 operatively associated with the reeds R1 and R4;

Key K9 actuates the bars B5 and B2 operatively associated with the reeds R5 and R2; and

Key K10 actuates the bars B4 and B5 operatively associated with the reeds R4 and R5, thus actuating the reeds R1, R2, R3, R4 and R5 in ten different combinations.

The U-shaped bar B6 which is pivotally mounted on shaft 25 is held in operable relation with each of the key members K1, K2, K3, etc., by a retractile spring 45 shown in Figs. 2, 3, 4, 10 and 11 hooked at one end to an arm 46 carried by that bar and its other end hooked to the upward extending portion 27 of plate 22. The arm 46 is provided with a downward extending portion 47, best seen in Fig. 4, carrying a stud 48 made of insulating material provided for actuating a set of switch springs 49 mounted in a pile-up arrangement on the plate 22 and held securely thereon by screws 50 and 51 shown in Fig. 2, the function of switch springs 49 being to effect circuit connections similar to the so-called off-normal contacts as used in ordinary finger-wheel operated call transmitters.

The pawls *a1*, *b1*, *c1*, *d1* and *e1* are pivotally mounted on similar right-angle-shaped brackets 54, best seen in Figs. 6, 7 and 8, having their horizontally disposed sides secured on the permanent magnet 40 by screws 55, while nuts 56 engaging the studs 57 also mounted on magnet 40 are provided for adjusting these pawls to permit their movement in position under the free ends of reeds R1, R2, R3, R4 and R5 when the latter are moved in their normal flexed positions as shown in Fig. 6.

The U-shaped bar B5 carries an arm 53 shown in Figs. 2, 3, 5, 9 and 10 having its free end disposed in engageable relation with the arm *a2* of a yoke member pivoted on a shoulder screw 61 laterally extending from a flange 60 secured to the plate 22, while the opposite arm *a3* of this yoke is disposed in operable relation with an arm 62 formed with a pivoted plate 63 operated by gravity against the tension of a retractile spring 69 upon the placing of the telephone handset on the ends of studs 64 and 65 shown in Figs. 1, 3, 5 and 6 extending in bearings in the cradle CF of a casing 21 which in cooperation with the base 20 serves for housing the transmitter mechanism,

the plate 63 being pivoted on a shaft 67 supported at both ends by a bracket 66 securely mounted on studs 68 laterally extending from the base 20.

The yoke member in addition to arms *a2* and *a3* is formed with a downwardly extending arm *a4* operatively engaging a lever member 70 mounted on a shaft 71. This shaft is journaled at one end on the flange 60 and at its other end in a plate 72 extending perpendicularly to plate 22 and secured thereto by screws 73 shown in Figs. 2, 3 and 10, and on shaft 71 is securely mounted a gear sector 74 meshing with the pinion 75 mounted on a shaft 76 for rotation with a gear 77, in turn engaging a pinion 78, mounted on a shaft 79, for rotating a fan-wheel 80 serving as a speed governor for controlling the operation of gear sector 74 as effected by a spring 81 having one end connected to an arm *a5* of the yoke and its other end connected to a lug 83 formed with the gear sector 74 and tensioned by the pivotal movement of plate 63 upon the placing of the telephone handset in its cradle and the consequent operation of plungers 64 and 65 as above described, the rotation of gear sector 74 from the position shown in Fig. 3 to the position shown in Fig. 5 being effective to actuate the switch springs 84 to perform switching operations so as to permit the automatic switches at the telephone exchange to operate in a manner to distinguish between digits and complete call designations transmitted.

In a typical example of operation supposing that it is desired to transmit the call designation EH3-4627. Upon the removal of the telephone handset from its cradle CF the spring 69 shown in Figs. 2, 3, 5, 6, 10 and 11 is effective to cause the pivotal movement of plate 63 from the position shown in Fig. 5 to the position shown in Fig. 3 and thereby causing the clockwise pivotal movement of the yoke under the tension of retractile spring 28 of bar B5 and that of the shaft 71 through the engagement of lever 70 with the arm *a4* of the yoke. The pivotal movement of arm 70 permits the contact spring 84A to open its upper contacts and close its lower contacts under the medium of its own tension while the yoke through its arm *a2* permits the upward movement of arm 58 and, therefore, the movement of U-shaped bar B5 as effected by its retractile spring 28 from the position shown in Fig. 5 to the position shown in Fig. 3 for tensioning its associated reed *e1* prior to the operation of any one of the key members K1, K2, K3, etc. The operation of key K3 for transmitting the letter E, the first digit of the call designation EH3-4627 above-mentioned is effective to impart a small angular movement to U-shaped bar B1 carrying lever 34 and to bar B3 carrying lever 32. A partial pivotal movement of these levers from the position shown in Fig. 6 to the position shown in Fig. 7 permits the reeds R1 and R3 to move in abutment against the ends of the upward extending portions of their associated pawl-like members *a1* and *c1* so that upon the continued movement of the key K3, the lugs 35 of levers 34 and 32 engage their respectively associated pawls *a1* and *c1* for pivoting them from the position shown in Figs. 6 and 7 to the position shown in Fig. 8 for releasing the reeds R1 and R3 simultaneously and thereby causing their vibrations. The operation of key K3 in addition to the release of the reeds R1 and R3 is effective to impart a pivotal movement to the U-shaped bar B6 against the tension of its retractile spring 45 (see Fig. 3) for operating the set of off-nor-

mal contact springs 49 through the insulating stud 48 carried by the downward extending lug portion 47 of arm 46 secured to that bar. The return movement of key K3 in normal position under the tension of its retractile spring 26 following its release by the operator, and the consequent return movement of the U-shaped bars B1 and B3 under the tension of their retractile springs 28 is effective to move their associated reeds R1 and R3 in the pretensioned position and this operation repeated for each of the keys included in the call designation EH3-4627 above-mentioned but according to the operating combinations above described.

The placing of the telephone handset in its cradle following the sending of the call designation causes the downward movement of plungers 64 and 65, the pivotal movement of plate 63 from the position shown in Fig. 3 to the position shown in Fig. 5 against the resistance of its retractile spring 69 and the counter-clockwise movement of the yoke actuated thereby for causing the pivotal movement of U-shaped bar B5 and the consequent vibrations of reed R5, while the movement of the yoke tensions the spring 81 which rotates the gear sector 74 under control of the fan-wheel 80 geared thereto for operating the spring 84A for opening its lower contact and closing its upper contact as shown in Fig. 5 a small fraction of time after the operation of reed R5, and the transmitter is now ready for a subsequent call transmitting operation, the function of contact springs 84 being to permit the automatic switch controlled thereby to return to normal position preliminary to a succeeding call transmitting operation.

What is claimed is:

1. A call transmitter device for a telephone desk set, said desk set comprising a handset, plunger members, a pivoted plate actuated by the placing of the handset on the plunger members, in combination with a set of manually operable key members for the transmitter, a plurality of vibrative reeds, a plurality of means actuated in predetermined combinations by the operation of said key members to cause the operation of said reeds, a set of off-normal contact springs, a lever mechanism operated by the placing of the handset on the plunger members for actuating the contact springs and one of said reeds independently

of the operation of its associated key member, a gearing mechanism actuated by said lever mechanism, and a speed governor operatively connected to said gear mechanism for producing a time delay between the operation of the last-mentioned reed and the operation of said contact springs.

2. A call transmitter device for a telephone desk set, said desk set comprising a handset, plunger members, a pivoted plate actuated by the placing of the handset on the plunger members, in combination with a set of manually operable key members for the transmitter, a plurality of vibrative elements, a plurality of means actuated in predetermined combinations by the operation of said key members to cause the operation of said elements, a set of contact springs, a lever mechanism operated by the placing of the handset on the plunger members for actuating the contact springs and one of said elements independently of the operation of its associated key member, a motor spring tensioned by the operation of said lever mechanism, a governor mechanism actuated by the tension of said motor spring for retarding the operation of the contact springs relative to the operation of said element by one of said means, said lever mechanism comprising a lever carried by the last-mentioned means, a pivoted yoke having an arm engaging said lever and its other arm engaging said pivoted plate, a third arm disposed in operative relation with said governor mechanism for tensioning said motor spring for actuating said contact springs and said governor following the movement of said plate and thereby one of the vibrating elements in one of said combinations.

3. A call transmitter device having a set of off-normal switch springs, a set of manually operable key members and a plurality of vibrative elements, operated in predetermined combinations by the movement of said key members, means manually operable for actuating one of the vibrative elements of one of said combinations and said switch springs in a predetermined order and means operable by the operations of said manually operable means for causing a time delay in the operation of said elements and said switch springs.

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