

June 14, 1949.

R. F. MALLINA
CALL TRANSMITTER

2,473,438

Filed July 17, 1947

3 Sheets-Sheet 1

FIG. 1

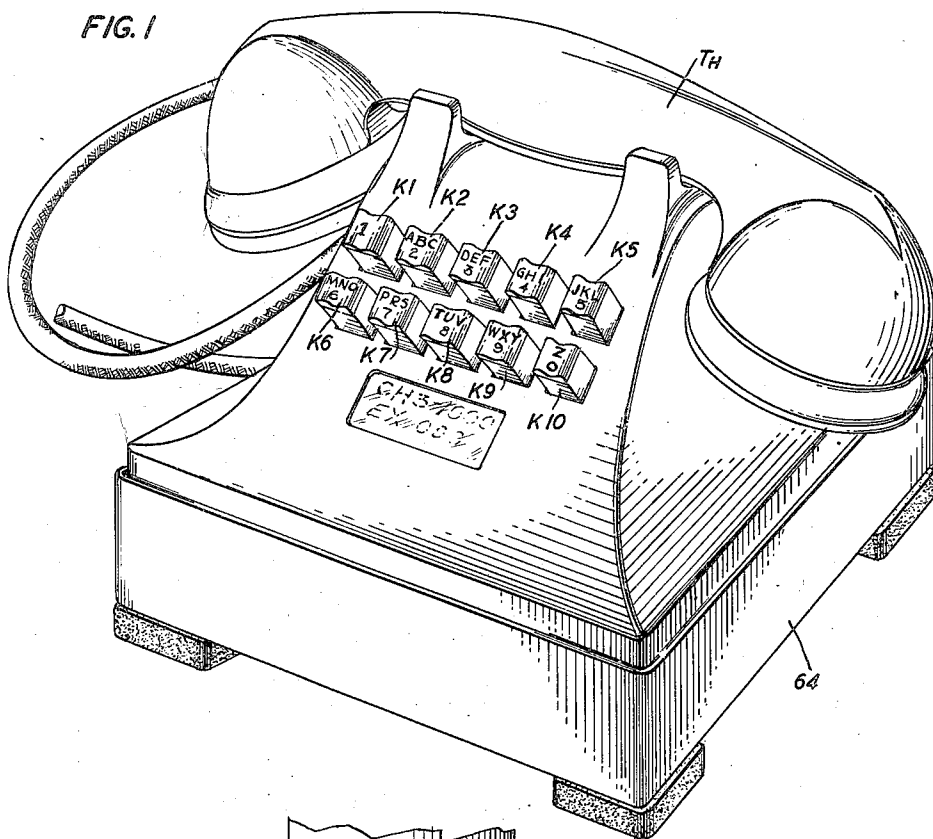
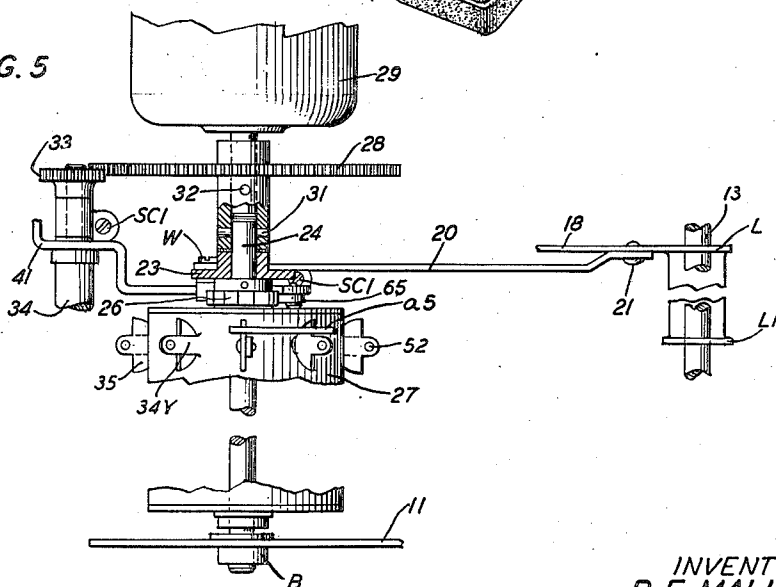


FIG. 5



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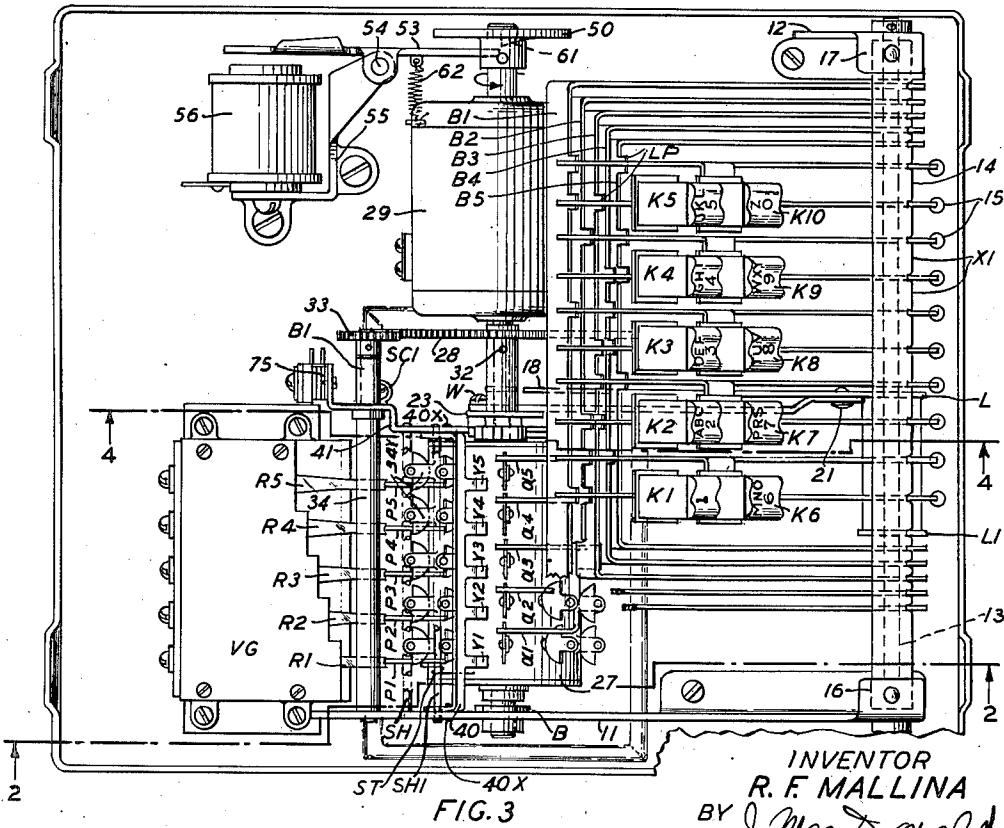
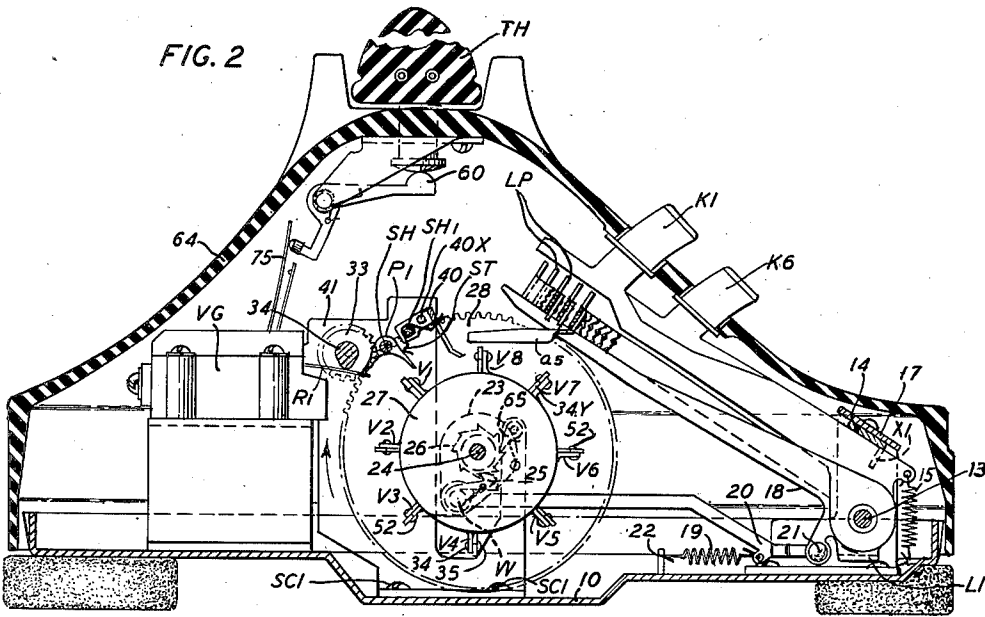
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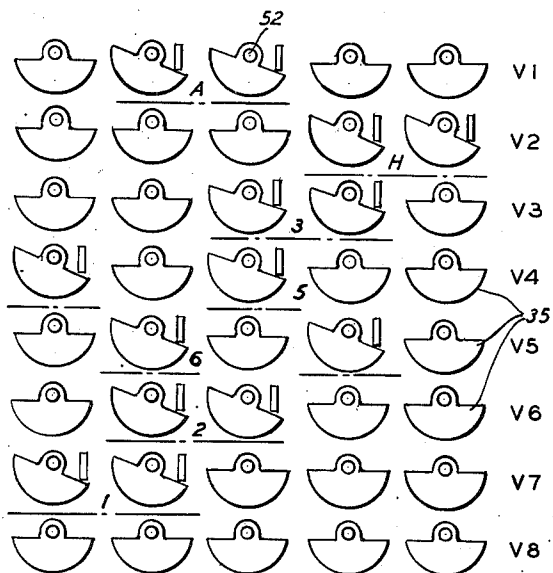
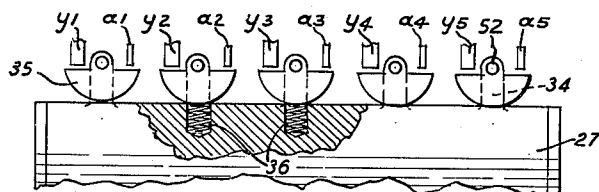
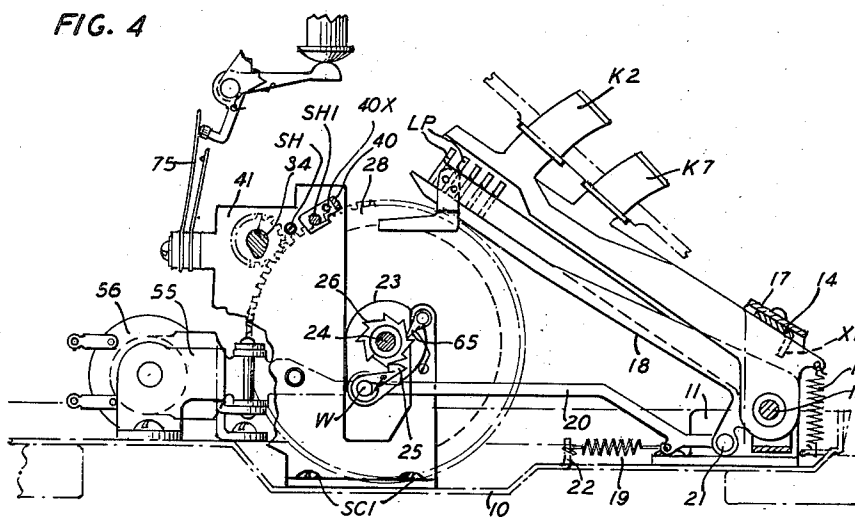
3 Sheets-Sheet 2



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3 Sheets-Sheet 3



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2,473,438

CALL TRANSMITTER

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Application July 17, 1947, Serial No. 761,563

7 Claims. (Cl. 177—380)

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This invention relates to telephone call transmitters and more particularly to telephone call transmitters of the type in which a complete telephone call designation may be set by the operation of key members prior to the transmitting of the signals corresponding to the digits of the operated keys for establishing a telephone connection.

The object of the present invention is the provision of a call transmitter of the type above referred to which is simple in construction, and accurate in operation.

In the drawing:

Fig. 1 is an assembly view shown in perspective;

Fig. 2 is a side elevation view shown with the casing housing the mechanism in longitudinal vertical section taken on line 2—2 of Fig. 3;

Fig. 3 is a top assembly view of the operating mechanism;

Fig. 4 is a vertical longitudinal sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a partial view showing the driving mechanism for a support serving for pivotally mounting segment-shaped elements which are operated by the movement of the keys for the setting of a telephone call designation;

Fig. 6 is a fragmentary view of the support for the segment-shaped elements, showing segments in normal position; and

Fig. 7 is a diagrammatical view showing coordinately disposed rows of segments, a number of such segments in each row being set in position for transmitting a 7-digit telephone call designation.

According to the construction of the call transmitter of this invention, a base 10 is provided for securing a pair of upright supports 11 and 12 best seen in Fig. 3 on which is journaled a shaft 13 and on this shaft is pivotally mounted a set of key members K1, K2, K4, K5, K6, K7, K8, K9 and K10 and a set of U-shaped bars B1, B2, B3, B4 and B5. These bars extend transverse of the key members K1, K2, K3, etc., and are provided with similar lug portions LP extending upwardly in engageable relation with the key members K1, K2, K3, etc., for operation in pairs as will be hereinafter described in detail.

The key members K1, K2, K3, etc., are yieldably held in the non-operated position against the underside of a bar 14 by the tension of similar retractile springs 15. This bar has downwardly extending projecting lug portions X1, serving for holding the keys in spaced relation to each other on shaft 13, the bar 14 being secured as by rivets at both ends on lug portions

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16 and 17 formed with supports 11 and 12, respectively.

An angle-shaped lever 18 best seen in Figs. 2, 3, 4 and 5 is formed with bearing portions L and L1 serving for pivotally mounting this lever on shaft 13. Angle lever 18 is yieldably held in operative relation with the downwardly disposed edges of U-shaped bars B1, B2, B3, etc., by a retractile spring 19 having one of its ends hooked to a connecting rod 20 pivoted at 21 to the short arm portion of angle lever 18, while the other end of spring 19 is hooked to a lug 22 formed or carried by the base 10. The opposite end of rod 20 is connected as by a shoulder screw W to the end of an arm 23 mounted for reciprocatory angular movements on a shaft 24 and on the end of arm 23 is mounted a spring-pressed pawl 25 disposed in engageable relation with a ratchet wheel 26 secured on shaft 24 in position adjacent one end of a cylindrically-shaped support 27 for rotating it step by step as will be hereinafter described in detail, a retaining pawl 65 being provided for holding the support 27 in each operated position.

Support 27 is keyed on the shaft 24, the latter having one of its ends journaled in a bearing B carried by the upright support 11, while its opposite end is fitted into the hub portion of a gear 28 best seen in Fig. 5 and keyed thereto by a pin 31. The gear 28 in turn is secured to the armature shaft of a motor 29 by a pin 32 and is disposed in meshing relation with a pinion 33 keyed on one end of a cam shaft 34, the speed ratio being 8 turns of pinion 33 for each turn of gear 28.

According to this construction, the cylindrically-shaped support 27, the armature shaft of motor 29 and the cam shaft 34 are rotated step by step by the operation of the ratchet wheel 26 as effected by the key members K1, K2, K3, etc. in the setting of a call as will be hereinafter described in detail.

The cylindrically-shaped support 27 as best seen in Figs. 2, 3, 5 and 6 is provided at its periphery with eight coordinately disposed rows of equally spaced lug members 34Y extending radially therefrom, serving for mounting as on pivot 52, a corresponding number of segment-shaped members 35 which are held frictionally in the operated and non-operated positions as the case may be by similar springs 36, fitted into drilled holes in the support 27 and having one of their ends bearing against the periphery of the segment-shaped members as shown in Fig. 6. The similarly disposed radial edges of the segment-shaped members 35, that is, the edges disposed to the left side of the pivot 52, as viewed from

Fig. 6 are disposed in engageable relation with arms *a1*, *a2*, *a3*, *a4* and *a5* formed with or carried by the U-shaped bars B1, B2, B3, B4 and B5, respectively, so as to impart a small angular movement to these segment members for positioning their opposite edges in engageable relation with one arm of respectively associated inverted V-shaped pawl-like elements P1, P2, P3, P4 and P5, for operating the latter upon the rotation of the cylindrically-shaped support 27 as effected by the motor 29 for releasing normally tensioned tuned reeds R1, R2, R3, R4 and R5 of a voltage generator VG of the type disclosed in Patent 2,352,723 issued to R. F. Mallina, July 4, 1944, for transmitting the call, as will be hereinafter described in detail. These vibrative reeds are moved collectively to tensioned position upon each rotation of cam shaft 34 and are held individually under such tension by their respectively associated V-shaped pawl-like members P1, P2, P3, P4 and P5. These pawl-like members are pivoted on a shaft SH and movable in engageable relation with their respective reeds by the tension of similar retractile springs ST coiled around a shaft SH1 supported at one end by upright support 11 and its opposite end by an upright support 41 secured to the base 10 by a number of screws SC1 shown in Figs. 3, 4 and 5.

A bar 40 has one of its ends secured as by rivets 40X to upright support 11 and its opposite end to upright support 41 secured as above mentioned to the base 10. The upright support 41 in addition serves for supporting one end of cam shaft 34, while the opposite end of this cam shaft is supported by upright 11 as best seen in Fig. 3. The bar 40 is provided with arm portions Y1, Y2, Y3, Y4 and Y5 extending downwardly in engageable relation with the pivoted segments 35 which have been set by the operation of the keys for returning them to normal position following the operation of their respectively associated V-shaped pawl-like members P1, P2, P3, etc., upon the rotation of support 27 as effected by motor 29.

On the armature shaft of motor 29 as shown in Fig. 3 is secured a disc member 50 having a ratchet tooth 61 provided for engaging a pawl in the form of a magnet armature 53 pivoted as at 54 to the support 55 of a magnet 56, this magnet being energized as by a current impulse generated at the exchange following the closing of the line circuit as effected by the closure of an ordinary switch spring upon the removal of the telephone handset TH from its cradle which is formed at the top portion of a casing 64 housing the transmitter mechanism.

In a typical operation of the call transmitter of this invention, supposing that it is desired to transmit a 7-digit telephone call designation as AH35621 for example, the operation of key K2 having the symbols ABC2 printed thereon is effective to impart a small angular movement to the U-bars B2 and B3 and through their projecting arms *a2* and *a3* impart a pivotal movement to two of the segments 35 of row V1 from the position shown in Fig. 6 to the position shown in Fig. 7 so as to position such segments in engageable relation with the pawl-like members P2 and P3 where they are frictionally held by their respective springs 36 following the release of that key. The collective movement of U-shaped bars B2 and B3 is imparted to the angularly-shaped lever 18 and thereby to the connecting rod 20 against the tension of its retractile spring 19, thus pivoting the arm 23 on shaft 24 for moving the pawl 25 one tooth ineffectively on the ratchet wheel 26, pre-

paratory to the release of key K2 above mentioned. The release of key K2 permits the retractile spring 19 to operate the ratchet wheel 26 and thereby the cylindrical support 27 for positioning the row V2 of segments 35 in operative relation with the projections *a1*, *a2*, *a3*, *a4* and *a5* of U-shaped bars B1, B2, B3, B4 and B5, the support 27 for segments 35 being held in each position by the retaining pawl 65.

The operation of key K4 having the symbol GH14 printed thereon, the second digit of the called designation AH35621 above mentioned, is effective to operate the U-shaped bars B4 and B5, thus causing their respective projections *a4* and *a5* to impart a pivotal movement to their associated segments 35 of row V2 to the position as shown in Fig. 7. The return of key member K4 to normal position permitting the spring 19 to move the drum 27 one step through the engagement of pawl 25 with the ratchet wheel 26 thus positioning the segments 35 of row V3 in operating relation with the projections *a1*, *a2*, *a3*, *a4* and *a5* of U-bars B1, B2, B3, B4 and B5 and this operation is repeated for each digit of the call designation AH35621 to be transmitted when all segments 35 representing the call designation above mentioned are set in the position shown in Fig. 7 when the segments 35 of row V1 which have been set by the operation of the key K2 are in position as shown in Fig. 2 for operating the pawl-like members P2 and P3 for releasing the pretensioned reeds R2 and R3 tuned to generate a voltage in the generator corresponding to digit 2 upon the rotation of support 27 as effected by the motor 29 following the removal of the telephone handset TH from its cradle so as to cause the closure of a contact spring 75 in the telephone line circuit not shown for energizing the winding of motor 29 while an electrical impulse received under control of the operator at the exchange causes the energization of magnet 56 during the rotation of the motor to cause the movement of armature 53 in the path of the projection 61 carried by the disc 50 for stopping the motor and the support 27 in the starting position.

The operation of motor 29 and the gear 23 actuated thereby is effective to actuate the cam shaft 34 one turn for each 45-degree angular movement of support 27 or one turn of cam shaft 34 for each row V1, V2, V3, etc. of segments 35 for retensioning the reeds which have been released by the operation of the V-shaped pawl-like members P1, P2, P3, etc. by the segments representing the telephone call designations transmitted. The retensioning of the reeds permits the previously operated pawls to reengage their respective reeds when flexed by the operation of cam shaft 34 for holding them in the pretensioned position preliminarily to their release as above described for the transmitting of a similar signal in a successive call designation. The deenergization of magnet 56 permits the retractile spring 62 to pivot the armature 53 to the position for releasing the armature shaft of motor 29 following a complete turn of the latter for transmitting the call designation AH35621 above mentioned. The camming elements Y1, Y2, Y3, etc., as shown in Figs. 2, 3 and 6 are effective to return the operated segments 35 to normal position upon each digit transmitted preparatory to the setting operation of the segments for transmitting a successive telephone call designation.

What is claimed is:

1. In a telephone call transmitter, a set of key members, a set of pivoted bars actuated in

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pairs by the movement of each of said key members, a set of vibrating reeds, a rotatable support, a row of segment-shaped members mounted for pivotal movement on said support from normal to engageable relation with said reeds, means carried by each of said bars for setting a number of said segment-shaped members relative to said reeds in position representing the digit of the operated key member and motor means for rotating said support for transmitting the call.

2. In a telephone call transmitter, a set of key members, a set of bars mounted for operation in pairs by the movement of each of said key members, a step-by-step rotatable support, a plurality of operable segment-shaped members disposed in rows on said rotatable support, means carried by said bars for moving a number of said segments in each of said rows in position for setting a call upon the step-by-step operation of said support, a set of vibrative reeds disposed in the path of said segments, motor means for rotating said support to cause the operation of a number of said reeds by the segments set by the operation of said key members, and means disposed in the path of said segment-shaped members for returning the latter to normal position during the rotation of said support by said motor for transmitting the call.

3. In a telephone call transmitter, a set of key members, a set of bars mounted for operation in pairs by the movement of each of said key members, a movable support, a plurality of operable segment-shaped members arranged in rows on said support, a stepping mechanism actuated by the operation of each of said bars by said key members for operating said support, each of said bars having means for moving one of said segments in each of said rows in position for setting a call upon the operation of said support, a voltage generator having a plurality of vibrative reeds, and other means for actuating said support independently of said stepping mechanism to cause the vibration of said reeds for transmitting the call.

4. In a telephone call transmitter, a set of key members, a cylindrically shaped support, a mechanism operable by the movement of said key member for rotating said support step by step, a plurality of operable segment-shaped members arranged in rows on said support, a plurality of bars operable in pairs by the movement of any one of said key members, each of said bars having means for actuating one of said segments in each of said rows for setting a call upon the operation of said support, a voltage generator having a plurality of vibrative reeds, a cam shaft, a gearing mechanism for actuating said cam shaft upon the rotation of said support for tensioning said reeds collectively, means operable for holding said reeds in said tensioned position, and motor means for actuating said support to cause the operation of said operable means by the segments set by the operation of said bars for releasing a corresponding number of said reeds for transmitting the call.

5. In a telephone call transmitter, a set of key members, a plurality of U-shaped bars operable in pairs by the movement of any one of said key members, a rotatable support, an arm actuated by the movement of said bars, a ratchet mechanism actuated by the operation of said arm for actuating said support step by step upon the successive operation of said key members, a plu-

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ality of pivoted segment-shaped members arranged in coordinate rows on said support, means carried by said U-shaped bars for moving a corresponding number of said segments in position for setting a call representing the digits of the operated key members, a voltage generator having a plurality of normally tensioned vibrative reeds, operable means for holding said reeds in the tensioned position, a motor for rotating said support following the setting of the call to cause the operated segments to actuate said holding means for releasing a corresponding number of said reeds for transmitting signals corresponding to the operation of said key members.

6. In a telephone call transmitter, a set of key members, a plurality of bars disposed transverse of said key members for operation in pairs by the operation of any one of said key members, a movable support, a plurality of shiftable members carried by said support disposed in parallel rows relative to the longitudinal axis of said support, a ratchet mechanism operable upon the movement of any pair of said bars for actuating said support, means carried by said bars for setting a pair of said shiftable members in each of said rows upon the successive operation of said support by said key members for setting a call, a voltage generator having a plurality of vibrative reeds, a camming mechanism actuated by the operation of said support for tensioning said reed, operable pawls associated with said reeds for holding them in the tensioned position, said pawls having means extending in the path of the segments set by the operation of said key members, and motor means for rotating said support to cause the engagement of said segments with the means carried by said pawls for releasing said reeds for transmitting the call, and electromagnetic means operable for stopping the operation of said motor following the transmitting of such call.

7. In a call transmitter, a set of key members, a plurality of bars engageable by said key members for operation in predetermined combinations representing the symbols of said key members, a step-by-step operable support, shiftable elements disposed in a plurality of rows on said support, means carried by said bars for positioning a corresponding number of said elements in each of said rows upon the step-by-step operation of said support for setting a call, means for frictionally holding said elements in the shifted position, a set of normally tensioned vibrative reeds operatively associated with said elements, operable means for normally holding said reeds in pretensioned position, a motor for actuating said support to cause the operation of said holding means by the positioned elements for successively releasing said reeds in said combinations to cause their operation for transmitting the call, and camming means for returning the shifted elements to normal position following the release of said reeds by said operable means.

RUDOLPH F. MALLINA.

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The following references are of record in the file of this patent:

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