

April 11, 1944.

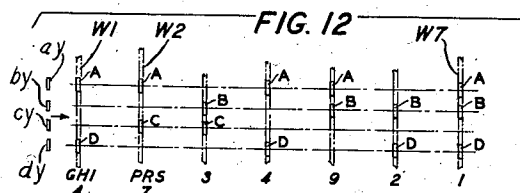
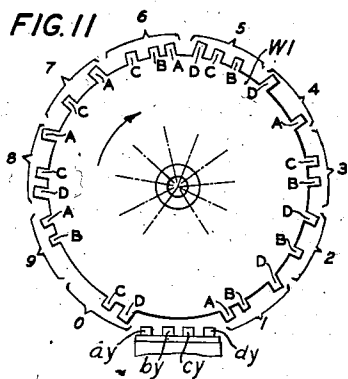
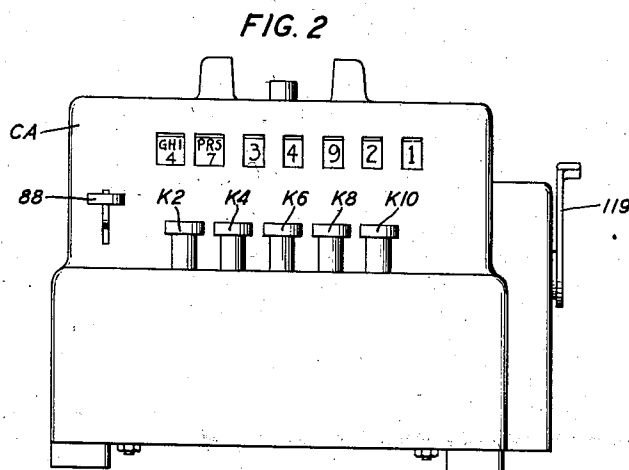
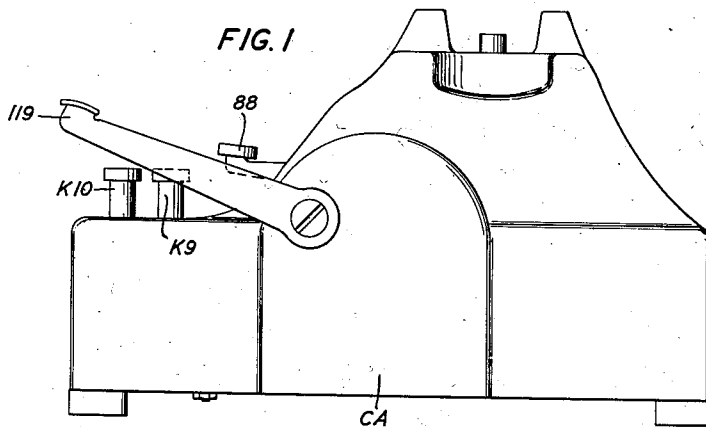
C. N. HICKMAN ET AL

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PRESET CALL TRANSMITTER

Filed May 21, 1941

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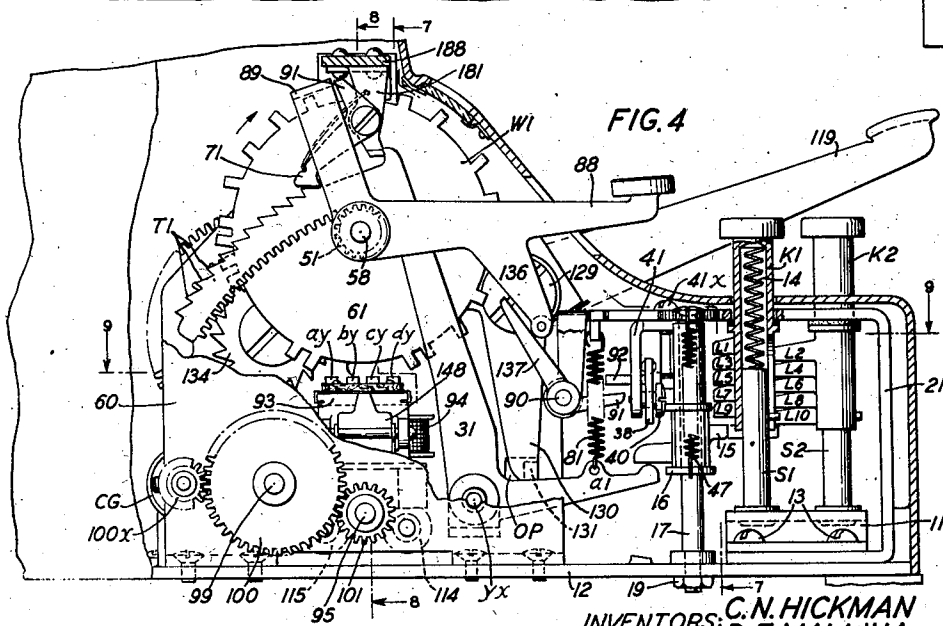
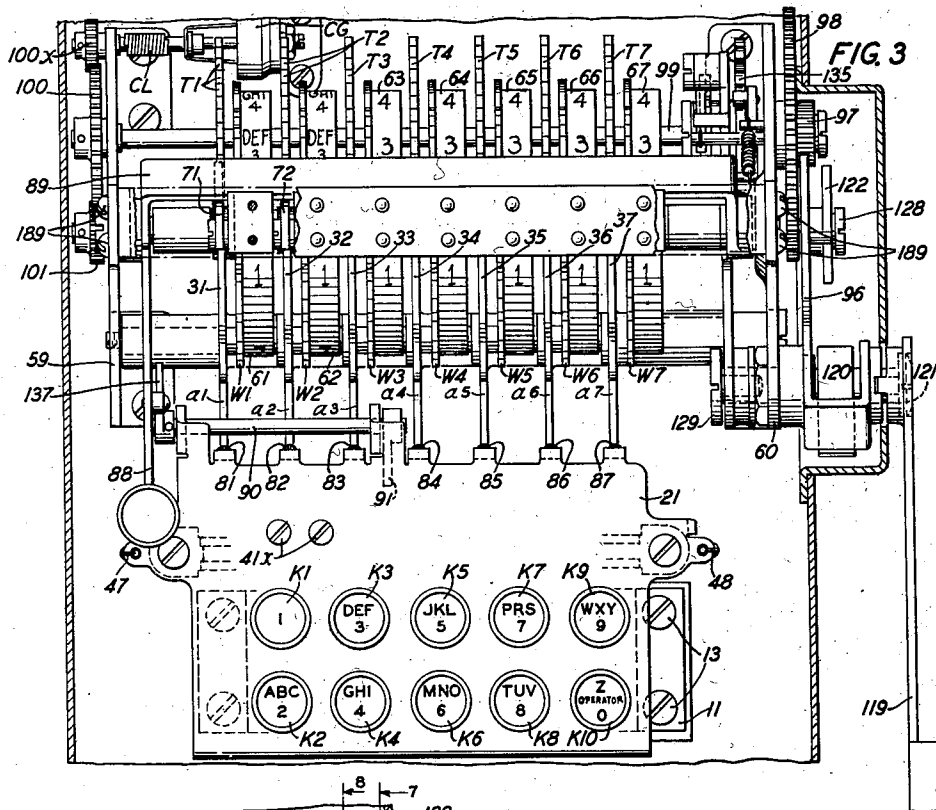
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C. N. HICKMAN ET AL

2,346,305

PRESET CALL TRANSMITTER

Filed May 21, 1941

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FIG. 5

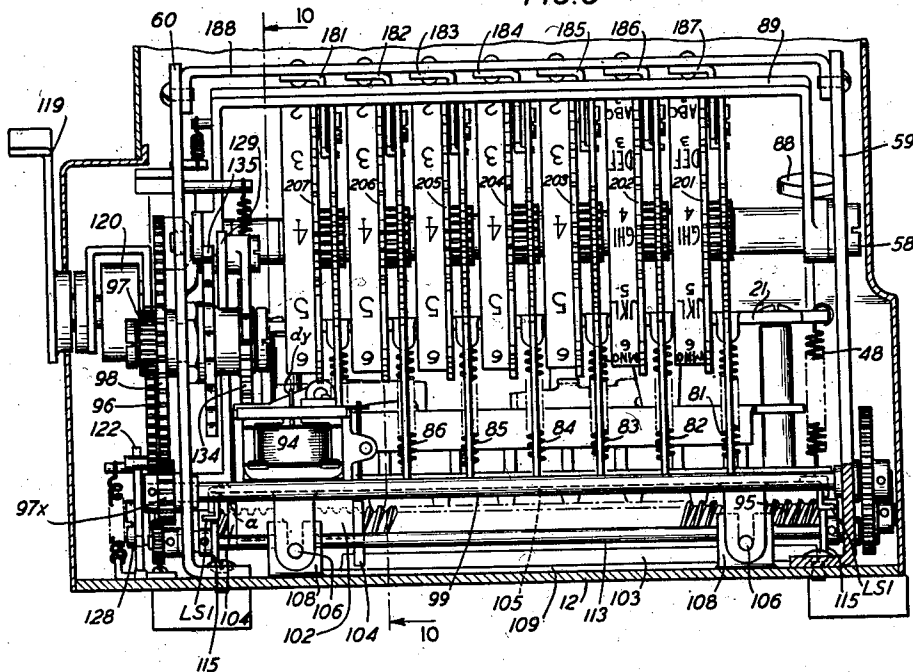
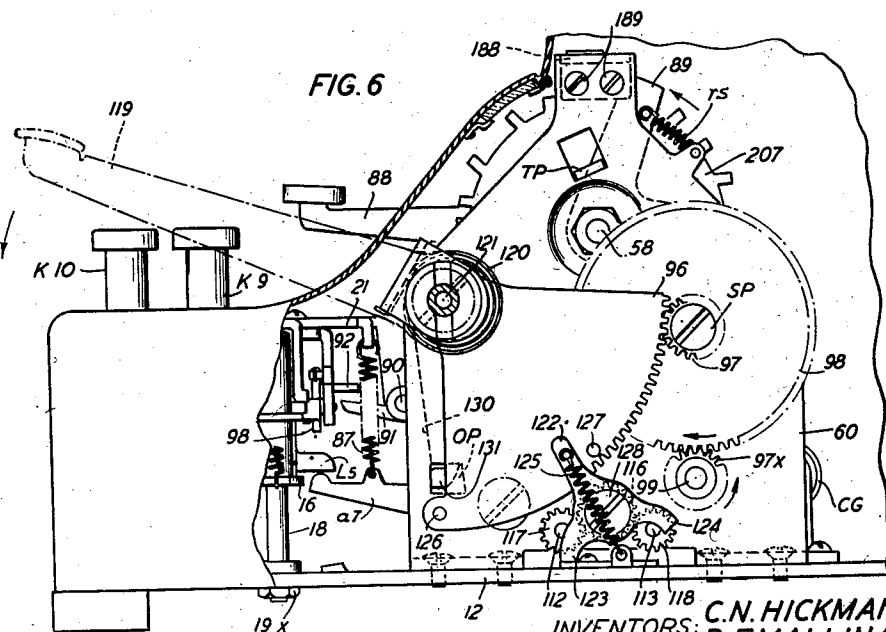


FIG. 6



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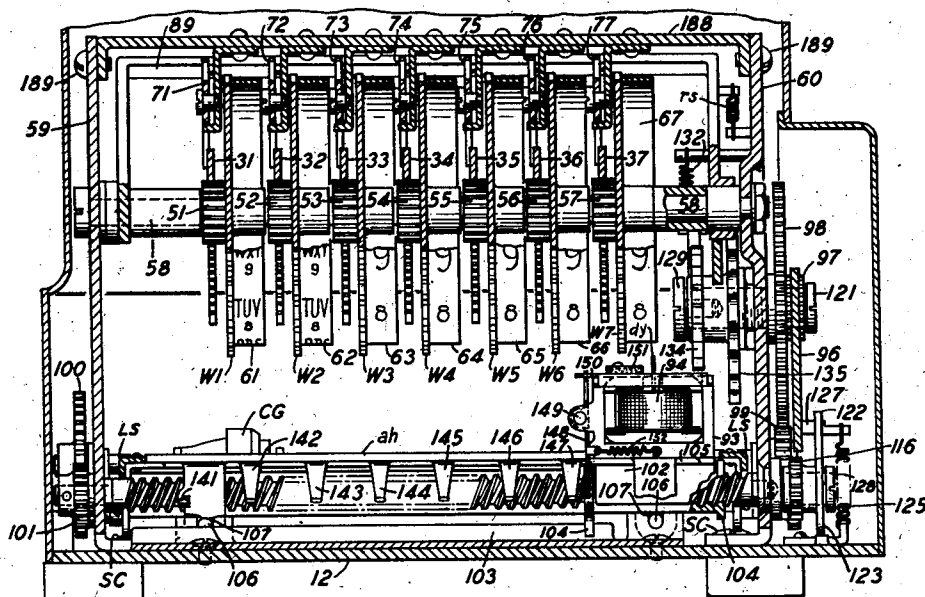
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2,346,305

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Filed May 21, 1941

FIG. 7



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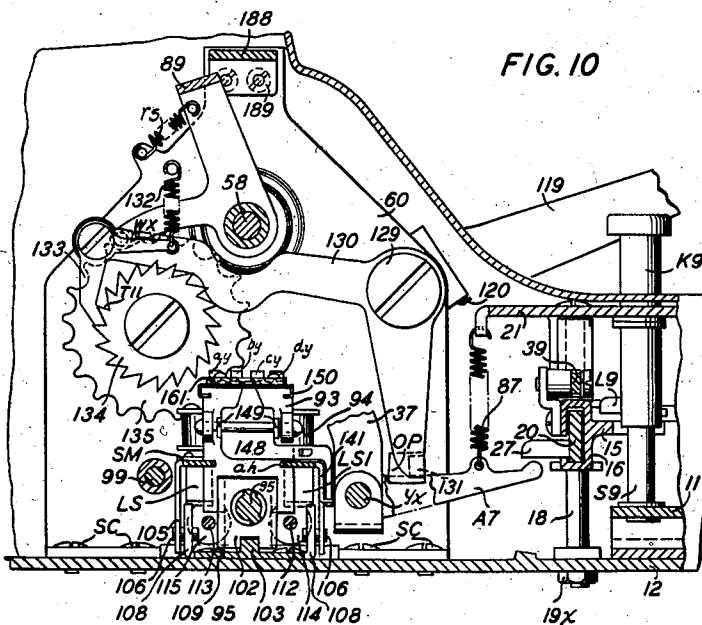
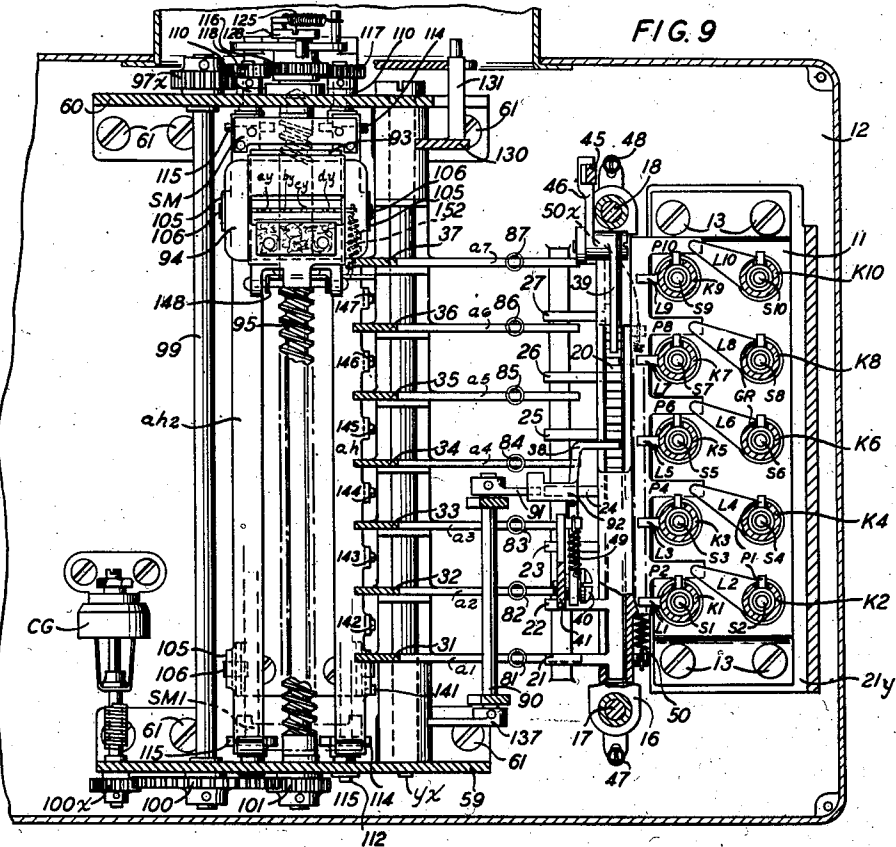
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2,346,305

PRESET CALL TRANSMITTER

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,346,305

PRESET CALL TRANSMITTER

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13 Claims. (Cl. 179—90)

This invention relates to call transmitters of the key-operated preset type.

In accordance with this invention a call transmitter of the type above referred to is provided in which the successive operation of a set of numbered key members is effective to move a series of code discs in positions for determining the operation of vibrative elements which form parts of an alternating current generator in a plurality of combinations representing the digits of the keys depressed, the code discs cooperating with wheels having digits printed at their peripheries for indicating the successive operation of the keys and thereby the number of the telephone call designation it is desired to transmit. Means in the form of a supplemental key is provided whereby the code discs and the indicating wheels movable therewith may be returned to normal position following the setting of a wrong telephone call designation without transmitting signals and independently of a resetting mechanism actuated by the tension of a motor spring following each call transmitting operation. Means in the form of a lead screw geared to the motor spring is provided for moving the alternating current generator and the vibrative elements carried thereby in engageable relation with the code discs set by the operation of the key members for transmitting signals corresponding to the operation of the keys. Means is provided for imparting movement to the current generator for placing the vibrative elements out of engageable relation from the code discs preliminary to the movement of the generator to normal starting position as effected by the lead screw simultaneously with the tensioning of the motor spring by the operation of a handle lever extending outside of the casing housing the transmitter mechanism.

Other novel features of the invention and advantages 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 right-side elevation showing the motor spring tensioning handle lever, the digit keys and the key of the code discs resetting mechanism in the non-operated position;

Fig. 2 is a front elevation of Fig. 1 showing the combined code indicator wheels in one of their operated positions;

Fig. 3 is a top assembly view shown with the casing housing the transmitter mechanism in

horizontal section and with a number of operating parts with portions broken away;

Fig. 4 is a left side assembly view of the transmitter mechanism showing a number of operating parts in section and with portions broken away, the casing housing the mechanism being shown in vertical section;

Fig. 5 is a rear assembly view showing the base and the casing in vertical section and with portions broken away, the generator being shown in normal non-operated position;

Fig. 6 is a right side view showing the motor spring tensioning mechanism, a number of parts being shown with portions broken away and the keys in normal non-operated position;

Fig. 7 is a vertical sectional view taken on line 7—7 of Fig. 4;

Fig. 8 is a vertical sectional view taken on line 8—8 of Fig. 4;

Fig. 9 is a horizontal sectional view taken on line 9—9 of Fig. 4;

Fig. 10 is a vertical cross-sectional view taken on line 10—10 of Fig. 5;

Fig. 11 is a view of one of the code discs; and

Fig. 12 is a diagrammatic view of a setting of the code discs according to a given telephone call designation.

The call transmitter of the invention consists of a set of manually operable key members K1, K2, K3, K4, K5, K6, K7, K8, K9 and K10 in the form of tubings telescopically engaging studs S1, S2, S3, S4, S5, S6, S7, S8, S9 and S10 best seen in Figs. 4, 9 and 10 having one of their ends secured to a bridge piece 11 in turn secured to a base 12 as by a number of screws 13, while compression springs, such as 14 shown in Fig. 4, are provided for returning the keys to normal non-operated position following the setting of code discs W1, W2, W3, W4, W5, W6 and W7 in a manner which will be hereinafter described in detail. The studs S1, S2, S3, etc., are provided with laterally extending pins as P1, best seen in Fig. 9, engaging longitudinally disposed grooves GR in the tubing elements of keys K1, K2, K3, etc., so as to prevent rotating movement of the keys relative to studs S1, S2, S3, etc., so as to permit reading of the groups of digits and letters carried by these keys from the front of the casing as shown in Fig. 3.

The tubing portions of key members K1, K3, K5, K7 and K9, as shown in Figs. 4 and 9, are provided with similar laterally extending lug portions as L1, L3, L5, L7 and L9 for individually engaging a rib 15 formed with a carriage 16

while the tubing portions of key members K2, K4, K6, K8 and K10 are provided with similar laterally extending lug portions L2, L4, L6, L8 and L10 disposed in engageable relation with the laterally extending portions P2, P4, P6, P8 and P10 formed with rib 15 of carriage 16. The carriage 16 is mounted for vertical sliding movement on studs 17 and 18, best seen in Figs. 7 and 9, extending perpendicularly from the base 12 to which they are secured as by nuts 19 and 19X, these studs being held in spaced relation at their upper ends by a support 21 of substantially U-shaped cross section having one of its sides clamped securely between the base 12 and the bridge piece 11, as shown in Figs. 4, 9 and 10, with the upper disposed side of U-shaped member 21 serving as a common stop for limiting the upward movement of keys K1, K2, K3, etc., as effected by their retractile springs 14.

The lugs L1, L3, L5, L7 and L9 of keys K1, K3, K5, K7 and K9 are disposed at predetermined vertical distances from the common projection 15 formed with carriage 16, while lugs L2, L4, L6, L8 and L10 of keys K2, K4, K6, K8 and K10 are disposed at predetermined vertical distances from lugs P2, P4, P6, P8 and P10, respectively, laterally extending from the projection 15 so as to impart to this carriage downward sliding movements on studs 17 and 18 against the tension of two retractile springs 47 and 48, shown in Figs. 4, 7 and 9, corresponding to the numerical values of the key members K1, K2, K3, etc., thus imparting corresponding angular movements to the code discs W1, W2, W3, etc., by a gearing mechanism which will be hereinafter described in detail.

In carriage 16 is slidably mounted a ratchet toothed rack 20 best seen in Figs. 7, 9 and 10 having laterally extending arms 21, 22, 23, 24, 25, 26 and 27 spaced relative to each other so as to successively engage with arms a1, a2, a3, a4, a5 and a7 formed with gear sectors 31, 32, 33, 34, 35 and 37, respectively, these gear sectors being pivoted on a common shaft YX supported by upright supports 59 and 60 secured to the base 12 by a number of screws 61.

The longitudinal movement of rack 20 in carriage 16 is effected by the coaction of pawls 38 and 39, best seen in Figs. 5, 7 and 9. Pawl 38 is pivoted on a shoulder screw 40 engaging a downwardly extending support 41 secured to the U-shaped member 21 as by screws 41X, Figs. 4 and 7. This pawl is limited in its pivotal movement as effected under the tension of a spring 49 upon the downward movement of carriage 16 by a stop 42 engaged by a lug 43 formed with the pawl 38, the pivotal movement of pawl 38 being limited to an arc corresponding to the pitch or the distance between the ratchet teeth of rack 20.

The retaining pawl 39 of the rack is pivoted on a screw 44 engaging an upwardly extending lug formed with the carriage 16. This pawl, however, is moved out of engagement from the rack 20 when carriage 16 is in normal non-operated position, as shown in Figs. 4, 7 and 9, by a stop 45 formed with the U-shaped member 21 abutting against a projection 46 of pawl 39. The disengagement of pawl 39 which occurs at the time the carriage 16 reaches its normal non-operated position, as effected by the retractile springs 47 and 48, permits the movement of rack 20 automatically due to the tension of spring 49 acquired during the return movement of the carriage 16

to normal and the holding of rack 20 by pawl 39, such automatic movement being effected against the tension of a comparatively light retractile spring 50 having one of its ends hooked to the carriage 16 and its other end hooked to pin 50X laterally extending from the rack 20.

The gear sectors 31, 32, 33, 34, 35, 36 and 37 which are mounted for pivotal movement on shaft YX engage with pinions 51, 52, 53, 54, 55, 56 and 57, respectively. These pinions are mounted for free rotation on a shaft 58 journaled at both ends in the upright supports 59 and 60 and on the hubs of pinions 51, 52, etc., are mounted for rotation as units the code discs W1, W2, W3, W4, W5, W6 and W7 combined with the indicating wheels 61, 62, 63, 64, 65, 66 and 67, respectively. On the indicating wheels 61, 62, 63, etc., are printed the digits 1 to 9 plus 0, while on the two indicating wheels, such as 61 and 62, representing the first and second digits of any given telephone call designations, the numerals are combined with groups of letters as shown in Figs. 2, 3, 5, 7 and 8 corresponding to that of keys K1, K2, K3, etc., appearing as shown in Fig. 2 upon the setting of a call in registry with glass-covered openings in a casing CA housing the transmitter mechanism. The code discs W1, W2, W3, W4, etc., which are similar to each other are provided as shown in Fig. 11 with ten sets of teeth as:

ab-d corresponding to key K1
-b-d corresponding to key K2
-bc- corresponding to key K3
a--d corresponding to key K4
-bcd corresponding to key K5
abc- corresponding to key K6
a-c- corresponding to key K7
a-cd corresponding to key K8
ab-- corresponding to key K9
--cd corresponding to key K10

These groups of teeth are provided for operating different tuned vibrative elements *ay*, *by*, *dy* and *cy* of a reed generator in such combinations as determined by the setting of the code discs W1, W2, W3, W4, etc., under the control of the key members K1, K2, K3, etc., as shown diagrammatically in Fig. 12, in a manner which will be hereinafter described in detail.

Spring-pressed pawls as 71, 72, 73, 74, 75, 76 and 77, best seen in Figs. 3, 4, 7 and 8, are pivoted on downwardly extending brackets as 181, 182, 183, 184, 185, 186 and 187 secured to a bar 188. These pawls serve to hold the gear sectors 31, 32, 33, etc., and the combined code discs and indicating wheels carried thereby in each digit indicating position through their engagement with the ratchet teeth T1 formed with these gear sectors, the bar 188 being secured at both ends to the upright supporting members 59 and 60 as by a number of screws 189.

The gear sectors 31, 32, 33, etc., and thereby the combined code discs and indicating wheels 61, 62, 63, etc., actuated thereby may be released from operated position so as to permit their return movement to normal as for canceling a call by the manual operation of a release key member 88 formed with an inverted U-shaped bar 89 pivoted on shaft 58. The movement of this key and that of bar 89 is effective to impart a pivotal movement to pawls 71, 72, 73, etc., collectively for disengaging them from the gear sectors 31, 32, 33, etc., these gear sectors being returned to normal position under the tension of their retractile springs 81, 82, 83, 84, 85, 86 and 87 shown in Figs. 3, 4, 5, 7, 9 and 10.

The operation of the release key 88 in addition to causing the release of gear sectors 31, 32, 33, etc., by the operation of pawls 71, 72, 73, etc., is effective to impart a small angular movement to a shaft 90 best seen in Figs. 3, 4, 6 and 9, through the engagement of an arm 136 formed with that key with an arm 137, keyed to the shaft 90, the rotation of this shaft being effective to disengage the pawl 38 from rack 20 through the engagement of arm 91, keyed to the other end of shaft 90 with a lug 92 laterally extending from pawl 38 so as to permit the return movement of rack 20 to normal position under the tension of its retractile spring 50 timed to occur following the return of the combined code and indicating wheels to normal unoperated position.

A current generator consisting of a two-part permanent magnet 93, the vibrative elements *ay*, *by*, *cy* and *dy* clamped therebetween and a coil 94 are connected to the telephone line. This generator is moved transverse of the direction of rotation of the code discs W1, W2, W3, etc., and indicating wheels 61, 62, 63, etc., by a lead screw 95 best seen in Figs. 5, 8, 9 and 10, journaled in the upright supports 59 and 60 and operatively connected to a gear sector 96, this gear sector being pivoted on a shoulder screw 121 engaging the support 59. Gear sector 96 is movable from the position shown in Figs. 1, 4 and 6 to the position where it engages a stop TP for rotating a pinion 97 mounted on a spindle SP for rotation as a unit with a gear 98 in turn engaging a pinion 97X, keyed to one end of a counter shaft 99 journaled at both ends of the supports 59 and 60 and to the opposite ends of this shaft is keyed a gear 100 (see Figs. 3, 4 and 9) meshing with a pinion 101, keyed to the end of lead screw 95, the operation of lead screw 95 being under control of a speed governor mechanism CG best seen in Fig. 3 operatively connected to gear 100 by a pinion 100X, while a one-way clutch prevents the operation of the governor during the manual operation of a handle lever 119 for winding the motor spring 120, handle lever 119 being formed with the gear sector 96.

Lead screw 95, as shown in Figs. 5, 8 and 10 engages a nut 102 of rectangular cross section having a key-way formed longitudinally therein for engaging a guiding ridge 102 formed with a plate 109 for preventing the turning movement of this nut upon the rotation of lead screw 95, while the sides of this nut are provided with guide-ways as 104, best seen in Figs. 5 and 8 forming guiding elements between which the current generator may slide as for moving the vibrative elements *ay*, *by*, *cy* and *dy* carried thereby in engaged and disengaged relation from the code discs W1, W2, W3, etc., upon the upward and downward movement of a supporting frame, in the form of guiding rails *aH* and *aH2* engaging registering notches in the two-part permanent magnet 93, these rails being held at their ends in spaced parallel relation to each by spacer members *sm* and *sm1*, best seen in Fig. 9, while the guiding rail members *aH* and *aH2* are each provided with two downwardly extending lug portions 105 having pins as 106 laterally extending therefrom for engaging vertically disposed slots in the upright extending lugs 108, best seen in Figs. 5 and 10, formed with the plate 109 with which the guiding rib 103 of nut 102 is formed. In the upright supporting flanges 59 and 60 are journaled the shafts 112 and 113 each provided with a pair of cams 114 and 115, respectively, on which rest the downwardly bent portions LS and

LS1 of rails *aH* and *aH2*. The shafts 112 and 113 and the cams 114 and 115 carried thereby are rotated so as to impart upward and downward movements to the generator frame, thus formed, upon the rotation of a gear 116 engaging with pinions 117 and 118 keyed on shafts 112, 113, respectively.

The rotation of gear 116 is effected automatically by the operation of a toggle mechanism, itself actuated by the movement of gear sector 96 as effected in one direction by the manual operation of handle lever 119 secured to gear sector 96 and in the opposite direction by a spiral motor spring 120 tensioned by the operation of the handle lever 119, this motor spring having its inner disposed convolution hooked to a spindle 121 supporting the handle 119 and the gear sector 96 while the outer disposed convolution of this spring is hooked to the gear sector 96, as shown in Figs. 3, 5, 6 and 7. The gear 116 which forms part of the toggle mechanism is keyed to the hub of an arm 122 pivoted on a shoulder screw 123 and having projections as 123 and 124 cooperating with the base 12 for limiting the angular movement of gear 116 and thereby that of pinions 117 and 118 and their supporting shafts 112 and 113 to which the cams 114 and 115 are keyed, the movement of the gear 116 being effected by the tension of toggle spring 125 upon the movement of arm 122 when engaged by the pins 126 and 127 carried by the gear sector 96.

On the upright support 60, as shown in Figs. 4, 5, 7 and 10, is pivoted as on shoulder screw 129 an angular-shaped lever 130, the downwardly extending arm of which is provided with a lug 131 extending perpendicularly therefrom through an opening OP in the upright support 60 in engageable relation with the vertical edge of gear sector 96, Fig. 6, to serve as a stop for the latter while holding the angle lever 130 and a pawl 133 in engaged relation with a ratchet wheel 134 against the tension of a retractile spring 132, provided for imparting a small angular movement to this lever following the manual operation of handle 119 and the gear sector 96 actuated thereby to move the pawl 133 in position for successively engaging the teeth, as T11 of ratchet wheel 134, for rotating this wheel and a multiple cam 135 keyed thereon one position for each return movement of gear sector 96.

The rotation of ratchet wheel 134 and the cam 135 secured thereto as imparted by the movement of angle lever 130 is effective to impart a small angular movement to the bar 89 in the direction indicated by the arrow in Figs. 4, 6 and 10 through the engagement of arm WX formed with this bar in engagement with the cam 135 for moving the pawls 71, 72, 73, etc., collectively out of engagement from the ratchet teeth T1 of sectors 31, 32, 33, etc., for permitting the return of these sectors to normal position under the tension of their retractile springs 81, 82, 83, etc., the operation of bar 89 through the engagement of its downwardly projecting arm 136 (see Fig. 4) with a lever 137 keyed on shaft 90 being effective to rotate this shaft and move the arm 91 keyed to the opposite end of this shaft in position to engage the lug 92 carried by pawl 38 for disengaging it from ratchet rack 20, thus permitting the latter to return to normal position under the tension of its retractile spring 50 being timed as above mentioned to occur following the return of gear sectors 31, 32, 33, etc., the code discs and the indicating wheels W1, W2, W3, etc., to normal unoperated positions.

The rail *aH*, Figs. 8, 9 and 10, of the frame on which the current generator is slidably mounted is provided with downwardly extending lug portions 141, 142, 143, 144, 145, 146 and 147 corresponding in number to the code discs *W1*, *W2*, *W3*, etc. These lug portions are successively engaged by the lower end of a two-armed lever 148 pivoted as at point 149 to the magnet 93 (see Fig. 8) while the other arm of lever 148 extends through a similarly sized opening in a plate 150 having secured thereon a pad of felt 151 or other fibrous material provided for collectively engaging the vibrative elements *ay*, *by*, *cy*, *dy* so as to damp their operations as effected by their engagement with the code discs *W1*, *W2*, *W3*, etc., a retractile spring 152 being provided to impart a pivotal movement to lever 148 for disengaging the damping pad 151 from the vibrating elements prior to the operation of such elements by the code discs *W1*, *W2*, *W3* so as to permit their vibrations following their engagement by the successive code discs.

In a typical example of operation of the call transmitter mechanism of the invention above described, supposing that it is desired to transmit signals corresponding, for example, to the telephone call designation *HP3-4921*, the operation of key *K4* having the combination *GH14*, the first digit of the call designation above mentioned is effective to impart a downward movement to the carriage 16 equal to four-tenths of the total movement of the latter, due to the clearance between the projection *L4* carried by key *K4* and the projection *P4* formed with the rib 15 of carriage 16. The downward movement of carriage 16 is effective through the engagement of projection 21 (see Fig. 9) carried by rack 20 now in engageable relation with the arm *a1* of gear sector 31 to impart a pivotal movement to this gear sector against the tension of its retractile spring 81 for rotating the code disc *W1* and its indicating wheel 61 an angular distance of four-tenths of a turn, thereby indicating the number of the depressed key, that is, keys *GH14* and moving the code disc *W1* in position wherein the teeth *a* and *d* of this disc will cause the operation of vibrative elements *ay* and *dy* upon the operation of the generator, the gear sector 31 being held in the operated position against the tension of its retractile spring 81 by the spring-pressed pawl 71.

The downward movement of carriage 16 causes the downward movement of pawl 38 under the normal tension of spring 49 within the limits defined by the abutment 42 of lug *LL* in engagement with the lug 43 of pawl 38 and causes the engagement of spring-pressed pawl 39 with the rack 20 when the arm 46 of this pawl disengages the abutment 45. As above described, it is to be noted that the arc generated by the downward movement of pawl 38 within the limits above mentioned causes this pawl to fall successively between the teeth as *TX* so as to cause a longitudinal movement to this pawl during the return movement of carriage 16 to normal position and thereby tensioning its retractile spring 49 due to the locking of rack 20 by pawl 39 moving with carriage 16. Upon the engagement of arm 46 of pawl 39 with the stop 45, this pawl is caused to disengage the rack 20, timed to occur when the carriage 16 reaches a small distance from normal position. The disengagement of rack 20 by pawl 39 causes the movement of this rack automatically longitudinally by the tension of spring 49 a distance limited by the

length of slot *SL1* in the pawl 38; that is, equal to a distance corresponding to the pitch of the teeth in rack 20, the tension of spring 49 overcoming the tension of the retractile springs 50.

The operation or longitudinal movement of rack 20 by the tension of spring 49 is effective to position the projection 21 (see Fig. 9) of this rack out of engageable relation from the arm *a1* of gear section 31 and position the projection 22 of rack 20 in engageable relation with the arm *a2* of gear section 32. Similarly, the operation of key *K7* having the digit designation *PRS7* is effective to impart a second downward movement to carriage 16, a distance seven-tenths of the total movement of the latter for imparting a corresponding angular movement to gear sector 32 and thereby moving the indicating wheel 62 in position for indicating the second digit of the call designation while rotating the code disc *W2* in position to cause the operation of vibrative elements *a* and *c*, the code disc *W2* and the indicating wheel 62 being held in the operated position by pawl 72 engaging the ratchet teeth *T1* of gear sector 32.

The downward and upward movements of carriage 16 as effected by the operation of key member *K7* and the carriage retractile springs 47 and 48 is effective through the coaction of pawls 38 and 39 as above described to impart a second step to the rack 20 for positioning its projection 23 in engageable relation with the arm *a3* of gear sector 33 while moving the projection 22 out of operable relation with the arm *a2* of gear sector 32 and this cycle of operation is repeated for each successive key in the telephone call designation *HP3-4921*, the indicating wheels 61, 62, 63, etc., being now in the position shown in Fig. 2 indicating the seven-digit telephone call designation *HP3-4921* while the code discs are positioned as shown diagrammatically in Fig. 12 to cause the operation of vibrative elements (*ay-dy*), (*ay-cy*), (*by-cy*), (*ay-dy*), (*ay-by*), (*by-dy*) and (*ay-by-dy*) upon the transverse movement of the current generator.

The operation of handle lever 119 from the position shown in Figs. 1, 2, 4, 5 and 6 to the position where the gear sector 96 actuated thereby engages the under-side of stop *TP* (Figs. 6 and 7), is effective to tension the motor spring 120 and to rotate the lead screw 95 for moving the generator and the vibrating elements *ay*, *by*, *cy* and *dy* mounted thereon ineffectively transverse of the discs *W1*, *W2*, *W3*, etc., to the opposite end of the frame formed by rails *aH*, *aH2* now in its lowered position. The rotation of lead screw 95 is effected by the rotation of pinion 97 engaging with gear sector 96, the gear 98 mounted for rotation as a unit with pinion 97, the engagement of gear 98 with pinion 97 keyed on shaft 99 and the gear 100 keyed to the opposite end of shaft 99 for engagement with pinion 101, keyed to the end of lead screw 95.

The manual operation of gear sector 96, as above mentioned, is effective to operate the toggle lever 122 when it is a small distance from its full operated position; that is, upon the engagement of this lever by the pin 125 to cause the spring 125 to continue the operation of the toggle lever to the position as determined by the abutment of arm 124 of this lever with the base 12. The angular movement of lever 122 and the gear 116 keyed thereto is effective to impart a rotary movement to the pinions 117 and 118 for rotating the shafts 112 and 113 and thereby the cams

114 and 115, thus raising the rail frame and the generator mounted thereon in position to cause the vibrative elements *ay*, *by*, *cy* and *dy* to engage the group of teeth of the code discs W1, W2, W3, etc., which have been moved in the path of the vibrating elements by the operation of the keys K4, K7, K3, K4, K9, K2 and K1 in the order named for transmitting signals representing the call designation HP3-4921, the movement of the lead screw 95 and thereby the movement of the generator as effected by the operation of motor spring 120 being under control of the speed governor CG operatively connected to gear 100 by pinion 100X.

Upon the return of gear sector 96 a small distance from its normal position, the pin 127 is effective to return the arm 125 to normal for rotating the gear 116 and thereby the shafts 112 and 113 and the cams 114 and 115 keyed to these shafts so as to lower the generator frame to position the vibrative elements clear of the teeth of the code discs W1, W2, W3, etc., preparatory to a successive operation of the handle lever 119 subsequent to a call setting operation.

The return of gear sector 96 from operated to normal is effective to impart a small angular movement to the angularly-shaped lever 130, Figs. 6 and 10, through the engagement of the gear sector with lug 131 of lever 130 to cause the operation of ratchet wheel 136 one tooth and therefore the operation of cam 135 so as to impart an angular movement to the bar 39 in the direction indicated by the arrow against the tension of its retractile spring *rs* for moving the pawls 71, 72, 73, etc. (Fig. 4), out of engagement from the ratchet teeth of gear sectors 31, 32, 33, etc., which are then returned to normal unoperated position by their retractile springs 31, 32, 33, etc., thus returning the indicating wheels and the code discs to normal unoperated position. The operation of bar 39 as effected by cam 135 imparts a small angular movement to shaft 90 through the engagement of arm 136 of key 98 with arm 137 keyed to that shaft, the operation of the latter moving the arm 91 in position for engaging the lug 92 of pawl 38 and thereby disengaging this pawl from rack 20 so as to permit the return of this rack to normal unoperated position under the tension of its retractile spring 50 and the transmitter is now ready for a subsequent call setting and transmitting operation.

The code discs W1, W2, W3, etc., the indicating wheels 61, 62, 63, etc., and the rack 20 may be returned to normal position for canceling a call but without the operation of the signaling mechanism by the simple operation of key member 83, such operation being effective to rotate the bar 39 for disengaging the pawls 71, 72, 73, etc., from the ratchet teeth of gear sectors 31, 32, 33, etc., while causing the rotation of shaft 90 as above described for disengaging the pawl 38 from rack 20 so as to permit the return of this rack to normal.

It is to be understood that minor changes may be made in the call transmitter of the invention without departing from the scope of the appended claims.

What is claimed is:

1. In a call transmitter, a set of independently operable numbered key members, independently operable code discs, a plurality of gear sectors operatively connected to said discs, and a mechanism for operatively connecting said key mem-

bers to said gear sectors successively for moving said independently operable code discs in position for setting a call according to the operation of said key members.

2. In a call transmitter, a set of independently operable numbered key members, a carriage actuated by the operation of said key members, a plurality of independently operable gear sectors, a ratchet mechanism actuated by the movement of said carriage for successively operating said gear sectors by the movement of said key members, a plurality of code elements actuated by said gear sectors for setting a call and means positioned by said gear sectors for indicating the number of such call.

3. In a call transmitter, a set of independently operable numbered key members, a plurality of independently operable gear sectors one for each of said key members but normally disconnected therefrom, code discs geared to said sectors, means operable by the manual movement of each of said key members for successively operatively interconnecting said key members to said gear sectors for moving said code discs in positions corresponding to the values of said key members for setting a call, means movable with said code discs for indicating the sequence of operation and the number of said key members, a signal transmitting device having vibrative elements movable for engaging the latter with said code discs and a plurality of means operable under the tension of said motor spring for returning said code discs and said device to normal starting position following the operation of said vibrative elements, one of said means moving said device in position wherein the code discs are ineffective relative to said vibrative elements during the return movement of said device to normal starting position.

4. In a call transmitter, a set of numbered key members, code discs, a gearing mechanism operatively connected to each of said code discs, a carriage variably operated by the operation of said key members for actuating said gearing mechanisms, a ratchet toothed rack mounted for longitudinal movement in said carriage, said rack having an arm projecting therefrom, a pair of pawls actuated by the movement of said carriage for moving said rack for successively placing said projection in operative relation with said gearing mechanisms for setting a call according to the operating order of said key members, and means positioned by the operation of said code discs for indicating such call.

5. In a call transmitter, a set of numbered key members, code discs, a carriage, a ratchet mechanism, operable by the operation of said key members for successively moving said carriage in direction transverse of said key members in position to cause the operation of said discs by said key members for setting a call, a generator having vibrative elements, a motor spring, means manually operable for tensioning said motor spring for actuating said generator for engaging said elements with said code discs for transmitting the call.

6. In a call transmitter, a set of numbered key members, gear sectors, a code disc operatively connected to each of said gear sectors, said gear sectors having means disposed for operation by the movement of said key members but normally ineffective thereto, a transfer mechanism having means actuated by said key members in position to render the operation of said key members effective for moving said code discs

successively in position for setting a call, a generator having vibrative elements, a motor spring, manually operable means for tensioning said spring for moving said generator to cause the engagement of said elements with said code discs for transmitting signals corresponding to the operation of each of said key members, means set by the operation of said code discs for indicating such call, a detent mechanism operable in one direction following the transmitting of the signal for returning said generator to normal and positioning said elements ineffective relative to said code discs during such return movement, said detent mechanism operating in another direction for returning said generator in position for engaging said vibrative elements with said code discs following the return movement of said generator to normal starting position.

7. In a call transmitter, a set of numbered key members, code discs, means operatively connected with each of said code discs, a carriage actuated by the operation of said key members, a ratchet toothed rack mounted for sliding movement longitudinally of said carriage, a plurality of pawls actuated by the movement of said carriage for moving said rack in position for successively operatively associating said rack with each of said means for setting a call, a generator having a plurality of vibrative elements, a motor, and a lead screw actuated by said motor for moving said generator in direction transverse of said code discs for engaging said vibrative elements with said code discs for transmitting signals corresponding to the setting of the call.

8. In a call transmitter, a set of numbered key members, rotatable code discs, a carriage actuated by the operation of said key members, a toothed rack mounted for sliding movement longitudinally in said carriage, a plurality of pawls actuated by the movement of said carriage for moving said rack in position for successively actuating said code discs upon the operation of said key members for setting a call, a support, a generator slidably mounted on said support, said generator having a plurality of vibrative elements, a manually operable mechanism for moving said generator on said support in one direction transverse of said discs but ineffective thereto, a motor spring for moving said generator in another direction transverse of said discs, and means actuated by said mechanism during its movement in the first-mentioned direction for imparting movement to said support to render the movement of said generator effective relative to said code discs for transmitting the call.

9. In a call transmitter, a set of numbered key members, rotatable code discs, a mechanism operatively associated with said key members and said discs for actuating the latter successively by the operation of said key members for setting a call, a support, a generator mounted for sliding movement on said support, said generator having a plurality of vibrative elements, a manually operable gearing mechanism, a lead screw actuated by said gearing mechanism for moving said generator transverse of said discs but ineffective thereto, a motor spring tensioned by the operation of said gearing mechanism for returning said generator to normal and a camming mechanism operable under control of said manually operable gearing mechanism for imparting movement to said mounting to cause the engagement of said vibrative elements with said discs upon the return movement of said generator to

normal for transmitting the call, and damping means for said elements actuated by the movement of said support upon the successive operation of elements by said discs.

10. In a call transmitter, a set of numbered key members, a plurality of gear sectors, retractile springs for said sectors tensioned by the movement thereof, code discs, means operatively interconnecting said key members to said gear sectors for moving said code discs individually in position for setting a call by the successive operation of said key members, means movable with said code discs for indicating the number of said call, means for holding said gear sectors individually in the operated position against the tension of said retractile springs and means manually operable for actuating said holding means to cause the return movement of said code discs and said indicating means collectively to normal by the tension of said retractile springs for canceling the call.

11. In a call transmitter, a set of numbered key members, a plurality of gear sectors, code discs geared to said sectors, a mechanism for individually associating said key members to said gear sectors for moving said discs by the operation of said key members in position for setting a call, a retractile spring for returning each of said sectors to normal positions, means operable for holding said sectors in the operated position following their operation by said key members, a generator having vibrative elements, a handle lever, a gearing mechanism operable one way by the operation of said handle levers for moving said generator transverse of said code discs but ineffective thereto, a spring tensioned by the operation of said handle lever for operating said generator in another direction transverse of said code discs to cause the operation of said elements for transmitting the call, and means actuated by said gearing mechanism following the transmitting of the call for operating said holding means to cause the return movement of said gear sectors and said code discs to normal by the tension of said retractile springs.

12. In a call transmitter, a set of numbered key members, a plurality of rotatable code discs, gear sectors operatively associated with said code discs, a mechanism operable upon the operation of said key members for successively actuating said sectors for moving said code discs in position for setting a call, each of said gear sectors having ratchet teeth, spring pressed pawls for retaining said gear sectors in each operated position, a handle lever, a generator having vibrative elements, a gearing mechanism actuated by said handle lever for moving said generator transverse of the direction of rotation of said code discs in one direction ineffectively relative to said code discs, a motor spring tensioned by the operation of said handle lever for moving said generator in another direction for engaging said vibrative elements with said discs for transmitting the call, a ratchet mechanism actuated by the operation of said handle lever, a cam rotated by the operation of said ratchet mechanism, a pivoted bar disposed in engageable relation with said pawls, and operable upon the movement of said cam for disengaging said pawls from the ratchet teeth of said gear sectors collectively, retractile springs for effecting the return movement of said gear sectors, and a manually operable key member for operating said bar for operating said pawls for releasing said gear sectors independently of said cam for canceling the call.

13. A set of key members, a plurality of rotatable code discs, gear sectors geared to said code discs, retractile springs for said sectors tensioned by the movement thereof, a carriage actuated by said key members, a ratchet mechanism operable upon the movement of said carriage to cause the successive operation of said gear sectors by the operation of said key members for rotating said discs in position for setting a call, retractile means for said ratchet mechanism, means rotatable with said discs for indicating the position of said disc, a signaling device having vibrative elements, manually operable means for moving said device from normal to starting position, a motor spring tensioned by 15

the operation of said manually operable means for returning said device to normal to cause the operation of said vibrative elements for transmitting signals corresponding to the setting of said code discs by said key members, a plurality of means actuated under control of said manually operable means to cause the return movement of said code disc, and said rotatable indicating means by the tension of said retractile springs and said ratchet mechanism under control of said retractile means to normal following the transmitting of said signals.

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