Nov. 30, 1937. H. W. GOFF 2,100,390

CALL TRANSMITTER

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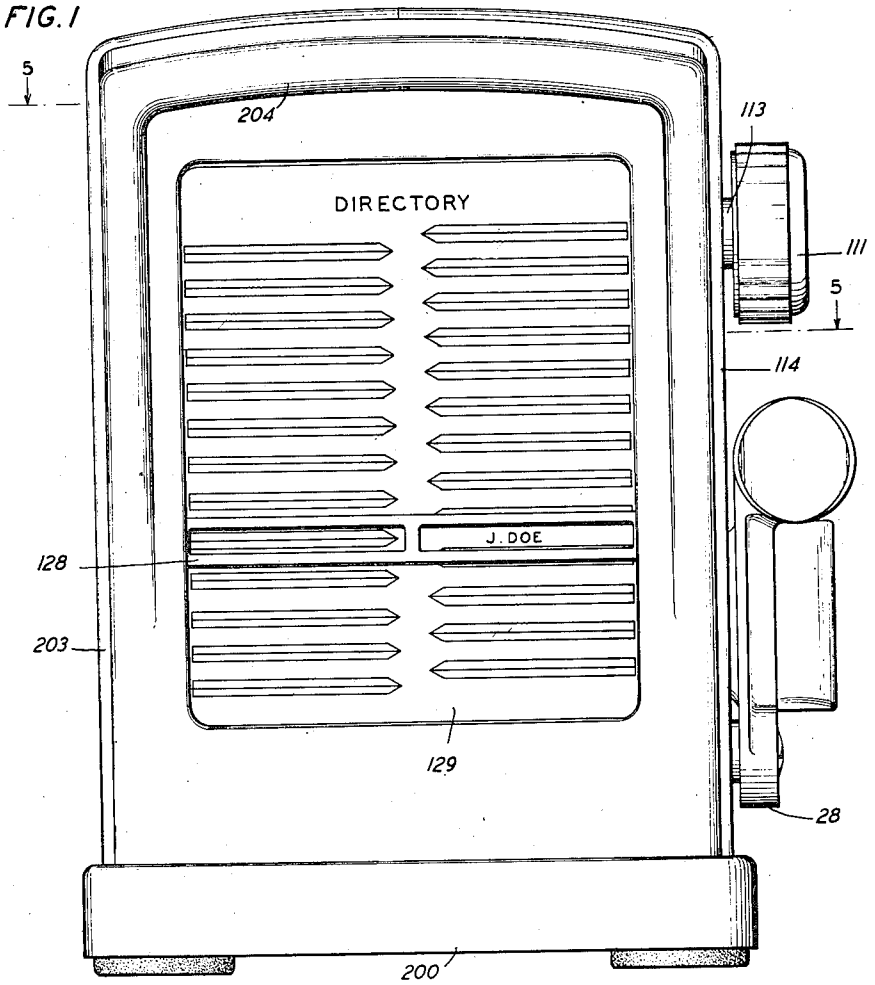
FIG. 1



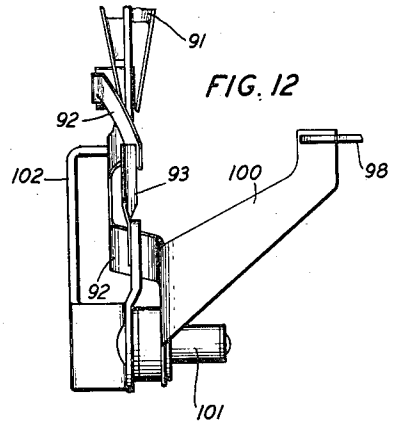


FIG. 12

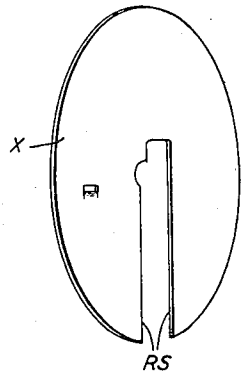


FIG. 13

INVENTOR
H.W.GOFF
BY J. MacDonald
ATTORNEY

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FIG. 2

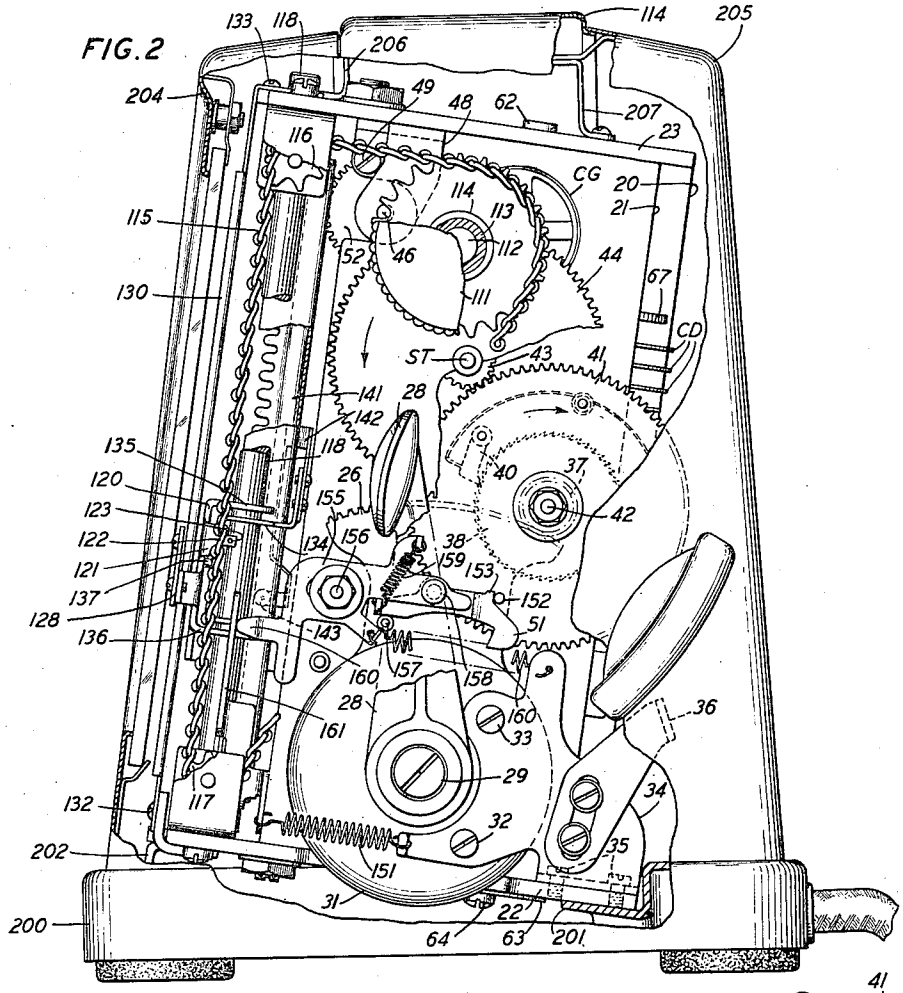
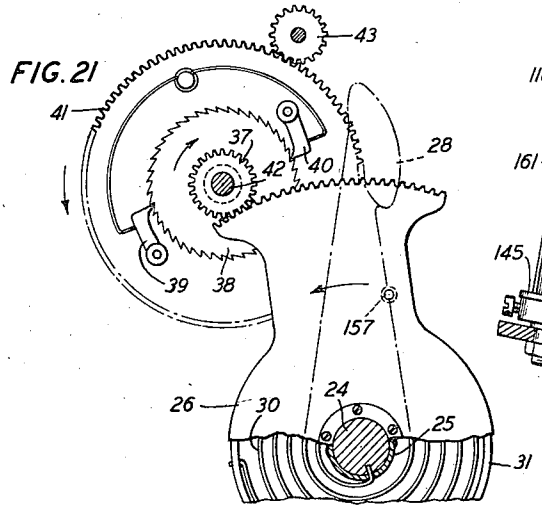


FIG. 21



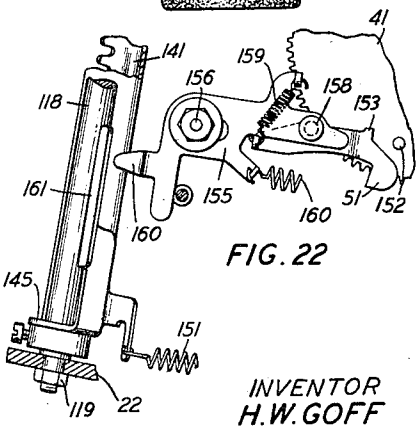


FIG. 22

INVENTOR
H. W. GOFF

BY
J. Mac Donald
ATTORNEY

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FIG. 3

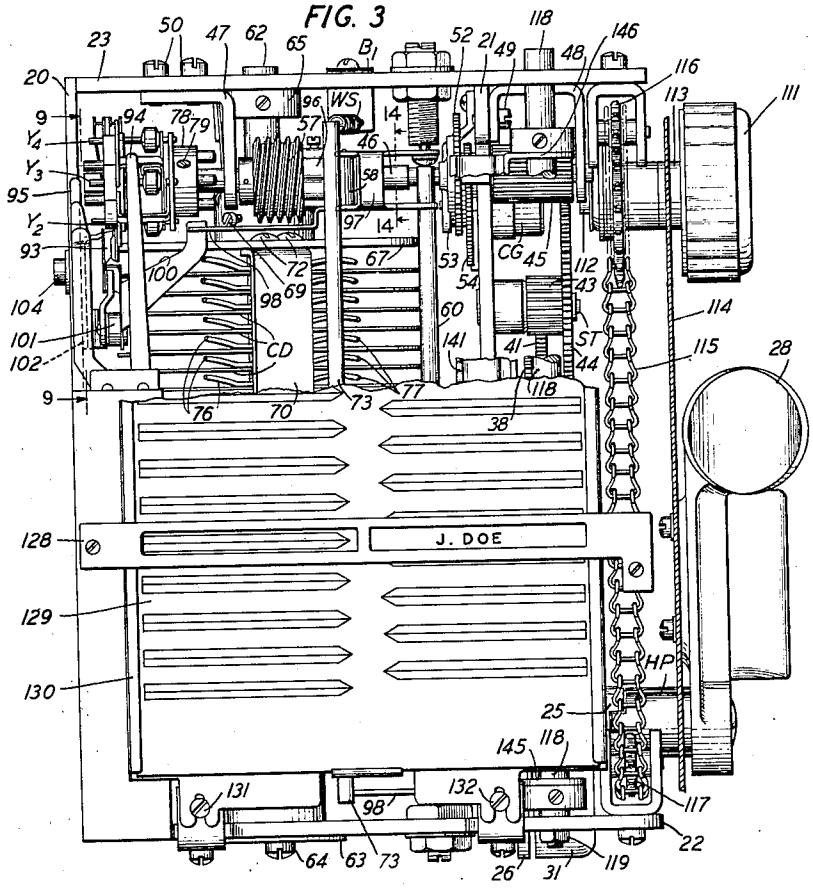
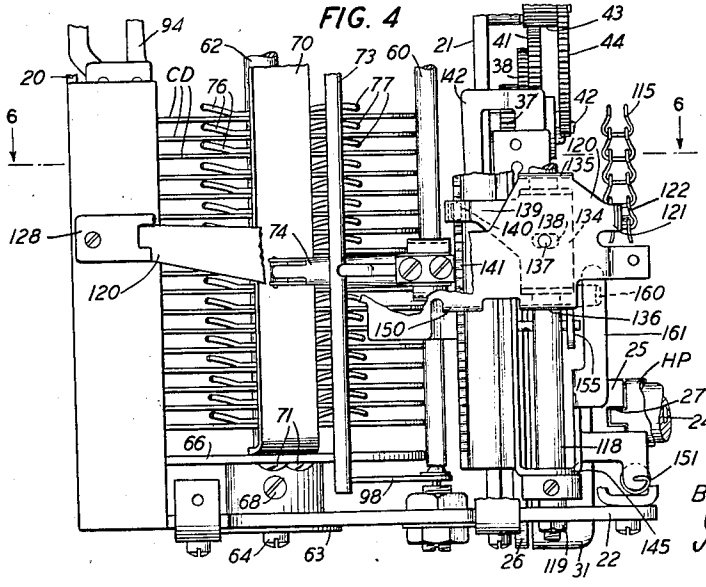


FIG. 4



INVENTOR
H. W. GOFF
BY
J. Mac Donald
ATTORNEY

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FIG. 5

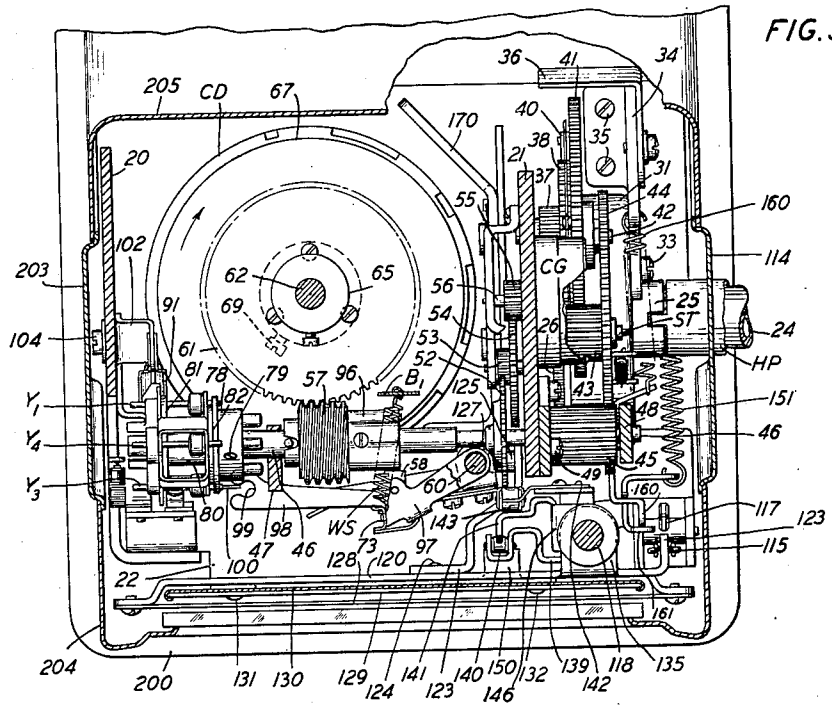
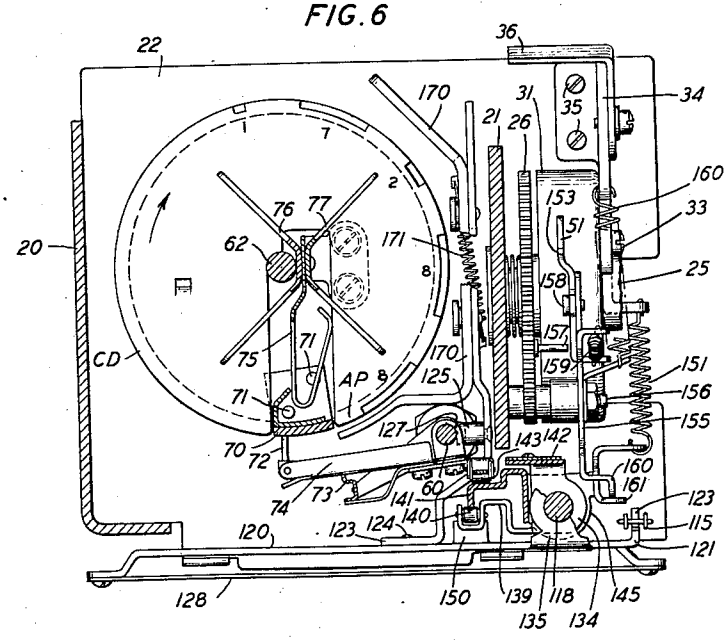


FIG. 6



INVENTOR
H. W. GOFF
BY
J. MacDonald
ATTORNEY

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FIG. 7

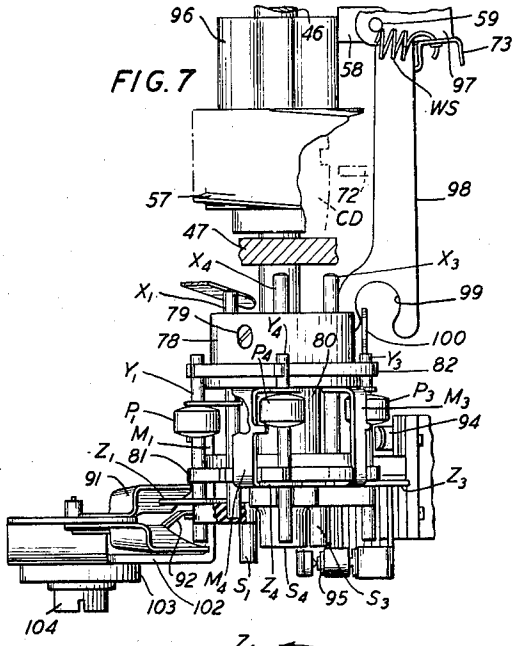


FIG. 8

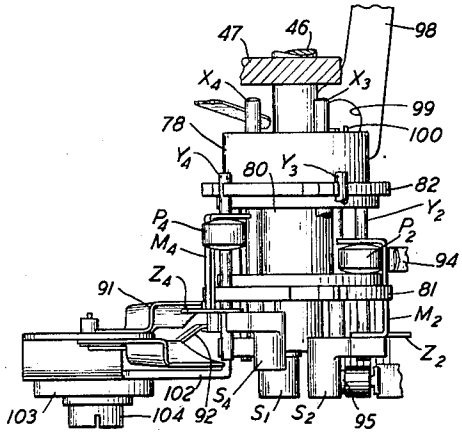


FIG. 9

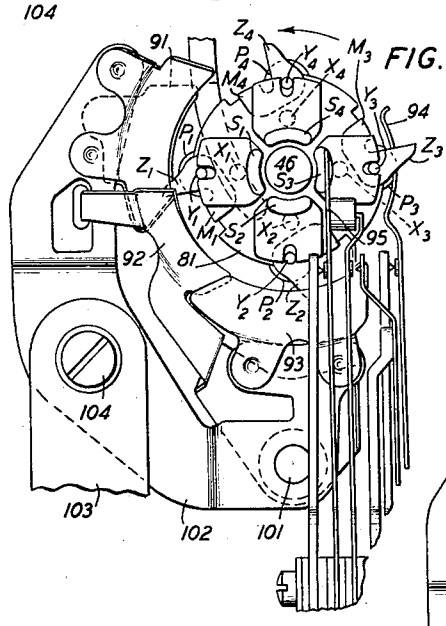


FIG. 10

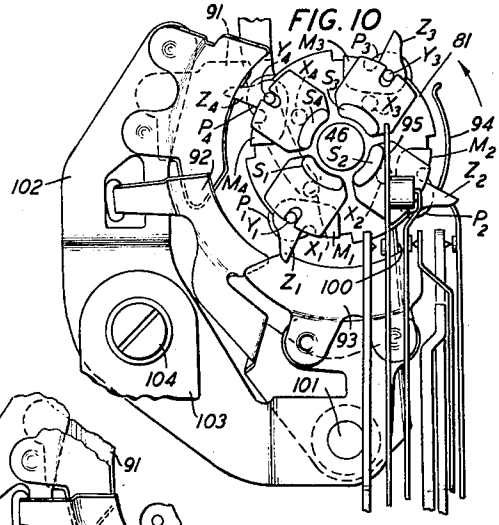
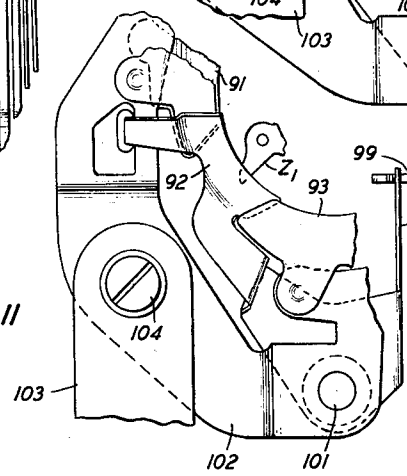


FIG. 11



INVENTOR
H. W. GOFF
BY
J. MacDonald
ATTORNEY

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FIG. 14

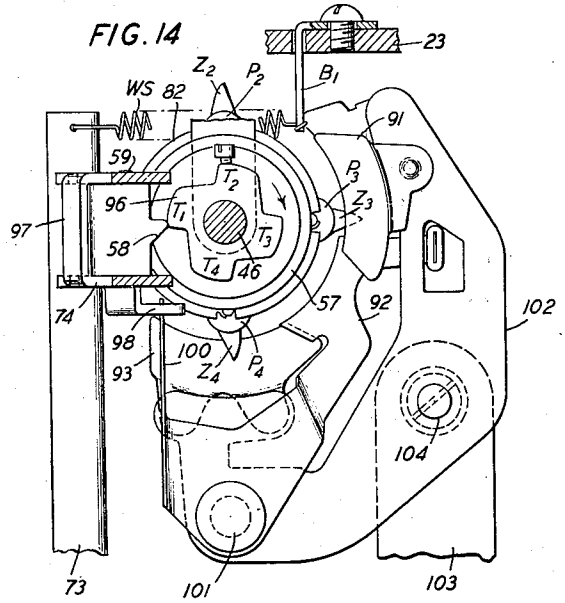


FIG. 15

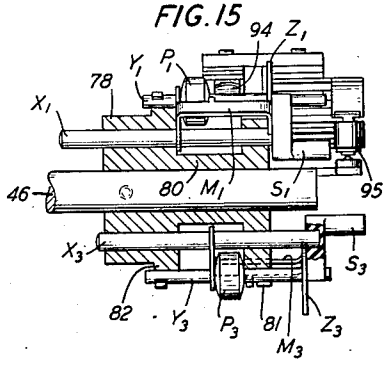


FIG. 17

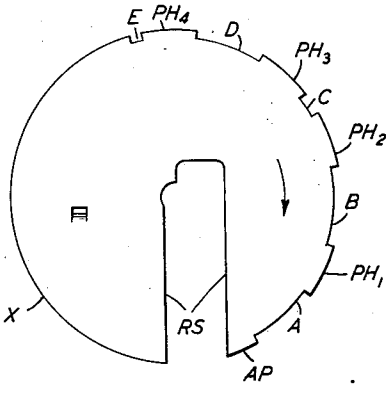


FIG. 18

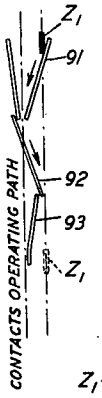


FIG. 19

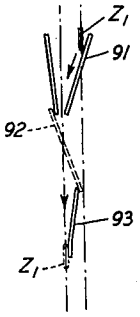


FIG. 20

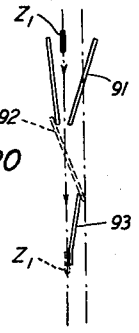
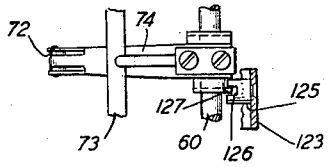


FIG. 16



INVENTOR
H. W. GOFF
BY J. MacDonald
ATTORNEY

Patented Nov. 30, 1937

2,100,390

UNITED STATES PATENT OFFICE

2,100,390

CALL TRANSMITTER

Harold W. Goff, Great Neck, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application February 18, 1937, Serial No. 126,416

10 Claims. (Cl. 179—90)

This invention relates to call transmitters of the so-called repertory type which are used in automatic telephone exchange systems to simplify the dialing operation of a predetermined number of frequently called telephone designations.

It is an improvement over the call transmitter disclosed in Patent 2,036,037 to H. W. Goff, dated March 31, 1936.

In that patent a manually operable crank is provided for rotating a screw for moving a feeler member in selected position with respect to a plurality of discs, each having peripherally disposed teeth which are removed to form notches representing a certain telephone number, these discs cooperating with a star wheel for reciprocating a lever mechanism which in turn moves normally non-effective pulsing and shunting rotating camming members in a path for actuating respectively associated contact elements, according to the character of selected discs or the number of teeth removed from the periphery of the selected disc, the discs being keyed to a supporting shaft which is actuated by a motor spring tensioned by the operation of a manually operable lever member.

According to the present invention, the manual operation of a knob disposed outside the transmitter housing is effective to rotate a sprocket wheel for moving a chain in a line parallel to a shaft provided for guiding an index member in juxtaposition to the face of a dial on which the names of a certain number of telephone subscribers are printed, such operation being effective to simultaneously move a feeler supporting arm in operative relation with the code disc thus selected which corresponds to the name of the telephone subscribers desired. Means operable upon the tensioning of a motor spring is provided for locking the selecting mechanism and the feeler supporting arm in the selected position during the operating of a pulsing mechanism. Means actuated by the operation of the motor mechanism cooperates with the selected code disc for imparting reciprocating movement to a cam for moving pulsing and shunting camming elements in a path for actuating the pulsing and shunting springs according to the code disc bearing the designation of the telephone subscriber desired. Means is provided for yieldably holding the code discs in spaced relation on their supporting shaft with means movable upon the operation of the selecting mechanism for selectively positioning such operable means in engaged relation with the selected disc for removing such a disc from the supporting shaft for replacement by another disc bearing a different telephone call designation.

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 drawings in which:

Fig. 1 is a front elevation of the call transmitter of the invention;

Fig. 2 is a right-side elevation view showing the casing with portions cut away;

Fig. 3 is a front assembly view of the mechanism showing a number of operating parts with portions cut away;

Fig. 4 is a partial view showing the code discs and their locating bar in normal position;

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 3 showing the pulsing mechanism, the casing being shown with portions cut away;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 4;

Fig. 7 is a partial view showing the pulsing mechanism with the pulsing and shunting cams in the normal non-operated position;

Fig. 8 is a view similar to that of Fig. 7 showing a number of pulsing and shunting cams in the operated position;

Fig. 9 is an end view of Fig. 7;

Fig. 10 is an end view of Fig. 8 showing the pivoted cam in the operated position;

Figs. 11 and 12 are detail views;

Fig. 13 is a view of a code disc blank shown in perspective;

Fig. 14 is a cross-sectional view taken on line 14—14 of Fig. 7;

Fig. 15 is a detail view of the pulsing mechanism showing their supporting element in section;

Fig. 16 is a detail view of the feeler supporting member showing its operating connection with an arm of the selecting mechanism;

Fig. 17 is a view of a disc notched to represent a certain telephone designation;

Figs. 18, 19, and 20 are diagrammatic views of the cams used for controlling the operation of the pulsing mechanism;

Fig. 21 is a detail view of the motor mechanism; and

Fig. 22 is a detail view of a lock used for preventing the operation of the selecting mechanism during the pulsing operation of the transmitters.

As shown in Figs. 2, 3, 4, 5, and 6 the side flanges 20 and 21 are welded at their lower and upper ends to the base 22 and plate 23, respec-

tively to form a mounting frame for the transmitter mechanism which will be hereinafter described in detail. A housing for the transmitter mechanism is shown in Figs. 1, 2, and 5. It consists of a stand 200 formed with lugs 201 and 202 for supporting the mounting frame thus formed in an oblique relation with respect to the plane of stand 200 and to this stand are secured the left and right side portions 203 and 114 and front and rear portions 204 and 205, respectively. At their upper disposed ends the casing portions 204 and 205 are provided with downwardly extending arms 206 and 207 for securing these portions to the top plate 23 in overlapping relation with the peripheral edges of side portions 203 and 114 as shown in Fig. 2 for holding them firmly to the plate 23.

At the lower disposed end of flange 21 is secured a laterally extending spindle 24 shown in Figs. 4 and 5 provided for rotatably mounting a sleeve 25. On one end of this sleeve is secured a gear sector 26 shown in Figs. 2, 6, and 21 and its other end is formed with a notch 27 provided for receiving a similar shaped tooth extending from the hub portion HP of a handle lever 28, this lever being held against axial movement on the spindle 24 by a screw 29.

On the bushing or sleeve 25 is secured one end of a spiral spring 30, shown in Fig. 21, and the other end of this spring is hooked to a spring barrel 31 secured to a bracket 34 by screws 32 and 33, this bracket being in turn secured to the base 22 by screws 35 shown in dotted lines in Fig. 2. According to this construction, the movement of lever arm 28 from the position shown in Fig. 2 to a stop 36 secured to bracket 34 is effective to tension the spring 30 for rotating the gear sector 26 and thereby a pinion 37 shown in Figs. 2, 5, and 21 secured to the ratchet wheel 38, this ratchet wheel being in turn engaged by two spring-pressed pawls 39 and 40 carried by a gear 41. Gear 41 is mounted on a stud 42 secured on the flange 21 and meshes with a pinion 43 rotatably mounted on a stud ST and on the hub portion of this pinion is securely mounted a gear 44. Gear 44 in turn meshes with a pinion 45 shown in Figs. 3 and 5 secured on a shaft 46 journaled at one end in a bracket 47 secured to the under side of plate 23 by a number of screws 50 and its other end in a bracket 48 secured to the flange 21 by a number of screws 49. The operation of gear sector 26 within the angular distance as limited by the stop 36 and a stop afforded by a pawl 51 shown in Figs. 2 and 6 and a pin 152 carried by gear 41 is effective to rotate the shaft 46 27½ turns for a purpose that will be hereinafter described in detail.

On shaft 46, as shown in Figs. 3 and 5, is securely mounted adjacent pinion 45, a gear 52 which meshes with a pinion 53 on the hub of which is securely mounted a gear 54, this gear engaging a pinion 55 secured to the shaft 56 of a centrifugal governor CG provided for controlling the speed of shaft 46 under the tension of motor spring 30.

On the shaft 46 is securely mounted a worm 57 and a star-wheel 96 having four cam-shaped teeth T_1, T_2, T_3, and T_4 as shown in Figs. 2, 5, 7, and 14 provided for reciprocating a bar 73 secured to the free ends of a pair of arms 97 and 98 in turn keyed on a rod 60, this rod being journaled at one end in the base 22 and its other end in the plate 23, while a spring hooked at one end to a bracket B1 and its other end to the bar 73 yieldably holds a shoe member 58 carried by arm 97 in engaged relation with the teeth T_1, T_2, T_3, and T_4 of star-wheel 96.

The worm 57 meshes with a worm gear 61 secured to the upper disposed end of a vertically disposed shaft 62 journaled in the plate 23 and in the base 22, the lower end of shaft 62 terminating in a semispherical-shaped portion resting on a plate 63 (shown in Figs. 3 and 4) secured to the under side of base 22 by a screw 64, while a collar 65 secured to the upper disposed end of shaft 62 prevents the axial movement of this shaft, the speed ratio between shaft 46 and the vertical shaft 62 being of the order of 27½ turns of shaft 46 for one turn of vertical shaft 62.

The saft 62 is provided at its ends with disc members 66 and 67 which are secured thereto by screws 68 and 69 and a bar 70 shown in Figs. 3, 4, and 6 is secured at both ends to these discs by screws 71 and 72. The bar 70 registers with the peripheral edges of discs 66 and 67 and engages the radial slots RS of code elements CD for readily locating them in their starting position with respect to a feeler supporting arm 74 actuated by the reciprocating movement of bar 73 as effected by the operation of star-wheel 96.

On shaft 62 between discs 66 and 67 is secured a mounting frame consisting of two substantially V-shaped comb members 76 and 77 having their lateral projections registering with each other for holding the code discs CD in equal spaced relation and perpendicular with respect to their supporting shaft 62 while springs such as 75 shown in Fig. 6 which are formed in the manner of the comb secured between the V-shaped comb members 76 and 77 serve for resiliently holding the code discs CD in centered relation with respect to shaft 62.

On shaft 46 is secured as by screws 79 a collar 78 shown in Figs. 3, 7, 8, and 15 formed with a sleeve portion 80 and a disc portion 81, which cooperates with a rim 82 also formed with the collars 78 for supporting a plurality of rods Y_1, Y_2, Y_3 and Y_4 and X_1, X_2, X_3, and X_4 shown in Figs. 9 and 10, the pins Y_1, Y_2, Y_3, and Y_4 being secured in indentations formed at the periphery of the ridge 82 and at the periphery of disc 81, while the pins X_1, X_2, X_3, and X_4 are mounted for longitudinal movement in guiding holes in the collar 78 and in similarly spaced holes in disc portion 81. On similar ends of the pins X_1, X_2, X_3, and X_4 are secured the camming members S_1, S_2, S_3, and S_4, respectively for operating shunting springs 95 for a purpose well known in the telephone art and on the pins Y_1, Y_2, Y_3, and Y_4 are slidably mounted camming members in the form of rollers P_1, P_2, P_3, and P_4 for operating pulsing springs as 94 in a manner that will be hereinafter described in detail.

The cams S_1, S_2, S_3, and S_4 which are secured at the ends of pins X_1, X_2, X_3, and X_4 and the roller cams P_1, P_2, P_3, and P_4 are connected by pairs S_1—P_1, S_2—P_2, S_3—P_3, and S_4—P_4 by U-shaped link members M_1, M_2, M_3, and M_4 secured on movable pins X_1, X_2, X_3, and X_4 and slidably moving on the stationary pins Y_1, Y_2, Y_3, and Y_4. The link members M_1, M_2, M_3, and M_4 are provided with projections Z_1, Z_2, Z_3, and Z_4, respectively for engaging once upon each turn of shaft 46 the cams 90, 91, and a barrier member 92 shown in Figs. 9, 10, 14 and diagrammatically in Figs. 18, 19, and 20.

The radially extending portions Z_1, Z_2, Z_3, and Z_4 link members M_1, M_2, M_3, and M_4 normally move in a vertical plane in position as indicated by projections Z_1 and Z_4 in Fig. 7 with cam roll-

ers P_1 and P_4 in position ineffective to operate the pulsing spring 94 and their associated segmentary shunting cams S_1 and S_4 in position ineffective to operate the shunting spring 95. However, upon the turning movement of shaft 46 in a clockwise direction as indicated by the arrows in Figs. 7, 8, and 9 and diagrammatically in Figs. 18 and 19 and with the movable cams 92 in the position shown in Fig. 10 the projections Z_1, Z_2, Z_3, and Z_4 successively engage the cam 91 for moving the links M_1, M_2, M_3, and M_4 and the pair of cams P_1—S_1, P_2—S_2, P_3—S_3, and P_4—S_4 in a path for successively engaging the pulsing spring 94 and the shunting spring 95 depending upon the operation of cam 92 as effected by the conjoint operation of star-wheel 96 and the code discs CD as will be hereinafter described in detail.

Upon the continued turning movement of shaft 46 and that of the projections Z_1, Z_2, Z_3, and Z_4 past the cam 91 and assuming that the cam 92 is in the position shown in Fig. 10 and diagrammatically in Figs. 19 and 20, these projections travel to the left side of the stationary segmental-shaped barrier member 93 that is in position wherein the roller cams P_1, P_2, etc. and the segmental-shaped cams S_1, S_2, etc., respectively, engage the pulsing contact 94 and the shunting contact 95, for operating them. Upon the continued movement of shaft 46 and therefore that of the projections Z_1, Z_2, etc., to a point where these projections engage the cam 91, but with the cam 92 in the position shown in Fig. 9 and diagrammatically in Fig. 18 the projections Z_1, Z_2, Z_3, and Z_4 and the pulsing and shunting cams are moved back to normal position to the right side of segmental barrier 93 and therefore in position ineffective to actuate the pulsing spring 94 and the shunting spring 95.

The bar 73 as above described is operated by the turning movement of star-wheel 96 engaging the shoe member 58 mounted on the supporting arm 97 of this bar. The supporting arm 97 is formed with an extension 98 shown in Figs. 3, 5, 7, 8, and 11 terminating at its free end in a fork-shaped portion 99 for engaging the upward extending arm portion 100 of movable cam 92, this cam being pivotally mounted on a stud 101 laterally extending from a bracket 102 in turn secured as by a screw 104 on a vertically extending projection 103 carried by or formed integrally with the flange 20.

A manually operable mechanism is provided for moving the arm 74 and the feeler member 72 carried thereby in selected position with respect to the code discs CD for signaling the desired telephone number, such mechanism comprising a knob 111 shown in Figs. 1, 2, and 3 mounted on one end of a spindle 112 rotatably mounted in a bushing 113 secured to a stud member 114 of the transmitter housing. On the other end portion of spindle 112 is securely mounted a sprocket wheel 114 provided for receiving a chain 115, this chain engaging the sprocket wheels 116 and 117 disposed for movement of the chain in a plane parallel to the turning axis of shaft 62. A shaft 118 has its top disposed end engaging the plate 23 and its lower end is secured in the base 22 by a nut screw 119 shown in Fig. 4. On this shaft is slidably mounted an arm 120 having a lug 121 engaging the line 122 of chain 115, as shown in Fig. 2 so that the clockwise and counter-clockwise movement of knob 111 and the consequent movement of the chain 115 is effective to move the arm 120 along the vertically disposed shaft 118 for a purpose which will be hereinafter described in detail.

An arm 123 shown in Figs. 5, 6, and 16 secured on arm 120 as by rivets 124 extends inwardly at right angles to the direction of arm 120 and in parallel relation with flange 21. The arm 123 is provided with a stud 125 having a slot 126 engaging a lug 127 formed integrally with one of the bearing portions of the lever 74 for moving this lever and the feeler member 72 carried thereby in operative or selected position with respect to the code discs CD on shaft 62, such positions being indicated by an apertured strip 128 secured at both ends to the arm 120 and moving adjacent the face of a dial 129 slidably engaging the overturned edges of a mounting plate 130 shown in Figs. 1, 2, and 3 which is in turn secured to the base 22 by screws 131 and 132 and at its upper disposed end to the plate 23 by a number of screws 133 shown in Fig. 2.

A mechanism is provided for centering the arm 74 and the feeler member 72 carried thereby in each selected position with respect to the code discs CD. In this mechanism a carriage 124 which is slidably mounted on shaft 118 and fitted in the space between the bearing portions 135 and 136 of arm 120 is moved along the shaft 118 by a pin 137 shown in Fig. 4 carried by arm 120 and engaging a slot 138 in the carriage 134. This carriage as shown in Figs. 4, 5, and 6 is formed with an arm 139 having a roller 140 provided for engaging the teeth of a rack 141 under the tension of a ribbon-shaped spring 142 having one of its ends secured to the carriage 134 and provided at its free end with a roller 143 bearing against the rear side of rack 141 for resiliently holding the centering roller 140 in engaged relation with the rack 141, this rack being formed at each end with bearing portions 145 and 146 shown in Figs. 3 and 4 for pivotal movement on the shaft 118 for a purpose that will be hereinafter described in detail.

The arm 120 as shown in Figs. 5 and 6 is formed with a laterally extending lug 150 for engagement with the teeth of rack 141 when this rack is pivoted on the shaft 118 through the tension of a spring 160, when released by the operation of the gear sector 26 as imparted by the handle lever 28 in its movement from normal non-operated position shown in Fig. 2 to a position against the stop 36 as for winding the motor spring 30, thus preventing the selective movement of knob 111 when the handle lever 28 is moved away from its normal non-operated position and during the pulsing operation of the transmitter. Upon the return movement of handle lever 28 and the gear sector 26 actuated thereby in the position shown in Fig. 2 following a pulsing operation the pin 52 carried by the gear 41 engages the shoulder portion 153 of pawl 51 for imparting a sliding movement to angle lever 155 on its pivot 156 for pivoting the rack 141 and thereby disengaging it from the lug 150 of arm 120, thus releasing the arm 120 as to permit the selective movement of the arm 74 and the feeler member 72 carried thereby with respect to the code discs CD through the operation of knob 111 and simultaneously stopping the pulsing mechanism.

On the arm 123 is slidably mounted a manually operable index member 170 which is resiliently held in its normal non-operated position as shown in Figs. 5 and 6 by a retractile spring 171. The index member 170 is positioned in engageable relation with the selected disc through the se-

lective movement of arm 74. In that position the manual longitudinal sliding movement of index 170 is effective to disengage the selected disc from its supporting shaft for replacement by another code disc bearing a different telephone designation.

In a typical example of operation for transmitting a telephone call designation and considering the angle lever 28 and the gear sector 26 in normal unoperated position as shown in Fig. 2 the pin 152 abutting against the shoulder portion 153 of pawl 51 under the tension of motor spring 30 through pinion 37 and the ratchet wheel 38 engaged by the pawls 30 and 40 carried by gear 41 force the lug 160 of angle lever 155 against the vertically extending arm 161 of rack 141 for pivoting this rack on shaft 118 against the tension of spring 151 and holding it in disengaged relation from the lug 150 of arm 120 as to permit the movement of this arm along the shaft 118 as imparted by the turning movement of knob 111 actuating the sprocket wheel 114 and thereby the chain 115 in line parallel with the shaft 118 through its engagement with the idle sprocket wheels 116 and 117. The sliding movement of arm 120 and that of the feeler arm 74 on shaft 118 is effective to position the feeler member 72 in operative relation with one of the code discs CD on shaft 62, such position being indicated by the perforated strip 128 carried by arm 120 when in juxtaposition to the name of the subscriber desired, which corresponds to the telephone designation formed at the periphery of the selected disc. Supposing that such a disc is formed for transmitting the telephone call designation No. 88271, as shown by the code disc X shown in Fig. 17 and in blank form in Fig. 13, in such a disc the notch A represents digit 8 or eight pulses, notch B, digit 8, notch C, digit 2, notch D, digit 7, and notch E, digit 1, the angular distance or length of the notch E being equal to one reciprocating movement of feeler member 72 as imparted by the star-wheel 96, while the notch D is equal to seven reciprocating movements, the notch C, two, the notch B, eight and the notch A eight since the code disc X may be considered to be divided into 110 parts, which is equal to $27\frac{1}{2}\times 4=110$, where $27\frac{1}{2}$ is the number of turns of shaft 46 and 4 is the number of teeth in star-wheel 96 which operate the bar 73 and thereby the feeler arm 74 and the cam 92.

Upon the movement of handle lever 28 from the position shown in Fig. 2 to a position where this lever engages the stop 36 for winding the spring 30, the pin 157 shown in Figs. 2 and 6 carried by gear sector 26 engages the pawl 51 for pivoting it on its pivot 158 against the tension of its retractile spring 159 to disengage this pawl from the pin 152 as to permit the turning movement of gear 41 and to cause the spring 160 to simultaneously impart a sliding movement to angle lever 155 on pivot 156 to cause the engagement of rack 141 with the lug 150 of arm 120 and thereby locking this arm and the feeler member 74 in the selected position.

Upon the return movement of handle lever 28 and that of gear sector 26 through the tension of motor spring 30 the gear 41 is rotated a complete turn through the engagement of its pawls 39 and 40 with the teeth of ratchet wheel 38, the latter being rotated as above described through the engagement of pinion 37 with the gear sector 26.

The movement of gear sector 26 is imparted to shaft 46 of the pulsing mechanism through the pinion 37, ratchet wheel 38, the gear 41, the pinion 43 and the gear 44, the latter engaging the pinion 45 on shaft 46. The turning movement of shaft 46 and the star-wheel 96 carried thereby is effective to impart reciprocating movements to the bar 73 and thereby to the feeler arm 74 and cam 92, simultaneously with the rotation of shaft 62 and the code discs CD mounted thereon. It is to be noted, however, that upon the rotation of shaft 62 and the code discs CD an angular distance corresponding to the portion AP of disc X, the lever arm 74 is held out of operative relation from the star-wheel 96 and the bar 73 is not reciprocated so that cam 92 is maintained against the resistance of its retractile spring WS in the position shown in Figs. 9, 11, and 14. In that condition the lugs Z_1, Z_2, Z_3, and Z_4 of links M_1, M_2, M_3, and M_4 as shown diagrammatically in Fig. 18 are guided by the cams 91, 92 and barrier 93 in a path wherein the roller pulsing cams P_1, P_2, P_3, and P_4 and the shunt cams S_1, S_2, S_3, and S_4 are ineffective with respect to their associated pulsing and shunting springs 94 and 95, respectively. However, upon the continued movement of shaft 46 and the selected code disc X carried thereby to a point where the feeler member 72 enters the notch A through the tension of spring WS as to permit the reciprocating movement of the bar 73, its supporting arm 97 through its extending portion 98 moves cam 92 out of engageable relation with lugs Z_1, Z_2, Z_3, and Z_4 of links M_1, M_2, M_3, and M_4, thus causing the pulsing and shunting cams to move in a path as indicated in Figs. 19 and 20 for engaging the pulsing and shunting springs 94 and 95 during two turns of shaft 46 or eight vibrations of the feeler member 72 thus causing the digit eight to be transmitted and in a like manner the remaining digits 8, 2, 7, and 1 included in the call designation represented by the code disc X.

The peripheral portions PH_1, PH_2, PH_3, and PH_4 are used to provide the so-called interdigit spaces and are each equal to one turn of shaft 46 or four vibrations of feeler member 72.

Upon the return movement of shaft 62 and the code discs CD carried thereby to normal, the pin 52 carried by gear 41 reengages the shoulder portion 153 of pawl 51 for imparting a sliding movement to angle lever 155, and thereby engaging the lug 160 of the angle lever 155 with the upright arm 161 of rack 141 for pivoting this rack against the resistance of its retracting spring 151 for disengaging it from the lug 150 of arm 120 as to permit the movement of this arm along its guiding shaft 118 for the selection of another disc bearing a different code designation by the manual operation of knob 111 and the transmitter is now ready for a subsequent call transmitting operation.

What is claimed is:

1. A call transmitter comprising normally closed impulse contacts, a plurality of operating members movable in a circular path for engaging said contacts, and a plurality of cooperating cams for changing the path of said members for controlling the operation of said contacts.

2. A call transmitter comprising normally closed contacts, a plurality of operating members movable in a circular path for engaging said contacts, a movable cam, and a stationary cam cooperating with said movable cam for changing the path of said members for controlling the operation of said contacts.

3. A call transmitter comprising normally closed contacts, a plurality of operating members movable in a path for engaging said contacts, a plurality of cams, one of said cams being movable but normally in position for changing the path of movement of said operating member for preventing the operation of said contacts, and means for moving said movable cam in a position ineffective with respect to said operating members for actuating said contacts.

4. A call transmitter comprising normally closed contacts, a plurality of operating members for said contacts, a rotatable shaft for moving said members in a circular path for actuating said contacts, a plurality of cams, one of said cams being movable, a rotatable code element, and means operated by the movement of said rotatable shaft and cooperating with said element for controlling the operation of said movable cam for operating contacts.

5. A call transmitter comprising normally closed contacts, a plurality of operating members for said contacts, a rotatable shaft for moving said members in a circular path, camming members for positioning said members along said path in position ineffective with respect to said contacts, a disc having a plurality of notches at its periphery representing the digits of a call to be transmitted, motor means for actuating said rotatable shaft, another shaft actuated by said motor means for rotating said disc, a star-wheel operated with said motor means for actuating one of said camming members in phase with the operation of said disc for controlling the operation of said contacts.

6. A call transmitter comprising normally closed contacts, a plurality of operating members for said contacts, a rotatable shaft for moving said members in a circular path in position ineffective with respect to said contacts, a star-wheel carried by said shaft, a plurality of discs having means formed at their periphery to represent the digits of calls to be transmitted, a spring motor for actuating said rotatable shaft, a supporting shaft for said disc operated by said motor, a bar vibrated by the operation of said star-wheel, an arm vibrated by the operation of said bar, said arm being movable for selectively engaging one of said code discs, and a cam operated by the operation of said bar under control of the code disc selected for actuating said contacts.

7. In a call transmitter, a shaft, a plurality of code elements having portions for engaging said shaft, a series of spider arms carried by said shaft and extending radially therefrom, and a plurality of spring members carried by said shaft for engaging said portions, said arms serving for holding said elements perpendicularly to the axis of said shaft and in spaced relation relative to each other.

8. A call transmitter comprising a plurality of code elements, a rotatable shaft, means carried by said shaft for receiving said elements in spaced relation to each other, a motor spring, a gearing mechanism operatively connecting said motor to said shaft, impulse contacts, a shaft actuated by said gearing mechanism, means rotated by said shaft for actuating said contacts, said means comprising a plurality of camming members normally ineffective with respect to said contacts, a star-wheel carried by the last-mentioned shaft, a reciprocating camming member actuated by said star-wheel for moving said camming member in position effective for actuating said contacts, and a speed governor actuated by said gearing mechanism for controlling the operation of said motor.

9. A call transmitter comprising a rotatable shaft, a plurality of code elements mounted on said shaft in equal spaced relation to each other, a feeler member, a manually operable mechanism for moving said member in operative relation with said elements selectively, an index positioned by the operation of said manually operable mechanism for indicating the selected position of said feeler member, a motor spring for actuating said elements and said feeler member, a plurality of contacts, means actuated by the conjoint operation of said elements and said feeler member for actuating said contacts, and locking means operable upon tensioning of said motor spring for preventing selective operation of said manually operable mechanism during the operation of said contacts.

10. A call transmitter comprising a plurality of code elements, a rotatable shaft, means for resiliently holding said elements in spaced and centered relation on said shaft, a pulsing mechanism, a feeler member, a reciprocating bar for actuating said feeler member, a manually operable mechanism for moving said feeler member in selected position with respect to said elements, said mechanism including a knob, a sprocket wheel actuated by the movement of said shaft and movable by the operation of said chain for positioning said feeler member in selected position with respect to said code elements, a projection laterally extending from said arm, a motor spring for actuating said elements for controlling the operation of said pulsing mechanism, a pivoted rack, means actuated by the movement of said manually operable mechanism for engaging the teeth of said rack for centering said feeler member with respect to one of said discs, a motor spring, a manually movable handle lever for tensioning said spring, and means actuated by the manual operation of said handle lever for moving said rack in engaged relation with the projection of said arm for locking said feeler member in selected position during the operation of said pulsing mechanism.

HAROLD W. GOFF.