

Jan. 11, 1944.

C. D. RICHARD

2,339,195

KEY-OPERATED TELEPHONE CALL TRANSMITTER

Filed May 8, 1941

4 Sheets-Sheet 1

FIG. 1

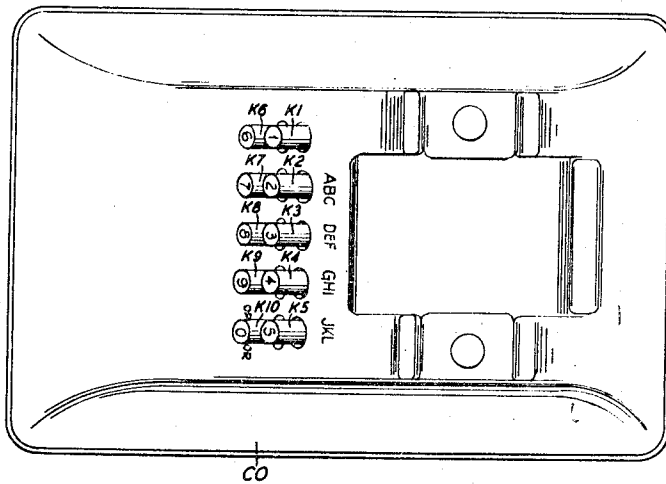
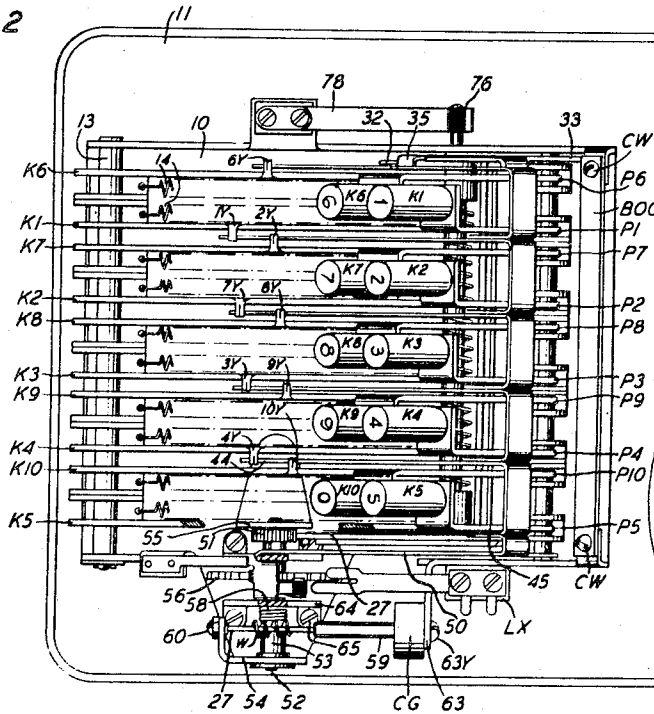


FIG. 2



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FIG. 5

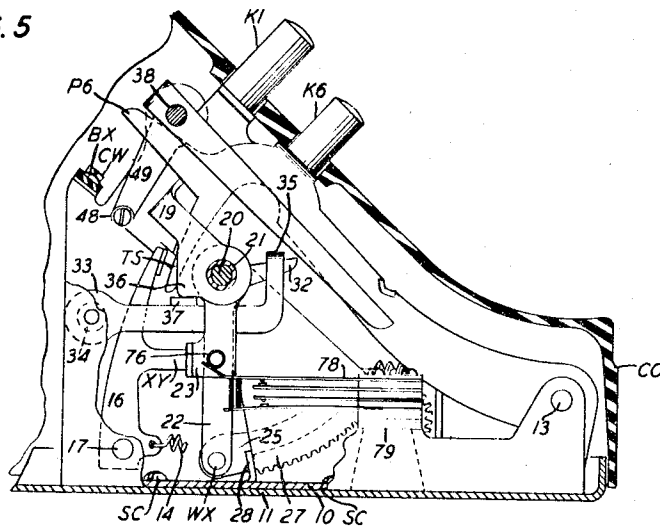
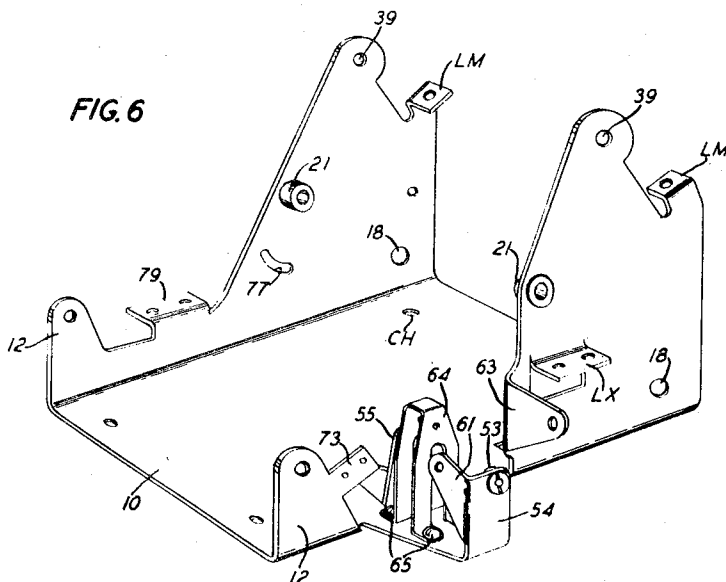


FIG. 6



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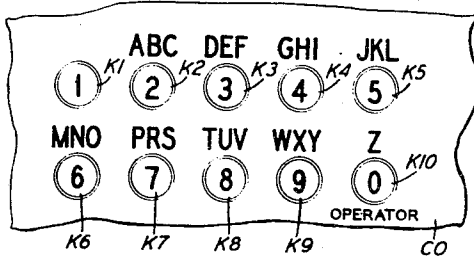
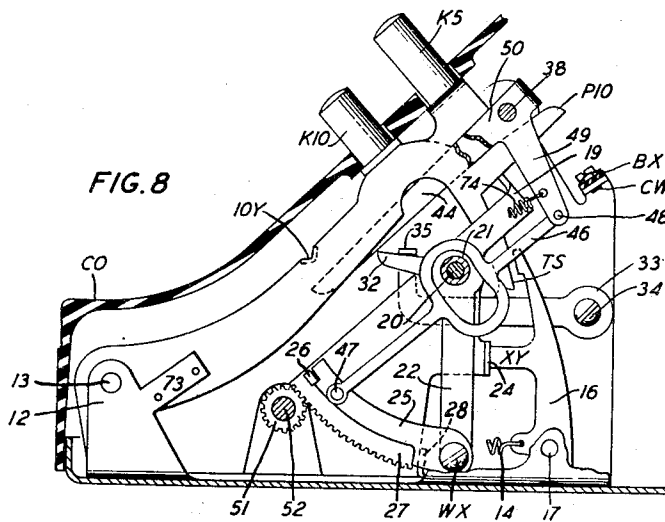
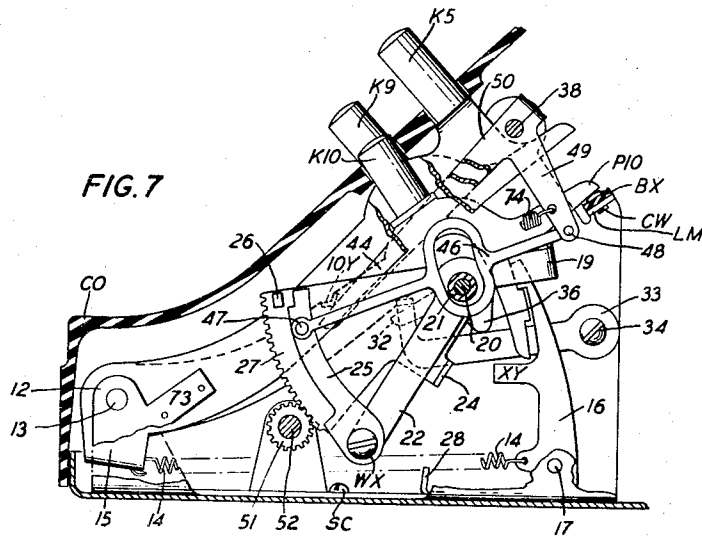


FIG. 9

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2,339,195

KEY-OPERATED TELEPHONE CALL TRANSMITTER

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Application May 8, 1941, Serial No. 392,441

17 Claims. (Cl. 179-90)

This invention relates to telephone call transmitters and more particularly to telephone call transmitters of the key-operated type.

The object of the invention is the provision of a telephone call transmitter of the type above referred to which uses a minimum number of operating parts, which is cheap to manufacture, convenient to operate and positive in operation.

A feature of the invention is the provision of a set of numbered key members for actuating a movable bar a distance corresponding to the movement of the keys from normal to a common stop bar, the movable bar having means normally disposed in operative relation with a gearing mechanism connecting with a pulsing mechanism.

Another feature of the invention is the provision of means actuated by the keys for moving the means carried by the movable bar out of operative relation from the gearing mechanism for permitting the return movement of the latter and that of the pulsing mechanism to normal position from different points relative to the movement of the operated key, the return movement of the pulsing mechanism to normal, operating a pulsing contact a number of times corresponding to the value or digit of the operated key.

Another feature is the provision of means operable for locking the depressed key in the operated position while locking the other keys in the non-operated position, the operation of the locking means as for releasing the keys being effected at the conclusion of each digit transmitting operation by a bar movable with the gear mechanism under the tension of a motor spring such tensioning being effected by the operation of the keys.

Another feature is the provision of a mechanism whereby the tensioning of the motor spring is continued by the operation of the keys following the disengagement of the means carried by the movable bar from the gear mechanism so as to maintain the pressure on the operated key during the operation of the latter from normal to the stop bar substantially constant.

Another feature is the provision of means whereby the contact actuating means is held out of engageable relation from the pulsing cam during the rotation of the latter by the manual operation of the keys and released in time relation with each return movement of the pulsing cam to normal effected by the tension of the motor spring, the operations of the pulsing mechanism

being effected under control of a centrifugal speed governor.

Another feature is the provision of a mounting of unit construction punched out of a metallic sheet and formed with bearing portions for the different shafts of the operating mechanism and support elements for a plurality of contact spring pile-ups and for the stop bar used for limiting the movement of the keys.

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 plan view of a telephone desk set fitted with the call transmitter of the invention shown in a slightly reduced scale;

Fig. 2 is a plan assembly view with the casing housing the transmitter mechanism removed from the base, the latter being shown with portions broken away;

Fig. 3 is a right side assembly view, shown with the operating mechanism in normal non-operated position, a number of operating parts being shown in section and with portion broken away;

Fig. 4 is a front assembly view showing the operating parts of the transmitter mechanism in normal non-operated position, the casing and the base being shown in vertical section and with portions broken away;

Fig. 5 is a left side assembly view shown with the operating parts of the transmitter mechanism in normal non-operated position and with a number of operating parts with portion broken away;

Fig. 6 is a view of the mounting for the transmitter mechanism such mounting being shown in perspective;

Fig. 7 is a right side assembly view shown with one of the keys and a number of parts actuated thereby in the operated position, a number of parts being shown in section and with portions broken away;

Fig. 8 is a view similar to that of Fig. 7 but showing the operating parts in normal position, a number of parts being shown in section and with portions broken away; and,

Fig. 9 is a partial view of the casing housing the transmitter mechanism showing the marking of the keys.

According to the call transmitter of the invention, a mounting 10 shown in Figs. 2, 3, 4, 5 and in detail in Fig. 6, is secured, for example, to the base 11 of a telephone desk set by a number of

screws SC shown in Fig. 5 extending through clearance holes CH in mounting 10 in engagement with similar screw-threaded holes in the base 11, provision being made in the base 11 for receiving a casing CO serving for housing the call transmitter mechanism which will hereinafter be described in detail.

Mounting 10 is formed with upright lug portions 12 provided for supporting a shaft 13 on which a set of ten key members K1, K2, K3, K4, K5, K6, K7, K8, K9 and K10 are pivotally mounted. Key members K1, K2, K3 etc. are held in normal non-operated position as shown in Figs. 1, 2, 3, 4 and 5 by similar retractile springs 14 having one of their ends hooked to the bridge portion 15 forming the bearing ends of these keys while the other ends of springs 14 are hooked to latching members 16 operatively associated with the keys, a small distance above the center of supporting shaft 17 on which these latching members are pivoted, shaft 17 being journaled in bearings 18 of mounting 10.

The operation of any one of the key members K1, K2, K3, etc. from normal position to the position wherein the projections P1, P2, P3, P4, P5, P6, P7, P8, P9 and P10 formed with these keys engage a stop bar BX as shown for example by key K10 in Fig. 7 is effective to impart similar angular movement to a common U-shaped bar 19 mounted for free pivotal movement on bearings 21 carried by mounting 10, the bar BX being supported at both ends to lug members LM formed with mounting 10 and secured thereto as by screws CW.

One of the pivoted arms of bar 19 is formed with a downwardly extending projection 22 best seen in Figs. 3, 5, 7 and 8, to which is pivotally mounted, as on screw WX, a pawl 25 normally engaging under the tension of a spring 74, a pin 26 carried by a sector 27 for actuating the latter in a clockwise direction upon the operation of any one of the key members K1, K2, K3, etc. Gear sector 27 is keyed on one end of shaft 20 for movement as a unit with an arm 23 keyed to the other end of this shaft. The shaft 20 is supported at both ends in bearings 21 while a bar 24 is secured, as by welding, to projections formed with the gear sector 27 and with the free end of arm 23 in parallel relation to shaft 20 and in engageable relation with projections XY formed with the key latching members 16. The gear sector 27 is limited in its counterclockwise movement as effected by the tension of a motor 29 best seen in Fig. 4 by a stop 28 (see Figs. 3, 7 and 8), formed with the mounting 10, the motor spring 29 being mounted concentric to shaft 20 with one of its ends hooked to a pin 30 secured to the hub portion of gear sector 27 and its opposite end hooked to a pin 31 secured to the hub of an arm 32 (see Figs. 2, 3, 4, 7 and 8) mounted for free rotation on shaft 20 adjacent the arm 23.

The arm 32 is held from rotation under the normal tension of motor spring 29 by a lever 33 pivoted on a shoulder screw 34 and having at its free end a lug 35 engaging the arm 32, the arm 33 being in turn normally held from pivotal movement by a cam portion 36 formed with the arm of U-shaped bar 19, this lever mechanism serving to yieldably hold the bar 19 in normal position and to perform another function which will be hereinafter described in detail.

The key members K1, K2, K3, etc. are provided with perpendicularly extending lug portions 1Y, 2Y, 3Y, 4Y, 5Y, 6Y, 7Y, 8Y, 9Y and 10Y best

seen in Figs. 2 and 4 disposed in engageable relation with arms 40, 41, 42, 43, 44 and 45 keyed or otherwise secured on a shaft 38, journaled in bearings 39 formed with mounting 10 as shown in Fig. 6, the arm 40 being actuated by key K6 through lug 6Y, arm 41 by keys K1 and K7 through lugs 1Y and 7Y; arm 42 by keys K2 and K8 through lugs 2Y and 8Y; arm 43 by keys K3 and K9 through lugs 3Y and 9Y; arm 44 by keys K4 and K10 through lugs 4Y and 10Y and arm 45 by key K5 and through lug 5Y, but it is to be noted that lugs 1Y, 2Y, 3Y, etc., are disposed at different distances relative to their points of contact with arms 40, 41, 42, etc. so as to impart a pivotal movement to shaft 38 at different points relative to the angular movement of the keys K1, K2, K3, etc., from normal to the stop bar BX and proportional to the rotation of a pulsing cam 56 as will hereinafter be described in detail.

The pivotal movement of shaft 38 as effected by the individual operation of key members K1, K2, K3 and the arms 40, 41, 42, etc., is imparted to the pawl 25 against the tension of the spring 74 for disengaging this pawl from pin 26 through a connecting rod 46 having one end pivoted on a shoulder screw 47 carried by pawl 25 and its opposite end pivoted on shoulder screw 48 carried by an arm 49 mounted on shaft 38 for movement as a unit with arms 40, 41, 42, etc., the arm 49 as shown in Figs. 2, 3, 4 and 8 being formed with a lever member 50 provided for a purpose which will be hereinafter described in detail.

The gear sector 27 meshes with a pinion 51 formed integrally with a spindle 52 having one end journaled in a bearing 53 secured to the upright lug member 54 of mounting 10 and the opposite end of this spindle is journaled in a bearing formed with the upright member 55 of mounting 10. On the spindle 52, best seen in Fig. 4, is securely mounted a ten-tooth pulsing cam 56 and on the reduced portion of this spindle is mounted for free rotation thereon a worm gear 57 which is driven, as during the return movement of gear sector 27 to normal under the tension of motor spring 20 through a clutch 58 in the form of a wire winding on the hub portion of cam 56 and on the hub portion of worm gear 57. The operation of worm gear 57 is effective to actuate the worm W (see Fig. 3) formed with the shaft 59 of a centrifugal speed governor CG provided for controlling the speed of pulsing cam 56 during its operation by the tension of motor spring 29. The governor shaft 59 has one end journaled in a bearing 60 in the right-angle bent portion 61 of upright portion 54 formed with mounting 10 and its opposite end in a bearing, not shown, formed with the drum of governor CG, this drum in turn being secured to a lug 63 formed with the mounting 10 as by a screw 63.

An inverted U-shaped support 64, best seen in Figs. 2, 3, 4 and 6, straddles the spindle 52 and is secured to the mounting 10, as by a number of screws 65. On support 64 is mounted, as on pivot 66, Figs. 3 and 4, a double armed lever member 67, the arm *h* of which is provided for engaging the cam 56 and its other arm having a roller 69 of insulating material disposed in operative relation with a contact spring 70 mounted in a pile-up arrangement with a stationary contact spring 71 on a lug LX formed with the mounting 10. The operation of lever members 67 is effective to cause the make and break operation of the springs 70—71 upon the rotation of cam 56 as ef-

ected by the tension of motor spring 20. The arm 50 during the rotation of cam 56 in the opposite or non-pulsing direction as effected by the operation of any one of the keys K1, K2, K3, etc., is effective to hold the double armed lever 67 against the tension of a flat retractile spring 72 in position wherein its arm *h* is out of engageable relation from the cam 56, this spring being secured at one end to a projection 73 formed with the mounting 10 and having its other end resting against a similarly inclined portion of double armed lever 67 when the latter is released by the downward movement of arm 50 as for engaging the pulsing cam 56.

The spring 74 while holding the pawl 25 normally in engaged relation with pin 26 of gear sector 27, also serves for holding the double arm lever 67 and the arms 40, 41, 42, etc., in normal position as shown in Fig. 3, this spring having one end hooked to arm 40 mounted on shaft 38 and the other end to a stud 75 projecting from the right disposed upright of mounting 10.

The downwardly extending arm 23 keyed on shaft 20 for movement as a unit with gear sector 27 is provided with an insulated stud 76, Figs. 2, 4 and 5, extending in an opening 77 in the left disposed upright of mounting 10 in engageable relation with a spring 78 forming part of a so-called off-normal spring assembly mounted on a supporting lug 79 formed with the mounting 10 to perform switching operation well known in the automatic telephone art.

In the operation of the call transmitter of the invention supposing that it is desired to transmit ten pulses as for calling the "operator," the op-

eration of key K10 marked 0 from the position shown in Figs. 2, 3 and 8 to the operator position shown in Fig. 7, is effective to rotate the spindle 52 through the engagement of pinion 51 with gear sector 27 and thereby the pulsing cam 56 keyed on this spindle one turn in a counterclockwise direction, the movement of gear sector 27 is effected by the movement of bar 19 and the engagement of pawl 25 with pin 26 carried by gear sector 27.

During the operation of gear sector 27 the arm 50 under the tension of spring 74, holds the double arm lever 67 in normal position wherein the arm *h* of this lever is out of engagement with cam 56 and therefore is not operated. A small distance from the full operated position of key K10, that is, a small distance prior to the engagement of lug P10 formed with key K10 to stop bar BX, the pawl 25 is disengaged from the pin 26 through the engagement of lug 10Y, see Figs. 2 and 4, carried by key K10 with the arm 44 keyed to shaft 38 thus moving the arm 50 in position to cause the engagement of arm *h* of lever 67 with the teeth of cam 56 timed to occur simultaneously with the release of gear sector 27 by pawl 25 for permitting the return of the gear sector and the pulsing cam 56 to normal position as effected by the tension of motor spring 20 under control of the speed governor CG thus actuating the double armed lever 67 and therefore the contact spring 70 once for each tooth of cam 56 for sending ten pulses, the gear sector 27 being arrested in normal position by the stop 28 following the operation of the normal contact spring pile-up 78 by insulating stud 76.

Upon the disengagement of pawl 25 from the pin 26 on gear sector 27, it is to be noted that the tension of motor spring 20 remains substantially

constant on the depressed key, as in this example key K10, due to the movement imparted to lever 33 by the cam portion 36 of bar 19 and the movement imparted by lever 33 to arm 32 to which, as above mentioned, the adjacent end of the motor spring 30 is hooked, in addition to the tension of retractile spring 74 which acts on the key simultaneously with the disconnecting of pawl 25 from pin 26.

Following a small angular movement of key member K10 from non-operated position and therefore that of gear sector 27, the latching members 16 are permitted to move in engageable relation with their cooperating latch elements 15 TS formed with the keys K1, K2, K3, etc., for locking the depressed key to the operated position and locking the non-operated keys in their normal positions until released by the return movement of gear sector 27 and the consequent engagement of bar 24 with the latching elements 16, the release and subsequent return movement of the operated key to normal permitting the re-engagement of pawl 25 with pin 26 and the return of arms 40, 41, 42, etc., to normal and the transmitter is now ready for a successive operation. Supposing again that it is desired to transmit five pulses, the operation of key K5 is effective to impart a movement to gear sector 27 for rotating the pulsing cam 56 due to the movement of common bar 19 and the engagement of pawl 25 with pin 26 of gear sector 27. The lug 5Y, see Fig. 4, carried by this key is so spaced from its arm 45 as to disengage the pawl 25 from pin 26 following an angular movement of 180 degrees imparted to pinion 41 and to pulsing cam 56 such disengagement permitting the return movement of gear sectors and that of cam 56 to normal for actuating the pulsing contacts 70, 71, thus transmitting five pulses while the movement of key K5 is continued to the stop bar BX. The make and break operations of the pulsing springs 70-71 are effected with absolute accuracy notwithstanding considerable plus and minus manufacturing limits in the spacing of the lugs 1Y, 2Y, 3Y, etc., of key members K1, K2, K3, etc., from the arms 40, 41, 42, etc. For example, in the operation of key K5 under normal conditions of the transmitter mechanism, the pulsing cam 56 is rotated wherein the point P1 of this cam is on a line passing from the center of pivot 66 and the center of spindle 52 when the double armed lever member 67 is released by arm 50 and moved under the tension of its retractile spring 72 for positioning its arm *h* in engageable relation with pulsing cam 56 at the time the pawl 25 is disengaged from pin 26 of gear sector 27, but supposing that after a great number of operations the double armed lever member 67 is released so as to fall at any point on the peripheral portion of either of the teeth T5 and T6, the release of lever member 67 within this angular movement of cam 56 will not cause the adding or canceling of a pulse since the arm *h* of lever will begin its operation only by the engagement of tooth T5 during the reverse movement of the cam.

In the operation of the call transmitter of the invention, it has been found that the pulsing operations for the digits 1 to 6 are effected in less time than that required for the selection and operation of succeeding keys by the operator with the result that the locking mechanisms for these keys operate only for preventing the manual operation of two keys simultaneously but in no case delaying the successive operation of the

higher digit keys beyond the time limit required for the proper operation of the automatic switches controlled by this transmitter.

What is claimed is:

1. A call transmitter comprising a set of numbered key members, a pulsing cam, a set of contacts, a clutch mechanism, a gearing mechanism actuated by said key members and said clutch for rotating said pulsing cam ineffectively relative to said contacts, means operatively associated with said key members for controlling the operation of said clutch relative to the numerical values of said key members and a motor spring tensioned by the operation of said key members for returning said cam to normal for actuating said contacts a number of times defined by the operation of said clutch.

2. A call transmitter comprising a set of numbered key members, a pulsing cam, a gearing mechanism, normally connected clutch elements actuated in one direction by the operation of said key members for rotating said cam, means actuated differentially by said key members for disconnecting said clutch elements for controlling the operation of said cam in said direction, a motor spring tensioned by the operation of said gear mechanism as effected by said key members for operating said cam in another direction, and a pulsing contact actuated by the differential operation of said cam in the last-mentioned direction.

3. A call transmitter comprising a set of numbered key members, a bar operated by the operation of said key members, an arm formed with said bar, a gear sector having a pin extending perpendicularly therefrom, a pawl carried by said arm for engaging said pin to cause the operation of said gear sector upon the operation of said key members, a pulsing cam actuated by the movement of said gear sector, a mechanism actuated by the operation of said key members for disengaging said pawl from said pin for controlling the movement of said cam according to the numerical values of said key members, a motor spring tensioned by the operation of said keys for returning said cam to normal, and a contact spring actuated by the operation of said cam.

4. A call transmitter comprising a set of key members, a pivoted bar actuated by the operation of said key members, a gear sector, a pulsing cam operatively connected to said gear sector, a pawl carried by said bar, normally engaging means carried by said gear sector for rotating said cam upon the operation of said bar, a stop bar for limiting the movement of said key members, a plurality of levers, means carried by said key members for engaging said levers for disengaging said pawl from the means carried by said gear sector for controlling the operation of said cam, a motor spring for returning said sector and said cam to normal, a contact device actuated by the return movement of said cam to normal for transmitting pulses according to the number of the operated key member and means to cause the reengagement of said pawl with the means carried by said sector.

5. A call transmitter comprising a set of pivoted key members having digit designations, a stop bar for limiting the operation of said key members to similar angular movements, a pivoted bar actuated by said key members an angular distance corresponding to the movement of said key members from normal to said stop bar, a gear sector, a pulsing cam actuated by said gear sector, a mechanism actuated by said pivoted bar for ac-

tuating said gear sector upon the operation of one of said key members, a mechanism actuated differentially by said key members for controlling the operation of the first-mentioned mechanism and said pulsing cam, a motor spring for returning said gear sector and said cam to normal following such a control, and a contact actuated by said cam for transmitting a number of pulses corresponding to the digit designation of the operated key member.

6. A call transmitter, a set of pivoted key members numbered to represent digits, a stop bar for limiting the angular movement of said pivoted key members, a pivoted bar operated by the movement of each of said key members, a gear sector, means normally operatively connecting said pivoted bar to said gear sector for actuating the latter upon the operation of any one of said key members, a pulsing cam actuated by the movement of said gear sector, a shaft, a pivoted double armed lever member having one of its arms for operatively engaging said cam, a lever secured to said shaft for holding said two armed lever member in position ineffective relative to said cam during the operation of the latter by one of said key members, a plurality of other levers secured to said shaft, engaged differentially by said key members for disconnecting said means from said gear sector for controlling the operation of said cam according to the digit of the operated key, a motor spring tensioned by the movement of the operated key for returning said cam to normal following said control, said lever releasing the double armed lever simultaneously with the change of motion of said cam under the tension of said motor spring, and a contact actuated by said double armed lever upon the return movement of said cam.

7. In a call transmitter a set of manually operable numbered key members, means for limiting the angular movement of said key members, a pivoted bar operated by the movement of each of said key members, a shaft, a gear sector keyed on said shaft, means carried by said bar normally engaging means carried by said sector for actuating the latter upon the operation of any one of said key members, a cam rotatable in one direction by the operation of said gear sector, a mechanism actuated by said key members for disengaging the means carried by said bar from the means carried by said gear sector following the angular motion of said cam corresponding to the numerical values of the operated key members, a motor spring, a lever mechanism actuated by the movement of said bar, said motor spring being mounted concentric to said shaft with one of its ends secured to one of the levers of said mechanism and its other end to said gear sector to be tensioned by the conjoint operation of the last-mentioned lever and said gear sector during the operation of one of said key members, said gear sector under the tension of said motor spring returning said cam to normal, and a pulsing contact actuated by the return movement of said cam.

8. In a call transmitter a set of key members, a mounting having bearings, a U-shaped bar pivoted on the peripheries of said bearings and movable upon the operation of each of said key members, a stop bar for limiting the movement of said key members, a shaft journaled in said bearings, a motor spring mounted concentric to said shaft and tensioned by the pivotal movement of said U-shaped bar, a gear sector secured at one end of said shaft, a lever member secured to the op-

posite end of said shaft, a bar having one end secured to said gear sector and its opposite end to said lever member, an arm formed with said pivoted bar having means normally engaging said gear sector for actuating the latter upon the operation of any one of said key members, a plurality of latching members one for each of said key members, retractile springs by said key members having one of their ends secured to said keys and their other ends secured to their associated latching members, each of said key members having a toothed lug portion disposed in engageable relation with their associated latching members, said retractile spring causing the engagement of said latching members with said toothed portions for locking the non-operated keys in that position and the depressed key in the operated position upon the movement of said gear sector, said bar disengaging said latching members from said toothed portions upon the return of said gear sector to normal, and a pulsing mechanism actuated by said gear sector upon its return to normal by the tension of said motor spring.

9. In a call transmitter a set of key members, a bar extending transverse of said key members, a gear sector operated in one direction by the operation of said key members acting on said bar, a motor spring tensioned by the operation of said sector in said direction for moving the latter in another direction, a lever mechanism actuated by said key members for defining the extent of angular movement of said gear sector during the continued operation of said bar, a spindle operatively connected to said gear sector, a pulsing cam keyed on said spindle, a contact, means disposed for operation by the movement of said cam for actuating said contact, a worm wheel mounted for free rotation on said spindle, a one-way operable clutching device operable upon the operation of said pulsing cam in said other direction and a speed governor geared to said worm wheel for controlling the operation of said contact by said cam.

10. In a call transmitter, a pulsing cam, a gearing mechanism for actuating said pulsing cam, a set of digit key members for actuating said mechanism, and means to render the movement of said key members during their operation variably effective relative to said mechanism for actuating said cam according to the digit value of said key members.

11. In a call transmitter, a gearing mechanism, a pulsing element operated by said mechanism, a set of digit key members for actuating said mechanism, means effective relative to said key members between normal non-operated positions to stop-operated position for controlling the operation of said cam to movements proportional to the digits of said key members.

12. In a call transmitter, a pulsing element, an actuating mechanism for said element, a set of digit key members variably effectively movable between normal non-operated positions to full-operated position, means actuated by said key members for imparting movements to said mechanism for actuating said element ineffectively according to the effective operation of said key members, a motor spring for effectively actuating said element, other means actuated by said key members for continuing tensioning said motor spring by said key members independently of the op-

eration of said element by said actuating mechanism.

13. In a call transmitter, a set of key members, a pulsing element, an actuating mechanism for said element, a motor spring for operating said actuating mechanism, a plurality of means actuated by the movement of said key members for operation in opposite direction for tensioning said spring, other means operable by the movement of said key members to render one of said means ineffective relative to said spring for permitting the operation of said actuating element by the tension of said spring, the other of said first-mentioned means continuing the tensioning of said motor spring during the movement of said key members to full-operated position.

14. In a call transmitter, a contact, a set of digit key members, a rotatable pulsing cam, a bar extending transverse of said key members for operation by the movement thereof, means for controlling the operation of said key members in their movement from normal non-operated to full-operated position, and a mechanism actuated by said bar for imparting movement to said cam for actuating said contact according to the value of the depressed key.

15. A call transmitter comprising a pulsing contact, a set of key members, a common bar extending transverse of said key members for operation therewith, a gearing mechanism actuated differentially by the movement of said key members, a cam actuated by said gearing mechanism, and means for returning said key members to normal non-operated position independently of the return movement of said cam for operating said contact.

16. A call transmitter comprising a pulsing contact, a set of key members, a motor spring-tensioned by the operation of each of said key members, a gear sector responsive to the tension of said spring, a pulsing cam actuated by the movement of said gear sector, latching means operable upon the movement of said gear sector as effected by said key members for blocking the depressed key in the operated position against the tension of said spring during the operation of said gear sector for actuating said contact.

17. A call transmitter comprising, a pulsing contact, a set of key members, a motor spring-tensioned by the operation of each of said key members, a gear sector actuated in one direction by the movement of each of said key members, a lever member, a cam actuated by the movement of said gear sector for actuating said lever member, means normally in position to render the operation of said cam during the manual operation of said key members ineffective relative to said lever member, said means operating upon the return of said gear sector by the tension of said spring to render the movement of said cam effective relative to said lever member for actuating said contact, a latching mechanism operable upon the movement of said gear sector, by any one of said key members for blocking the depressed key to operated position and the non-operated keys to normal non-operated position, and means operable upon the operation of said cam in direction effective relative to said lever member for controlling the operation of said contact, the return of said gear sector to normal non-operated position releasing all the key members.

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