

March 17, 1942.

M. FRITTS ET AL

2,276,954

CALL TRANSMITTER

Filed Dec. 13, 1939

5 Sheets-Sheet 1

FIG. 1

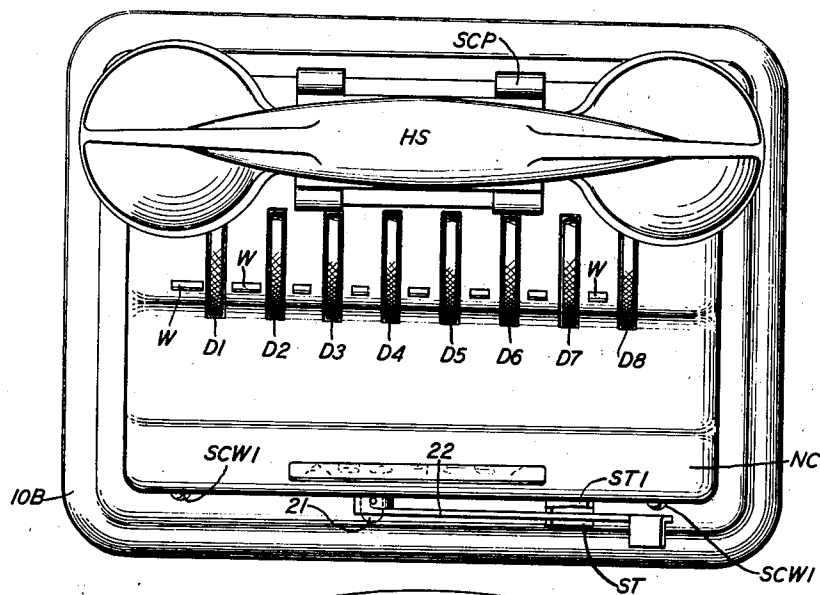
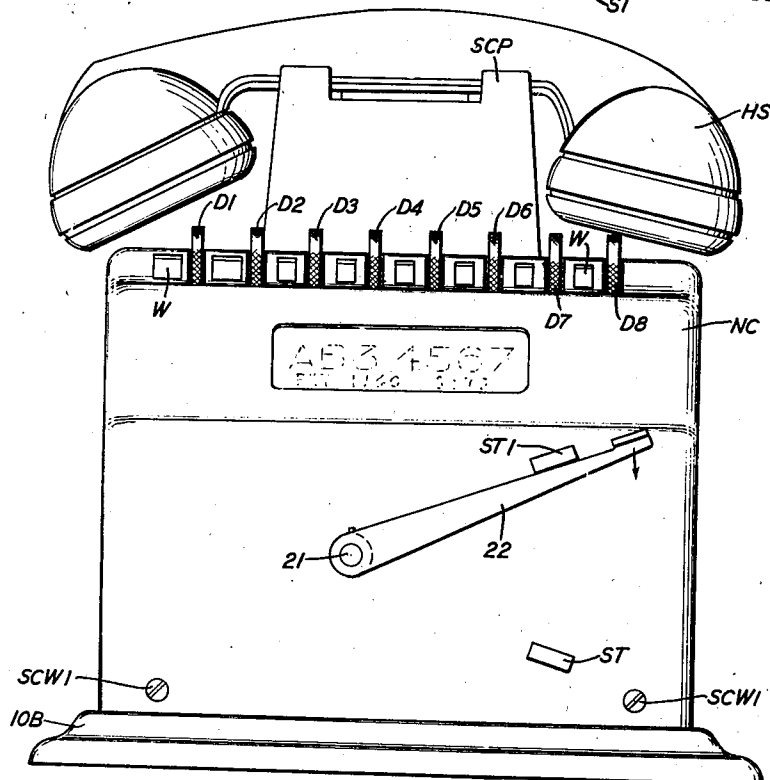


FIG. 2



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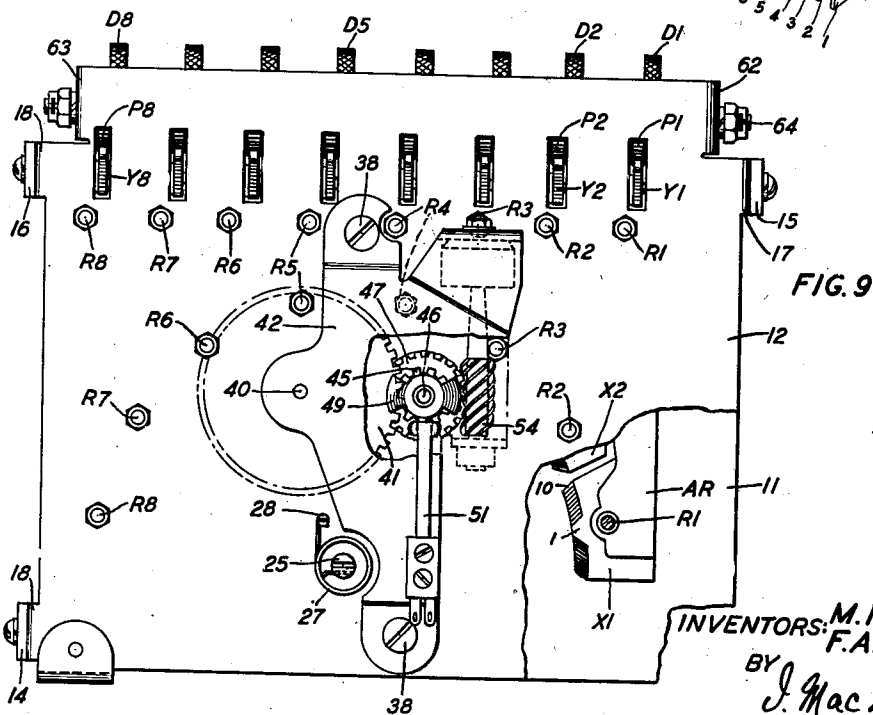
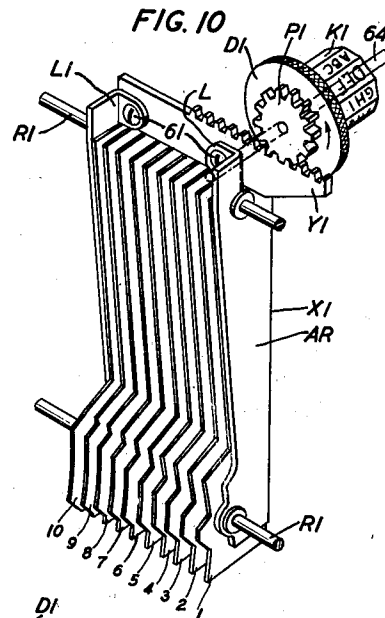
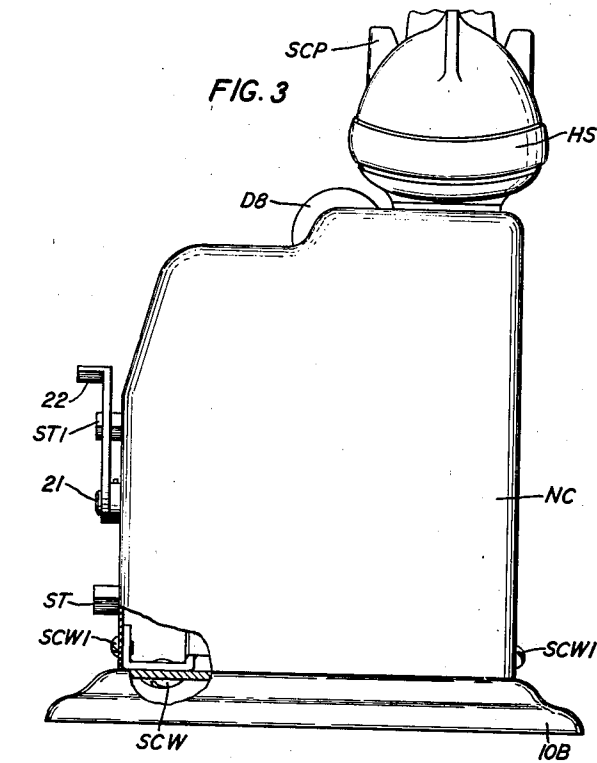
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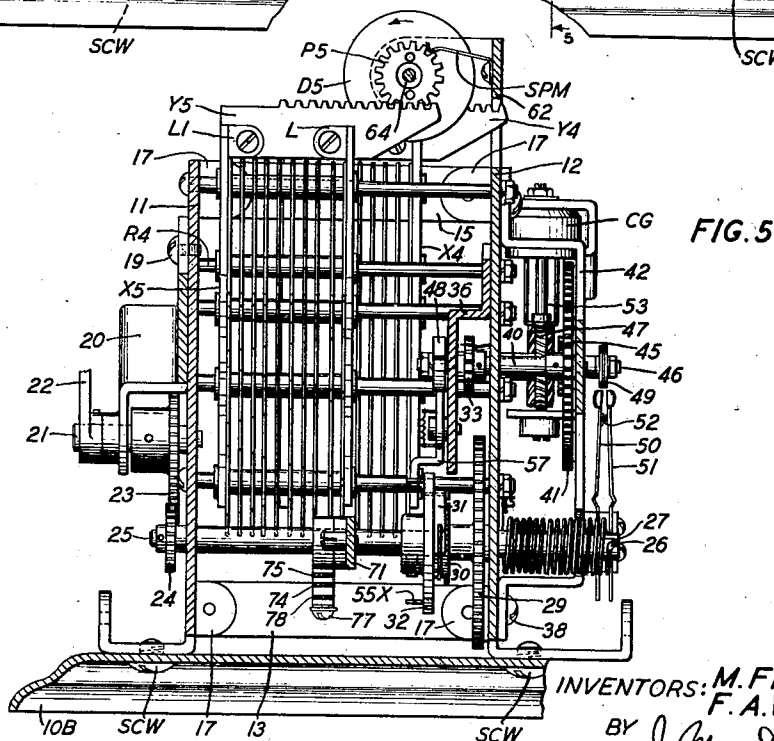
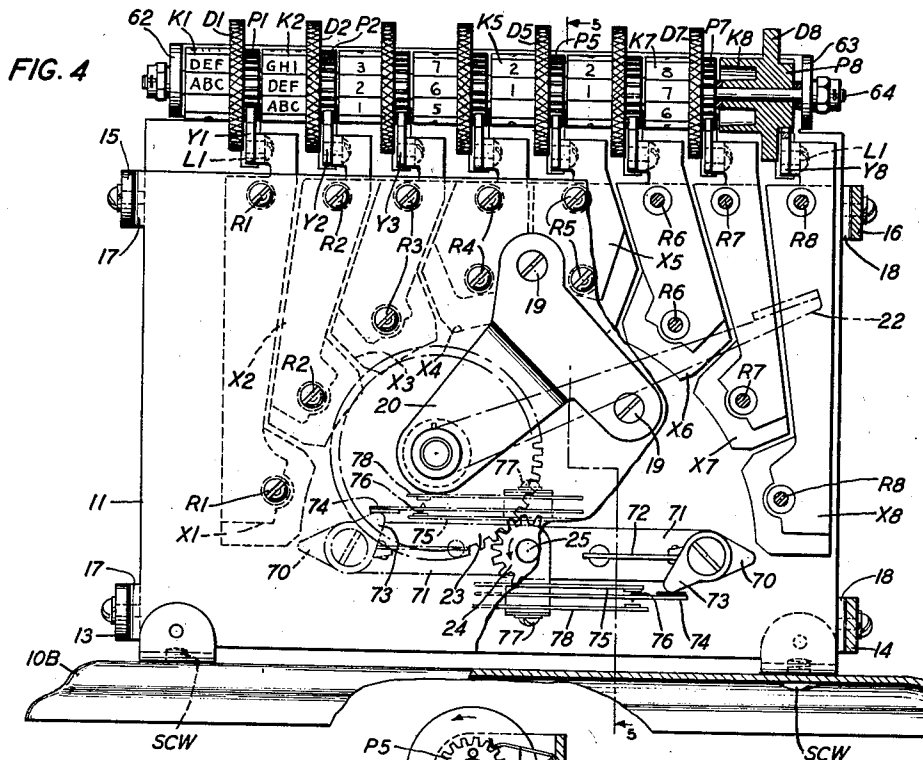
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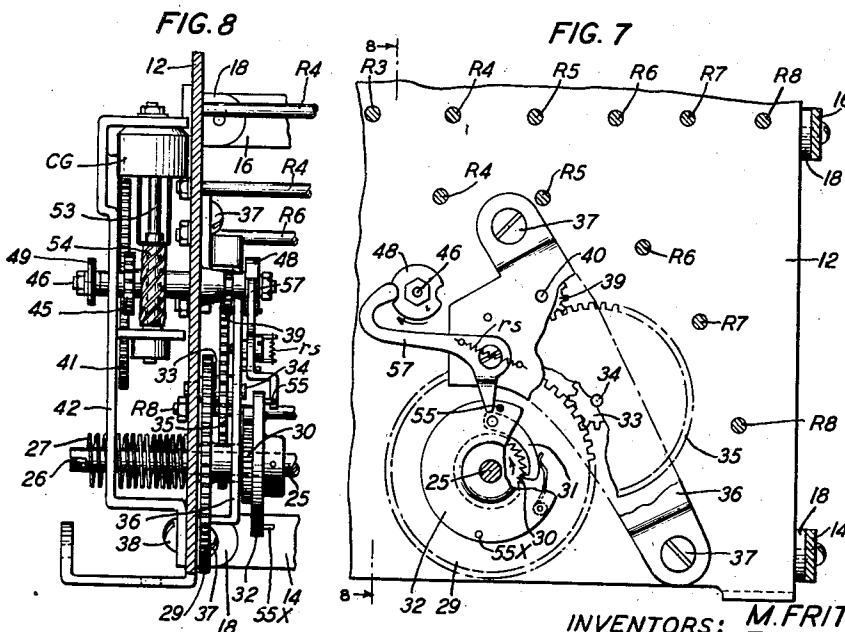
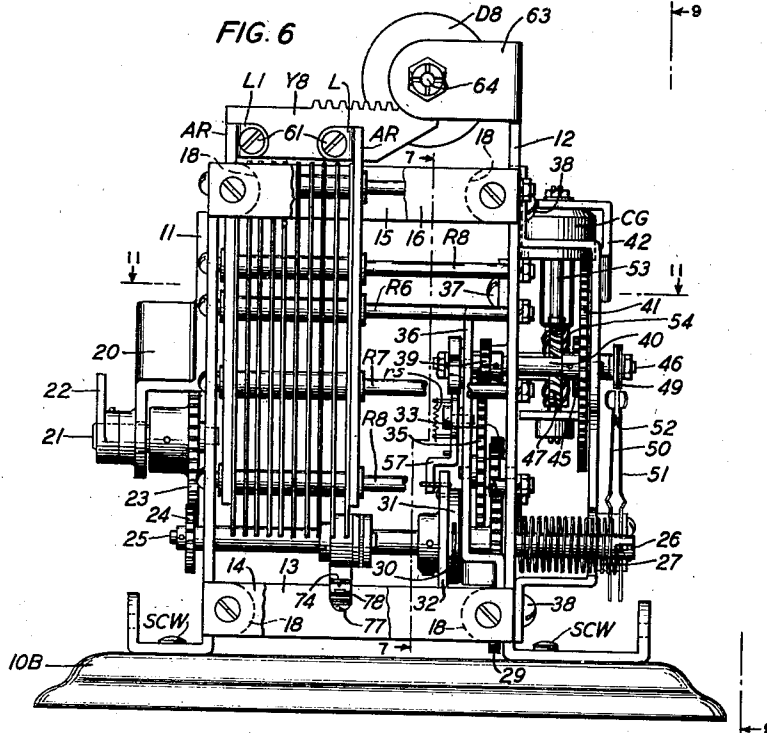
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FIG. 11

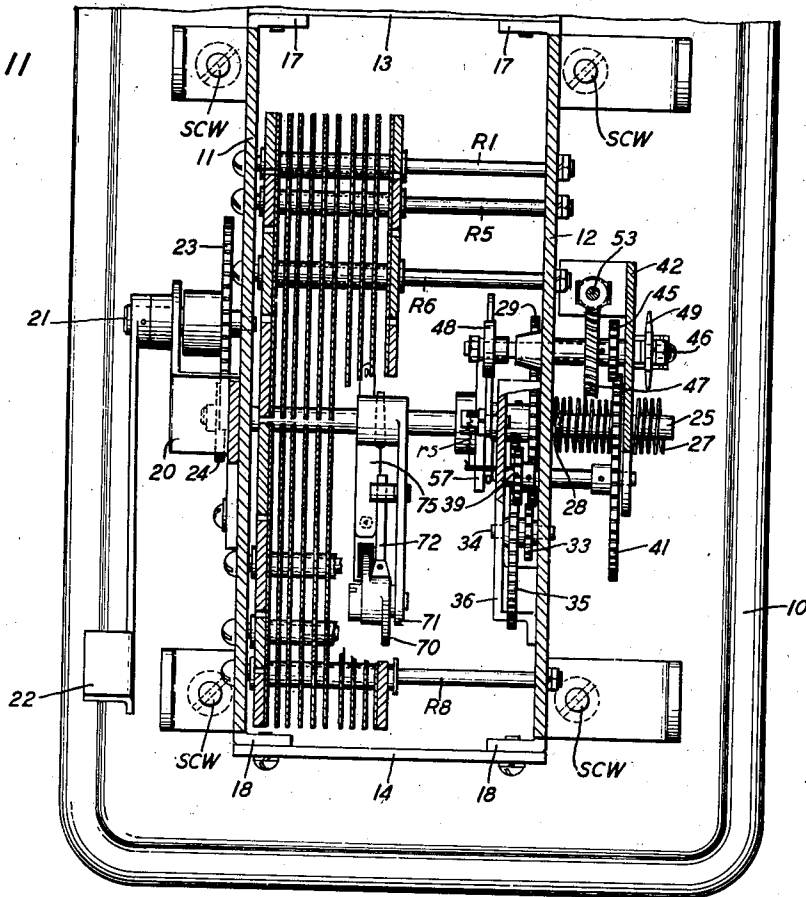


FIG. 12

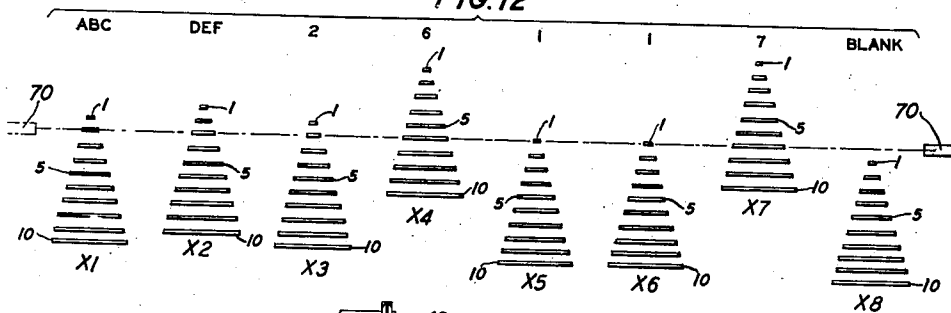
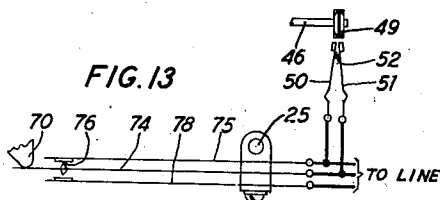


FIG. 13



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## UNITED STATES PATENT OFFICE

2,276,954

## CALL TRANSMITTER

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Application December 13, 1939, Serial No. 308,941

3 Claims. (Cl. 179-90)

This invention relates to call transmitter devices of the type used in automatic telephone systems for establishing talking connections and has particular reference to call transmitter devices of the preset type.

The object of the invention is to provide an improved device of this character.

A feature of the invention is the provision of a motor mechanism in the form of a spring tensioned by the rotation of a shaft geared to a manually operable lever member movable in two directions placed at the front of a casing housing the transmitter mechanism, means carried by the casing being provided for limiting the angular movement of the handle in each direction.

Another feature is the provision of clutching means operatively connecting the two-direction movable shaft to a gearing mechanism for operating the latter in one direction, the gearing mechanism actuating the operative element of a pulsing contact.

Another feature is the provision of sets of camming elements arranged in a circle and movable for selectively positioning a camming element of each set in operative relation to a contact actuating member for negating predetermined operations of the pulsing contact.

Another feature is the provision of rotatable means mounted on a common shaft and movable manually for independently actuating gearing mechanisms for moving the sets of camming elements in selected positions, with means positioned by the movements of the manually operable means for indicating such positions.

Another feature is the provision of guiding means for the sets of camming elements with means automatically operable for yieldably holding such elements in each selected position.

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

Fig. 1 is a top view;

Fig. 2 is a front elevational view;

Fig. 3 is a side elevational view, the casing and the base being shown with portions cut away;

Fig. 4 is a front assembly view shown with the casing removed, a number of operating parts being shown in section;

Fig. 5 is a vertical sectional side view taken on line 5-5 of Fig. 4 showing sets of camming elements in the operated position;

Fig. 6 is a side view shown with the casing removed and a number of operating parts with por-

tions cut away, the camming elements being in their normal unoperated position;

Fig. 7 is a sectional view taken on line 7-7 of Fig. 6;

Fig. 8 is a vertical sectional view taken on line 8-8 of Fig. 7;

Fig. 9 is a rear view showing a number of operating parts with portions cut away to show the operative relation of the pulsing cam and camming elements more clearly;

Fig. 10 is a detailed view of one of the sets of camming elements and its actuating mechanism;

Fig. 11 is a horizontal sectional view taken on line 11-11 of Fig. 6;

Fig. 12 is a diagrammatical view of the sets of camming elements shown in positions for transmitting a certain call designation; and,

Fig. 13 is a diagrammatical view of the pulsing contact, electrically connected to a contact actuated according to the setting of the camming elements.

In the call transmitter of the invention, a base 10B shown in Figs. 1, 2, 3, 4, 5 and 6 is provided for securing the mounting plates 11 and 12 as by a number of screws SCW. These plates are held in parallel relation to each other at their lower disposed ends by a pair of spacer members 13-14 and at their top disposed ends by spacer members 15-16 secured to lugs 17 and 18 formed with the mounting plates 11 and 12, respectively, these plates having upright extending lug portions for securing, as by screws SCW, a casing NC provided for housing the transmitter mechanism which will be hereinafter described in detail.

To the front disposed side of mounting plate 11 is secured, as by screws 19, a bracket 20 serving in cooperation with plate 11 for journaling a shaft 21 and on this shaft is keyed a handle lever 22 and a gear 23. This gear engages a pinion 24 keyed on one end of a shaft 25 journaled on mounting plates 11 and 12, one end of this shaft being provided with a slot 26 serving for hooking one end of a helical spring 27 having its other end secured to the plate 12, as by a screw 28 shown in Fig. 9.

On shaft 25 is mounted for free rotation thereon as a unit a gear 29 and a ratchet wheel 30, the latter being engaged by a spring-pressed pawl 31 mounted on a disc 32, keyed on shaft 25.

According to this construction, the rotation of shaft 21, as effected by a handle lever 22, is effective to rotate a shaft 25 through the engagement of gear 23 with pinion 24 for tensioning the spring 27, the function of which is to return the shafts 25 and 21 and the handle 22 to normal

non-operated position while imparting rotary movement to gear 29 through the engagement of the spring-pressed pawl 31 with the ratchet wheel 30.

The gear 29 meshes with a pinion 33 best seen in Figs. 6, 7, 8 and 11 keyed on a spindle 34 for rotation as a unit with a gear 35, the spindle 34 being journaled in the mounting plate 12 and in a bracket 36 secured to this mounting plate, as by screws 37. The gear 35 meshes with a pinion 39 mounted on one end of a shaft 40 and movable as a unit with a gear 41 keyed to this shaft. Shaft 40 has one of its ends journaled in bracket 36 and its other end in a bracket 42, the latter being secured to the mounting plate 12 by screws 38.

The gear 41 meshes with a pinion 45 secured on a shaft 46 journaled in a bearing formed with plate 12, as shown in Figs. 5, 6, 8 and 11, and in a bearing formed with bracket 42. On shaft 46 is mounted for movement as a unit therewith a worm gear 47, a two-toothed ratchet wheel 48 and a two-lobe pulsing cam 49 disposed in engageable relation with the normally closed pulsing springs 50 and 51 shown in Figs. 5, 6, 9 and 13 for opening the contact 52 upon the rotation of shaft 25 as effected by the tension of spring 27, the operation of pulsing cam 49 being under control of a speed governor CG having a shaft 53 provided with a worm portion 54 engaging the worm gear 47.

The disc 32, as shown in Figs. 5, 6, 7 and 8, is provided with pins 55 and 55x serving for imparting movement to a pawl 57 in the manner of a toggle mechanism for engaging it with the two-toothed ratchet wheel 48 for stopping the operation of the pulsing mechanism in a manner which will be hereinafter described in detail.

On the upright mounting plates 11 and 12 is mounted a plurality of pairs of rods R1—R1, R2—R2, R3—R3, R4—R4, R5—R5, R6—R6, R7—R7 and R8—R8, each pair serving as guides for a set of camming members X1, X2, X3, X4, X5, X6, X7 and X8 disposed in a semicircular row, there being ten cams as 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 in each set arranged at equal spaced relation on similar sleeves 58 and 59 in turn mounted for sliding movement on their respective pair of rods R1—R1, R2—R2, etc. Each set of camming members is mounted between reinforcing arms as AR shown in Figs. 6 and 10 having lugs L and L1 provided for securing the gear racks Y1, Y2, Y3, Y4, Y5, Y6, Y7 and Y8 thereon by similar screws 61, there being in the present invention eight sets of camming members X1, X2, X3, etc., but the number of such a set may be increased or decreased depending upon the number of digits contained in the call designation it is desired to transmit or the call designation of the telephone exchange to which the call transmitter is connected.

The upright mounting plate 12 at its upper end is formed with laterally projecting lug portions 62 and 63, best seen in Figs. 4, 5 and 6, serving as supports for a shaft 64 on which digit indicating wheels K1, K2, K3, K4, K5, K6, K7 and K8 are mounted for free rotation thereon.

The digit indicating wheels K1, K2, K3, etc., are formed with knurled discs D1, D2, D3, D4, D5, D6, D7, D8, D9 and D10 and pinions P1, P2, P3, P4, P5, P6, P7 and P8 engaging the gear racks Y1, Y2, Y3, etc., for moving their associated sets of camming members for selectively positioning the camming members in engageable relation with a contact actuating pawl-like member 10

upon the rotation of the knobs D1, D2, D3, etc., while springs SPM, shown in Fig. 5, engaging the pinions P1, P2, P3, etc., are provided for resiliently holding the indicating wheels K1, K2, K3, etc., in each adjusted position. Pawl 70, as shown in Figs. 4, 6 and 11, is pivotally mounted at the free end of an arm 71 keyed on the shaft 25, while a spring 72 normally holds this pawl in position to engage one of the camming members 1, 2, 3, etc., as the case may be, of each set which have been moved in selected position by the operation of knobs D1, D2, D3, etc. Pawl 70 is provided with a lug portion 73 disposed in operative relation with the normally closed contact springs 74 and 75 secured, as by screws 77, in a pile-up arrangement on the arm 71 at a point adjacent the shaft 25, as shown in Figs. 4, 5 and 6, while a spring 78, which is included in the pile-up, co-operates with spring 74 to perform switching operations well known in the automatic telephone art but which forms no part of the present invention.

In a typical example of operation for transmitting a telephone call designation as BE-26117, for example, the manual operation of knobs D1, D2, D3, D4, D5, D6 and D7, the gears P1, P2, P3, etc., and the indicating wheel K1, K2, K3, K4, K5, K6 and K7 carried thereby is effective to move the indicating wheels from their normal non-indicating positions to the positions wherein the digits of the call designation BE-26117, above mentioned, appear through windows W in the casing NC and actuate the gear racks Y1, Y2, Y3, etc., through their engagement with pinion P1, P2, P3, etc., for positioning the sets of cams X1, X2, X3, X4, etc., in the position shown diagrammatically in Fig. 2, that is, wherein a rotation of shaft 25 under tension of spring 27 will cause the wiper 70 carried by the arm 71 to engage the cam 2 of set X1, cam 3 of set X2, cam 2 of set X3, cam 6 of set X4, cam 1 of set X5, cam 1 of set X6 and cam 7 of set X7 for operating spring 74 and thereby opening the contact in a manner and for a purpose which will be hereinafter described in detail.

As above mentioned, the operation of handle lever 22 from the position against the stop ST1 shown in Fig. 2 to the position against the stop ST carried by casing NC is effective to impart a turning movement to shaft 25 for tensioning the spring 27, thus moving the arm 71 and the pawl 70 carried thereby from the position shown in full line in Figs. 4 and 12 to the starting position shown in dotted line, this movement of arm 71 causing the operation of pawl 70 upon its engagement with the cams 7, 1, 1, 6, 2, 3 and 2 of the call designation BE-26117 above mentioned. During the counter-clockwise movement of arm 71, however, it is to be noted that the pawl 70 is caused to pivot in a direction away from spring 74 and, therefore, ineffective to open the contact 76. The movement of shaft 25 and the disc 32 carried thereby is effective to engage the pin 55x with the pawl 57 for disengaging it from wheel 48. Upon the release of lever 22 by the operator, the spring 27 rotates a shaft 25 and the arm 71 in a clockwise direction under control of the governor CG for successively engaging the pawl 70 with the cams 2, 3, 2, 6, 1, 1 and 7 of sets X1 to X7, inclusive, while the rotation of gear 29 through the engagement of pawl 31 with ratchet wheel 30 is effective to rotate the pulsing cam 49 through the engagement of this gear with pinion 33, the gear 35 meshing with pinion 39 and the gear 41 mesh-

ing with pinion 45. The speed ratio between gear 29 and pinion 45 being such as to impart five turns to the two lobe pulsing cams 49 during the movement of wiper 70 on any one of the cams 10 of sets X1, X2, X3, etc., while the length of cam 1 of any one set X1, X2, X3, etc., is equal to one-half turn of pulsing cam 49, cam 2 to one turn, cam 3 to one and one-half turns, cam 4 to two turns, cam 5 to two and one-half turns, cam 6 to three turns, cam 7 to three and one-half turns, cam 8 to four turns, cam 9 to four and one-half turns, and cam 10 to five turns.

Normally the telephone line is closed at contact 52 operated by pulsing cam 49 and contact 76 operated by pawl 70. The rotation of pulsing cam 39 and the consequent opening of contact 52 are ineffective to transmit pulses to the telephone line during the motion of pawl 70 from its normal starting position shown in dotted lines in Figs. 4 and 12 to the point of its engagement with the cam 2 of set X1, while the passing of pawl 70 on cam 2 of set X1 opens the contact 76 during one turn of pulsing cam 49, which opens the pulsing contact 52 twice for transmitting two pulses, the first digit of the telephone call designation 2326117 corresponding to No. BE-26117 above mentioned, after which the pawl 70 permits the closure of contact 76 for negating the operation of the pulsing cam 49 during the so-called interdigit or angular space between the cams 2 and 3 of sets X1 and X2 and this operation is continued for each digit and interdigit spaces until the arm 22 has returned to normal position against the stop ST1, while the pin 55 carried by disc 32 causes the pivotal movement of pawl 57 to a point wherein this pivotal movement is continued by the tension of spring rs for reengaging the two-toothed ratchet wheel 48 and thereby locking the pulsing cam in its normal position and the transmitter is now ready for a subsequent call setting and transmitting operation.

The casing NC is provided with a cradle portion SCP for receiving the telephone handset HS actuating the so-called switchhook springs (not shown) in a manner and for a purpose well known in the telephone art.

What is claimed is:

1. In a call transmitter device, a shaft movable in opposite directions, a handle carried by said shaft, a second shaft geared to the first-mentioned shaft, a motor spring tensioned by the operation of the second-mentioned shaft in one of said directions upon the operation of said handle, a gearing mechanism, a pulsing cam geared to said mechanism, a clutching device mounted on the second-mentioned shaft effective in said direction for actuating said gearing mechanism, a contact actuated by said pulsing cam, a contact actuating member carried by the last-mentioned shaft, a plurality of sets of cam-

ming element arranged in a semi-circle, a third shaft, means mounted on said third shaft for positioning the camming elements of each of said sets in engageable relation with said contact actuating member for negating predetermined operations of said pulsing cam, and means set by the operation of the first-mentioned means for indicating the adjusted position of said camming elements.

2. In a call transmitter device, a rotatable shaft movable in opposite directions, a handle carried by said shaft for moving the latter in one of said directions, a second shaft geared to the first-mentioned shaft, a motor spring tensioned by the operation of said second shaft in said direction for moving each shaft in the other direction, a gearing mechanism actuated by said second shaft in said other direction, a normally closed pulsing contact, a cam geared to said mechanism for continuously actuating said contact during the operation of said second shaft in said other direction, an arm carried by said second shaft, normally closed contact springs carried by said arm, a pivoted pawl carried by said arm operatively associated with said springs, a plurality of sets of camming elements disposed concentric to the movement of said pawl but normally in position ineffective therewith, a third shaft, operating means for each of said sets mounted for rotary movement on said third shaft for positioning the camming elements of each of said sets in position effective relative to said pawl for causing the operation of said contact springs for negating a number of operations of said pulsing contact, and means set by the rotation of said operating means for indicating the operation of said pulsing contact.

3. In a call transmitter, a plurality of manually operable members, adjustable camming elements set by the operation of said members, a shaft rotatable in two directions, a pulsing mechanism actuated by said shaft, means to render the operation of said shaft ineffective relative to said mechanism when said shaft is rotating in one of said directions, a lever member carried by said shaft, a two-way movable pawl pivoted at the free end of said lever, a contact carried by said lever disposed for operation by the movement of said pawl one way, a motor spring and a handle for rotating said shaft in said ineffective direction for tensioning said spring and moving said pawl ineffectively relative to said contact, said spring operating said shaft in the other direction for engaging said pawl with the camming elements set by said manually operable members for operating said pawl the other way to cause the operation of said contact for negating predetermined operations of said pulsing mechanism.

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