April 21, 1942. C. D. RICHARD 2,280,604

TELEPHONE CALL TRANSMITTER

Filed Nov. 2, 1939 5 Sheets-Sheet 1

FIG. 1

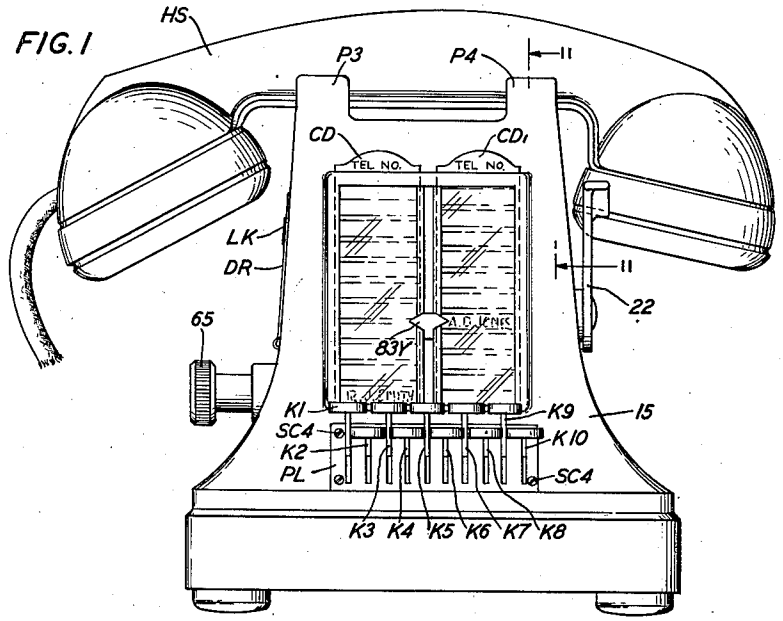

FIG. 2

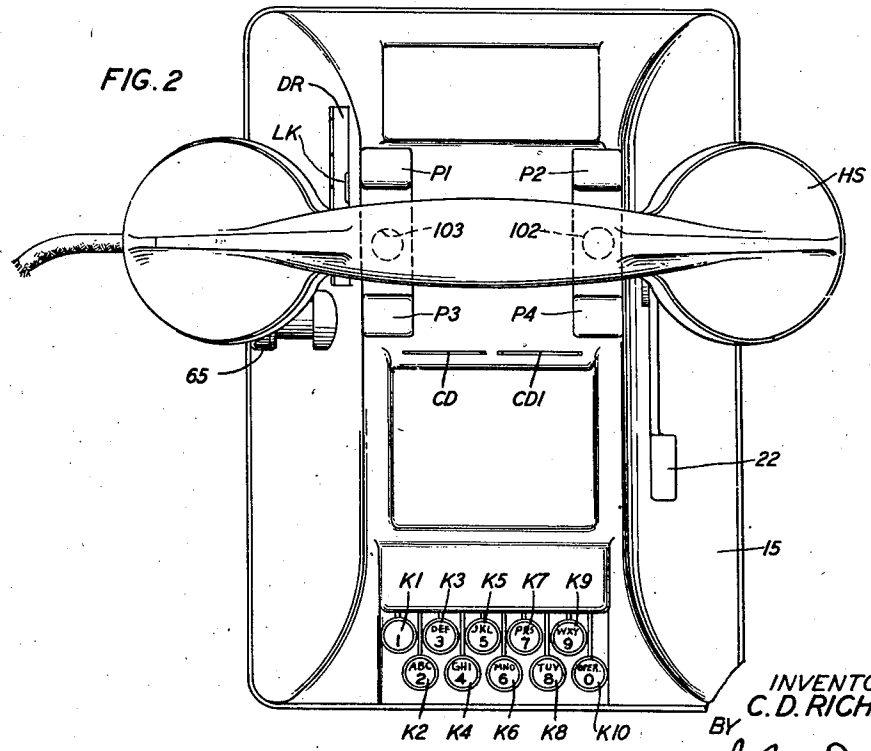

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FIG. 16

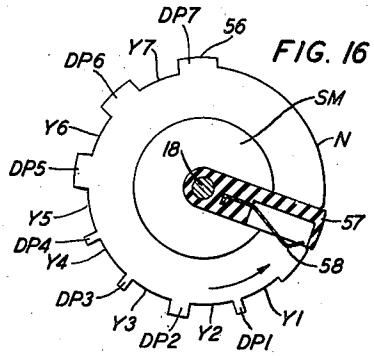
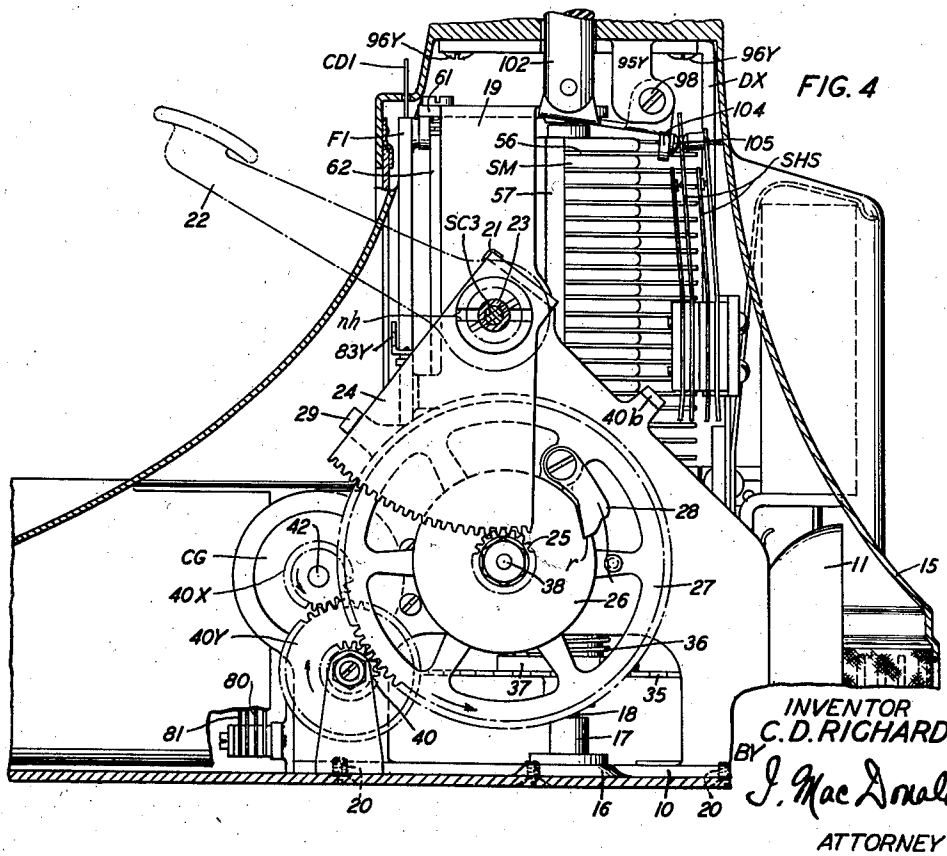


FIG. 3

FIG. 4



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TELEPHONE CALL TRANSMITTER

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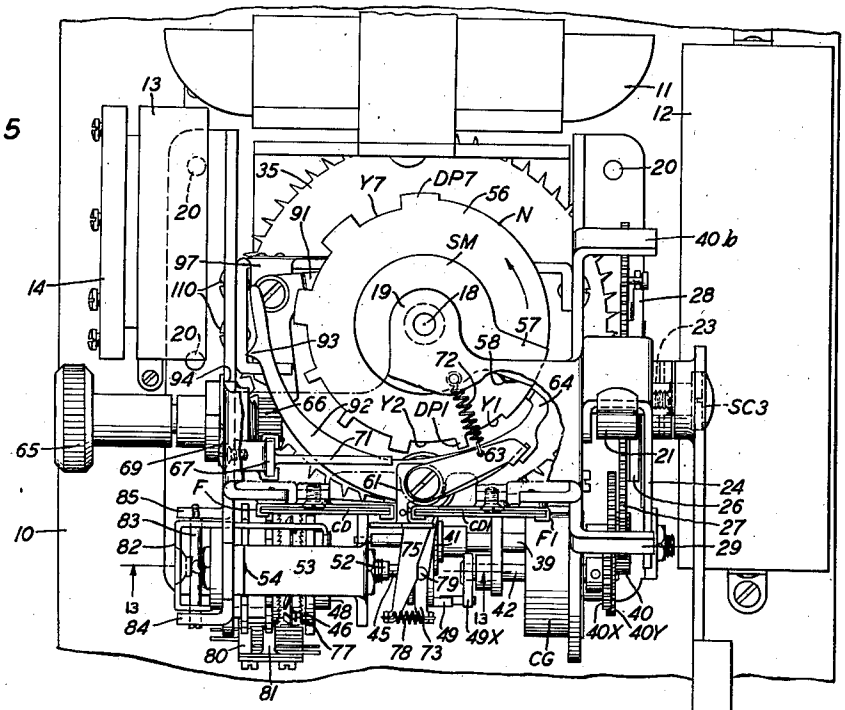
FIG. 5



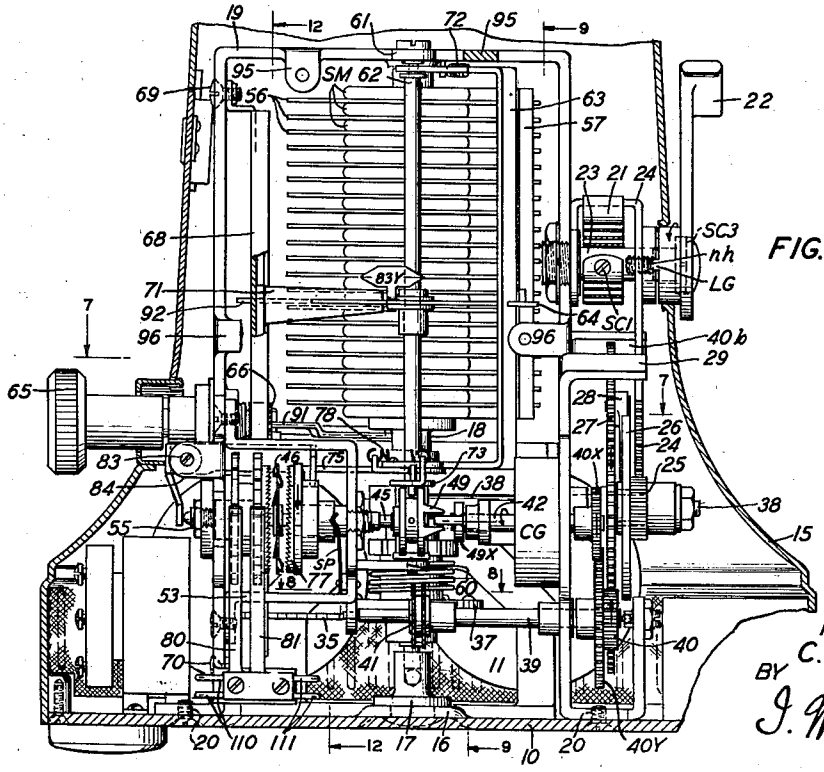


FIG. 6

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FIG. 7

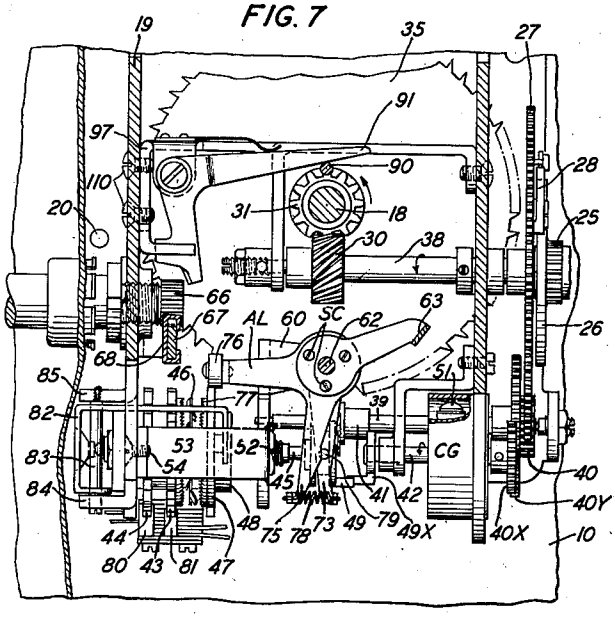

FIG. 8

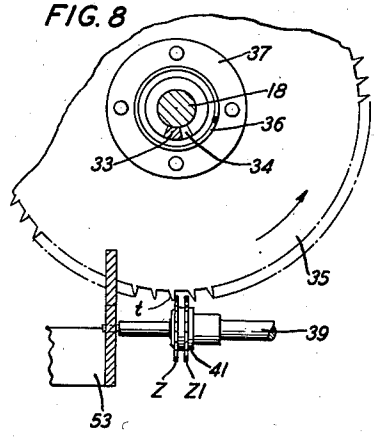

FIG. 9

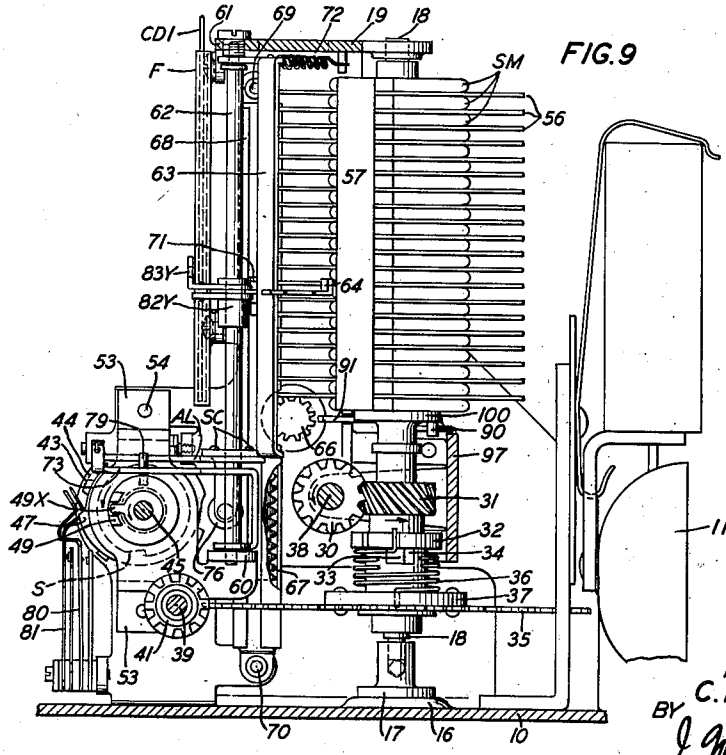

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FIG. 10

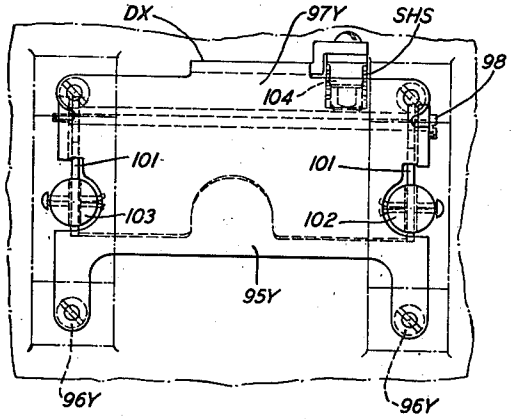


FIG. 11

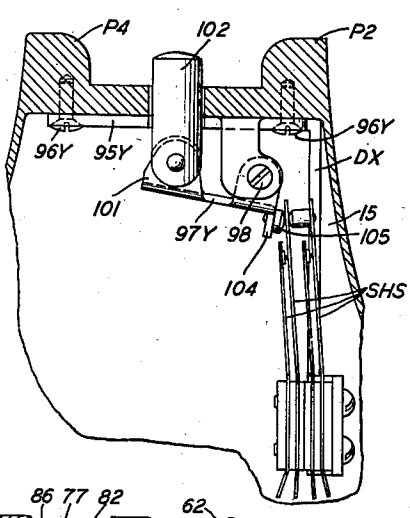


FIG. 12

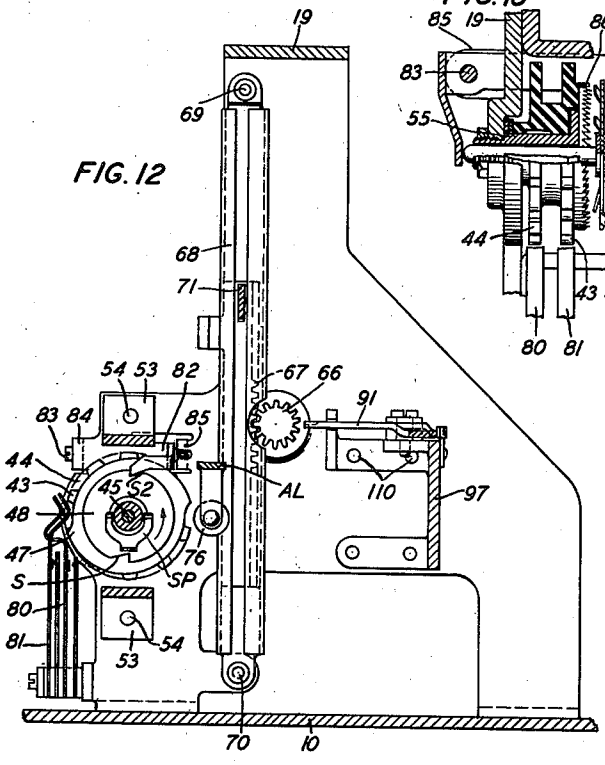


FIG. 13

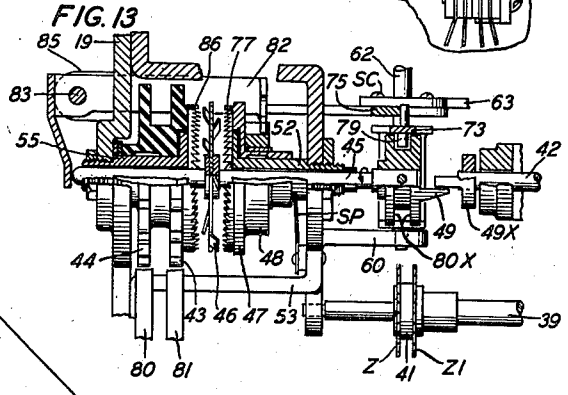


FIG. 15

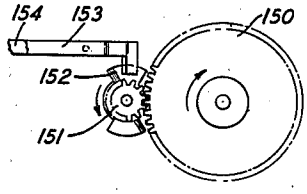
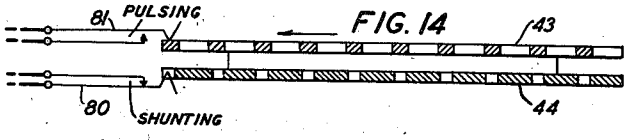


FIG. 14



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Patented Apr. 21, 1942 2,280,604

UNITED STATES PATENT OFFICE

2,280,604

TELEPHONE CALL TRANSMITTER

Charles D. Richard, West New Brighton, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application November 2, 1939, Serial No. 302,542

10 Claims. (Cl. 179—90)

This invention relates to telephone call transmitter devices.

The object of this invention is to improve the construction and operation of such devices and to combine in a single unit an improved call transmitter of the repertory type, a call transmitter of the key-controlled type, and a telephone handset with its associated ringer, condenser, induction coil and switches, the whole being housed in a common casing from which code elements and cards on which the telephone subscribers' names are printed may be removed without exposing the operating part of the call transmitter mechanism and those of the telephone handset cooperating apparatus.

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

Fig. 1 is a front elevation view of the transmitter slightly reduced;

Fig. 2 is a top view;

Fig. 3 is a side elevation;

Fig. 4 is a side assembly view of the transmitter full size shown with the casing and the base in section and a number of operating parts with portions cut away;

Fig. 5 is a top assembly view shown with a number of operating parts with portions cut away;

Fig. 6 is a front assembly view of the operating mechanism, the casing and the base being shown in section;

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

Fig. 8 is a horizontal sectional view taken on line 8—8 of Fig. 6;

Fig. 9 is a vertical sectional view taken on line 9—9 of Fig. 6;

Fig. 10 is a top view of the switchhook spring actuating mechanism;

Fig. 11 is a side view thereof showing the cradle portion of the casing in section taken on line 11—11 of Fig. 1;

Fig. 12 is a vertical sectional view taken on line 12—12 of Fig. 6 showing the card disc selecting mechanism and elements of the pulsing mechanism;

Fig. 13 is an enlarged detail view of the pulsing mechanism shown with a number of operating parts in section;

Fig. 14 is a diagrammatical view of the pulsing and shunting cams shown with their respective contacts;

Fig. 15 is a modification of the pulsing mechanism shown in Fig. 13; and

Fig. 16 is a detail view showing one of the code discs in assembled relation on its mounting frame.

According to the invention, a base 10 serves for mounting substation telephone apparatus such as ringer 11, a condenser 12, an induction coil 13, a terminal bank 14 and a casing 15 provided for housing the transmitter mechanism which will be hereinafter described in detail.

The base 10 is provided with a boss 16 shown in Figs. 4, 6 and 9 to which is secured an end-thrust bearing 17 provided for receiving the lower disposed end of a vertically disposed shaft 18, the other end of this shaft being journaled in a bearing portion formed at the top of an inverted U-shaped frame 19 secured to the base 10 by a number of screws 20 as shown in Figs. 4, 5 and 6.

On one side of frame 19 is mounted a spindle 23 provided for pivotally mounting a gear sector 24 and a spiral motor spring 21 best seen in Fig. 6 having the end of its inner convolution secured to supporting spindle 23 as by a screw SC1, while the end of its outer convolution is hooked to a bent-over portion of gear sector 24 which is moved as for tensioning the spring 21 by a handle lever 22 secured thereto by clutch elements in the form of a notch *nh* in the hub of gear sector 24 and a lug *lg* formed with lever 22 while a screw SC3 engaging the spindle 23 holds these clutch elements in their engaged relation, the movement of gear sector 24 being limited from normal to operated positions by stops 29 and 40^b best seen in Fig. 4.

The gear sector 24 meshes with a pinion 25 secured on the hub of a disc 26 having a ratchet tooth *r* at its periphery normally engaged by a spring press pawl 28 pivotally mounted on a gear 27. The gear 27 is keyed on one end of a shaft 38, Fig. 7, while the disc 26 is mounted for free rotation on this shaft so that rotation of this disc and pinion 25 as effected by the manual operation of gear sector 24 in its movement from stop 29 to stop 40^b is effective to impart a complete turn to pinion 25 and disc 26 for reengaging the ratchet tooth *r* of this disc with the pawl 28 while tensioning the motor spring 21.

The return movement of gear sector 24 from stop 40^b to stop 29 under tension of motor spring 21 and the consequent operation of gear 27 now operatively connected to disc 26 by pawl 28 is effective to rotate the shaft 38 and the right-angle helical gear 39 meshing with a similar gear 31 mounted for free rotation on the vertical shaft 18.

As shown in Fig. 9, the hub of gear 31 is provided with a notched collar 32 and a lug 33, the latter engaging a notch 34 in the hub of an escape wheel shown in Figs. 4, 5, 7, 8 and 9 keyed on shaft 18, the notch 34 being of such a width as to permit an angular movement of gear 31 relative to the escape wheel 35, while a helical spring 36 having one of its ends hooked to collar 32 and its other end in a hole drilled in the disc portion of hub 37 operatively connects the gear

31 to the escape wheel 35 for operation of the shaft 18 and a plurality of code discs 56 mounted thereon step-by-step in a manner which will be hereinafter described in detail.

The turning movement of shaft 38 is imparted to a shaft 39 and an anchor wheel 41 carried thereby through the engagement of gear 27 with a pinion 40, Figs. 4, 5, 6 and 7. The anchor wheel 41 controls the rotation of escape wheel 35 and thereby that of shaft 18 and code discs 56 as effected under the tension of spring 36, the speed ratio of gear 27 and pinion 40 being of the order of 6:1 while the anchor wheel 41 is formed by the staggered relation of two ten-teeth discs Z and Z1 which correspond to a complete turn of escape wheel 35 and that of the shaft 18 for each return operation of gear sector 24, the escape wheel 35 being, of course, provided with sixty teeth of a diametral pitch equal to the space relation of the discs Z and Z1 forming the anchor wheel 41 so as to correspond to the number of teeth of the anchor wheel times its number of turns or $6\times20=120$, the sum of positions of the digit portions, the interdigit portions and the neutral portion into which the code elements 56 are divided.

The movement of shaft 39 is imparted to a spindle 42 in the direction indicated by the arrow in Figs. 6 and 7 by a gear 40—Y keyed on shaft 39 and meshing with a pinion 40—X keyed on the spindle. Rotation of spindle 42 is imparted to a shaft 45 best seen in Figs. 6 and 13 through coupling members 49 and 49—X engaging each other so as to permit the longitudinal movement of shaft 45 for a purpose and in a manner which will be hereinafter described in detail. On shaft 45 is keyed a duplex clutch member 46 provided for actuating a pulsing and shunting cam unit 43—44 and a cam and ratchet wheel unit 47—48 as the case may be upon the longitudinal movement of shaft 45, while the spindle 42 serves for rotating the weights 51 of a centrifugal speed governor CG provided for controlling the pulsing rate of the transmitter mechanism as effected by the rotation of pulsing and shunting cam unit 43—44 and that of their cooperating code discs 56 carried by shaft 18.

The shaft 45 as shown in Fig. 13 is journaled at one end in a bushing 52 secured to a U-shaped bracket 53 which is in turn secured on support 19 by a plurality of screws 54, while the other end of shaft 45 is journaled in a bushing 55 secured to support 19, this shaft being as above described movable longitudinally in bushings 52 and 55 for engaging the duplex clutch member 46 with a clutch element 77 of cam and ratchet wheel unit 47—48 and a clutch element 86 of pulsing and shunting cam unit 43—44 as the case may be under control of code discs 56 and the automatic operation of a detent mechanism which will be hereinafter described in detail, the cam and ratchet wheel unit 47—48 being held against the collar of bushing 52 by a spring SP engaging V-shaped recesses at the end of the hub of this unit for holding the latter in normal starting position following each disengagement of clutch 46 therefrom.

Shaft 18 carries a cast mounting preferably formed of a low specific gravity material such as aluminum or phenol plastic material having a plurality of spacer members SM between which the code discs 56 are inserted as shown in Figs. 5, 6, 19 and 16, the spacer members SM being formed integrally with a common torque bar 57 while springs as 58 shown in Fig. 16 are provided for yieldably retaining the discs 56 on the mounting and in centered relation to the shaft 18.

A shaft 62 shown in Figs. 9 and 13 is journaled in a lug 60 formed with bracket 53 and in a lug 61 formed with inverted U-shaped support 19 and on this shaft is securely mounted a yoke 63 and on shaft 62 and on the vertically disposed bar of yoke 63 is mounted for sliding movement thereon a wiper member 64 adapted to be moved in engageable relation with any one of the code discs 56 by the turning movement of a knob 65.

This knob is secured at the end of a spindle portion formed with a pinion 66 operatively engaging a gear rack 67 best seen in Figs. 5, 7, 9 and 12 slidably mounted in a guiding member 68 in turn secured in a vertical position on the inverted U-shaped support 19 by screws 69 and 70. Gear rack 67 is provided with an arm 71 having a slot at its free end for engaging a handle portion 92 formed with wiper 64 for moving the latter in its selective movement on the code discs 56, while wiper 64 as shown in Fig. 5 is provided with a slot into which the vertically disposed bar portion of yoke 63 engages so as to impart rotation to shaft 62 as controlled by the differences in the radius of the neutral portion N, the interdigit portions Y1, Y2, Y3 and the pulsing portions DP1, DP2, DP3, etc., of one of the code discs 56 which may be selected, such portions corresponding to the neutral position of duplex clutch element 46 and its engaged positions relative to clutch elements 77 and 86 respectively.

Wiper 64 is normally yieldably held in operative relation on the periphery of the code disc 56 which may have been selected by the tension of a spring 72 shown in Figs. 5, 6 and 9 having one end hooked to the top of U-shaped frame 19 and its other end to the top disposed arm of yoke 63. To the lower disposed arm of yoke 63 and in centered relation to vertical shaft 62 is secured as by screws SC an angle-shaped lever AL while a lever member 73 is pivoted on this shaft adjacent the angle lever member 73 with which it is operatively connected by a spring 78 forming part of the detent mechanism above mentioned. The other arm of the angle lever AL is bent downwardly and carries a roller 76 for engaging the cam 47 serving for imparting a small angular movement to this lever and thereby to the yoke 63 for successively moving the wiper 64 out from the interdigit spaces Y1, Y2, Y3, Y4, Y5, Y6 and Y7 of the selected code disc 56 and thereby successively positioning it onto the pulsing portions DP1, DP2, DP3, DP4, DP5, DP6 and DP7, for example, as per the formation of code disc 56 shown in Figs. 5 and 16 while each time tensioning the springs 72 and 78 due to a stop afforded by an L-shaped lever 82 having its short arm portion abutting against the end of shaft 45 and its other portion resting against the periphery of ratchet-shaped wheel 48.

Lever 73, which is mounted for pivotal movement on shaft 62 is provided with a pin 79 extending from both sides thereof as shown in Figs. 7, 9 and 13 for engaging a collar 80 formed at the periphery of clutch element 49 keyed on shaft 45 while the other end of this pin due to the normal tension of spring 78 abuts against the arm 75 of the angle lever AL.

With the wiper 64 resting on the neutral portion N of any one of the code discs 56 the duplex clutch element 46 as above mentioned is disengaged from clutch elements 77 and 86 and there-

fore in position ineffective relative to pulsing and shunting cam units 43—44 and cam and ratchet-shaped wheel unit 47—48. The rotation of code discs 56, however, an angular distance where the wiper 64 is caused to automatically drop from the neutral portion of such disc into the interdigit space Y1, for example, shown in Figs. 5 and 16, under the normal tension of spring 72, the arm 75 of the angle lever AL is effective to move the arm 73 for imparting a longitudinal movement to the shaft 45 for engaging the duplex clutch element 46 with the clutch element 77 for rotating the cam and ratchet-shaped wheel unit 47—48 an angular distance of 180 degrees which according to the gear ratio above mentioned corresponds to the angular distance of each interdigit portion Y1 of the code discs 56. The pivotal movement of yoke 63, that of wiper 64 and of the angle lever AL, under the tension of spring 72, position the roller 76 against the effective surface of cam 77 whereby the turning movement of this cam is effective to impart a pivotal movement to yoke 63 for progressively moving the wiper 64 out from the interdigit space Y1 while tensioning the springs 72 and 78 due, as above mentioned, to the short arm of L-shaped lever 82 abutting against the end of shaft 45 while the other arm of this lever rides on the periphery of ratchet-shaped wheel 48 so as to prevent the pivotal movement of L-shaped lever 82 and the consequent longitudinal movement of shaft 45 during the tensioning of spring 78, lever 82 as shown in Figs. 5, 6, 7, 9, 12 and 13, being mounted on a pivot 83 in turn supported by lugs 84 and 85 formed on the frame 19.

Upon the completion of the half turn of cam and ratchet-shaped wheel unit 47—48, one of the recesses S or S2, as the case may be, permits the pivotal movement of L-shaped lever 82 and thereby the longitudinal, automatic movement of shaft 45 under the tension of spring 78 for disengaging the clutch element 46 from clutch 77 and simultaneously reengaging it with clutch 86 of the pulsing and shunting cam unit 43—44, thus rotating this unit for actuating the pulsing and shunting contacts 80—81 a number of times corresponding to the angular distance of the digit defining portion, as for example, DP1 of code disc 56 when the wiper 64 again falls automatically into the suceeeding interdigit portion as Y2 under the tension of spring 72 to disengage clutch 46 from clutch 86 and reengaging clutch 46 with clutch 77 to repeat the operation above described in connection with interdigit Y1 to a point wherein the wiper 64 falls on the neutral portion N of disc 56 thus positioning the clutch element 46 ineffective relative to clutch elements 77 and 86.

On hub 82^{Y} of wiper 64 and adjacent thereto is mounted an index member 83^{Y} which is positioned selectively in registry with the names of subscribers appearing on cards as CD and CD1 while positioning the wiper 64 relative to any one of the desired code discs 56, these cards being removable individually from the frames F and F1 best seen in Figs. 4 and 5 in turn secured to lugs such as 95^{Y} and 96^{Y} formed with the inverted U-shaped frame 19.

As shown in Fig. 15 the pulsing wheel 80 may be replaced by a gear 150 rotating a pinion 151 mounted for movement as a unit with a two-lobe cam 152 provided for opening the normally closed contacts 153 and 154, the speed ratios of gear 150 and pinion 151 being of the order of 1 to 5 for operating the pulsing cam 152 five turns for each zero digit portion which may be formed on any one of the code elements.

A pin 90 shown in Fig. 9 carried by the code discs mounting adjacent the lowermost disposed spacer SM is provided for controlling the operation of a spring-press lever member 91 shown in Figs. 7, 9 and 12. This lever is pivoted on a bracket 97 secured to the upright disposed side portion of U-shaped frame 19 as by a number of screws 110 and has one of its ends disposed in engageable relation with the teeth of pinion 66 for preventing the turning movement of knob 65 and thereby the selective movement of wiper 64 during a code signaling operation of the transmitter.

The wiper 64 is formed with a curved arm or handle 92 shown in Figs. 5 and 6 serving for manually imparting a pivotal movement to yoke 63 and to the wiper 64 mounted thereon for disengaging any one of the code discs 56 from its retaining spring 58 for replacement by a code disc bearing a different telephone call designation, the manual movement of yoke 63 and wiper 64 being limited by a stop afforded by a lug 93 formed with arm 92 in cooperation with a stop 94 formed with the frame 19.

The casing 15 which houses the transmitter mechanism is provided with a bracket 95^{Y} secured thereto by a plurality of screws 96^{Y} shown in Figs. 4, 10 and 11 and on this bracket is pivotally mounted as on shoulder screw 98, a plate 97 having lugs 101 for operatively connecting it to the plungers 102 and 103 while the plate 97 is provided with a downward extending lug 104 having an insulating stud 105 for engaging the so-called switchhook springs SHS mounted in a pile-up arrangement on the downward extending arm DX of bracket 95^{Y}, the plungers 102 and 103 being held in their upward unoperated positions as shown in Figs. 4 and 11 by the normal tension of spring SHS, which are in turn operated upon the placing of the handset HS in the cradle portion of casing 15 as formed by the projections P1, P2, P3 and P4.

The casing 15 is provided with a door DR shown in Figs. 1 and 2 provided to permit the removal of any one of the code discs 56 from their mounting frame without removing the casing from the base 10 and thereby avoiding the uncovering of the transmitter mechanism, the door being held in the closed position by a lock LK.

Casing 15 is provided at its front end portion with an opening for receiving a plate PL held securely thereon by a number of screws SC4, plate PL serving for mounting the keys K1, K2, K3, K4, K5, K6, K7, K8, K9 and K0 representing digits 1 to 0, inclusive, of a call transmitter which may be used for transmitting telephone call designations not included in the repertory transmitting mechanism.

In a typical example of operation supposing that it is desired to establish a talking connection with the subscriber having the telephone call designation 2422566, for example, as represented by the code disc 56 shown in Figs. 5 and 16. The turning movement of knob 65 is effective to operate the gear rack 67 for moving the index 83 in registry with the subscriber's name appearing on one of the cards CD and CD1 as the case may be, and simultaneously position the wiper 64 in operative relation with the code disc formed to represent the call designation 2422566, i. e., the code disc corresponding to the subscriber's name selected. With the wiper 64 resting on the neutral portion N of the code disc as shown in

Fig. 5, the clutch element 46 is positioned out of engaged relation from clutch 86 of pulsing and shunting cam unit 43—44 and from clutch 77 of the cam and ratchet-shaped wheel unit 47—48. Under this condition the operation of handle lever 22 is effective to move the gear sector 24 from stop 29 to stop 40b while tensioning the motor spring 21, the operation of gear sector 24 being effective to impart a complete turn to pinion 25 and disc 26 secured thereto for reengaging its ratchet tooth r with the spring pressed pawl 28.

The return movement of gear sector 24 under the tension of spring 21 is effective to rotate the disc 26 and the gear 27 operatively connected thereto by pawl 28 one turn. The movement of gear 27 through its supporting shaft 38 is effective to rotate the angle gears 30 and 31 for tensioning the spring 36, while the operation of gear 27 is imparted to the anchor wheel 41 through the pinion 40 both keyed on shaft 39.

The movement of shaft 39 in turn is imparted to a spindle 42 actuating the speed governor CG through a gear 40—Y mounted for movement as a unit with pinion 40 and a pinion 40—X while the rotation of spindle 42 is imparted to shaft 45 through the coupling elements 49 and 49—X, these elements being so formed as to permit longitudinal movement of shaft 45 for engaging the duplex clutch element 46 with clutch elements 77 and 86 depending upon the position of wiper 64 relative to the digit and interdigit portions of the code disc selected as will be hereinafter described in detail.

The rotation of gear 31 in the direction indicated by the arrow in Figs. 7 and 9 is effective to tension spring 36 while the escape wheel 35 and code discs 56 are retained from movement by the anchor wheel 41. Upon a small angular movement of this wheel, however, the escape wheel 35 is released to permit its turning movement and that of code discs 56 an angular distance equal to 1:120 determined as above mentioned by the space relation of the notched disc Z and Z1 of anchor wheel 41, the pitch and the number of teeth in wheel 35. The step-by-step movement of code disc 56 as above mentioned to a point wherein the wiper 64 is permitted to fall into the interdigit space Y1 of the selected code disc under the normal tension of spring 72 causes the pivotal movement of yoke 63 and thereby that of the angle lever AL secured thereto, the arm 75 of this lever engaging the pin 79 for imparting a longitudinal movement to shaft 45 so as to engage the clutch element 46 with clutch element 77 of cam and ratchet-shaped wheel unit 47—48 for rotating such a unit and positions the roller 76 of angle lever AL wherein the operation of cam 47 imparts a pivotal movement to yoke 63 so as to tension the springs 72 and 78 while withdrawing the wiper from the interdigit spaces Y1 above mentioned which equals five steps of escape wheel 35 or half a turn of cam 47, this cam being so shaped that the wiper 64 is raised to the pulsing portion DP1 of the code disc following the five steps of the interdigit portion Y1.

The ratchet-shaped wheel 48 is set relative to cam 47 so as to impart a pivotal movement to L-shaped lever 82 immediately following the fall of wiper 64 into the interdigit portion Y1, Y2, Y3, etc. so as to prevent the longitudinal movement of shaft 45 and the consequent disengagement of clutch 46 from clutch element 77 during the tension of springs 78 and 72 as effected by movement of angle lever AL under control of cam 47 prior to the completion of the five steps included in the interdigit portion Y1 of the code disc.

Upon the completion of the half turns of ratchet-shaped wheel 48 one of the notches S—S2 of this cam, as the case may be, permits the pivotal movement of L-shaped lever 82 and thereby the longitudinal movement of shaft 45 by spring 78 for disengaging the duplex clutch 46 from clutch 77 and simultaneously reengaging the clutch element 46 with clutch 86 of the shunting and pulsing cam units 43 and 44 but the wiper 64 now rides on the digit portion DP1 above mentioned under the tension of spring 72 while the pulsing and shunting cam units 43 and 44 are rotated through the rotation of clutch element 46 operatively connected thereto for sending a number of pulses corresponding to the angular distance of the pulsing portion DP1, i. e., two pulses or digit 2, the first number of the call designation 2422566 above mentioned.

Upon the passing of the digit portion DP1 out of contact from wiper 64, this wiper is again caused to fall into the interdigit space Y2 and this operation is continued until the last digit portion DP7 or digit 6, the last digit of the call designation, has passed under the wiper 64 where this wiper now falls onto the neutral portion N of the disc so as to position the clutch element 46 ineffective relative to clutches 77 and 86 during the continued operation of code disc 56 to normal position when the pin 90 carried by disc mounting SM engages the lever 91 for moving it out of engaged relation from the pinion 66 as to permit the selective operation of the code discs 56 in the manner above mentioned and the transmitter is now ready for a subsequent call transmitting operation.

Supposing now that it is desired to change one of the code discs 56 for another code disc bearing a different telephone call designation, the rotation of knob 65 is effective to move the index 83Y in registry with the name of the subscriber indicating the position of the code disc bearing the telephone designation it is desired to replace. The door DR hinged on the casing 15 may then be opened so as to give access to the arm 92 formed with wiper 64 for pivoting it to a point limited by stops 93 and 94 and thereby disengaging the code disc from its retaining spring 58.

The contact and shunting springs 80 and 81 are provided with terminal portions as 110 and 111, respectively, for connections in the bank 14 on base 10 also connecting with the switchhook spring SHS, while telephone call designations not appearing on the cards CD and CD1 may be transmitted by the operation of the key controlled transmitter mechanism having an independent motor or operatively connected to the motor of the repertory call transmitting device of this invention.

What is claimed is:

1. In a call transmitter, a motor, an escapement device operatively connected to said motor, a code element movable step-by-step by the operation of said escapement device, a contact, a pulsing cam for actuating said contact, a clutching mechanism controlled by the operation of said element for operating said cam, and a speed governor geared to said motor for controlling the operation of said escapement device.

2. In a call transmitter, a motor, a code element, an escapement device actuated by said motor for actuating said element step-by-step, a contact, a pulsing cam, and a clutch actuated under control of said element for operatively con-

necting said pulsing cam to said motor for actuating said contact.

3. In a call transmitter, a motor, a code element, a spring tensioned by the operation of said motor, an escapement mechanism for actuating said code element step-by-step under the tension of said spring, a contact, a normally stationary cam disposed in operative relation with said contact, and a clutching mechanism controlled by said element to cause the unidirectional intermittent rotating movement of said cam for operating said contact.

4. In a call transmitter, a motor, a code element, an escapement device, a spring operatively connecting said element to said device, a gearing mechanism actuated by said motor for tensioning said spring, a pulsing cam, a pulsing contact, clutching means, and a detent mechanism operated by the conjoint operations of said motor and said element for actuating said clutching means for rotating said cam in a series of intermittent rotary movements to cause the operation of said contact.

5. In a call transmitter, a shaft, a gearing mechanism, a code element and an escapement wheel carried by said shaft, a spring operatively connecting said shaft to said mechanism, a second shaft actuated by said mechanism, an anchor wheel carried by said second shaft for controlling the operation of said escapement wheel, a third shaft having a clutch element rotated by said gearing mechanism, a normally stationary cam having a clutch element, a contact disposed in operable relation to said cam, and means controlled by said code element for engaging the first and second-mentioned clutch elements for successively actuating the contact.

6. In a call transmitter, a motor, a contact, a pulsing cam disposed in operative relation to said contact, a code element, a supporting shaft for said element, an escapement device having yieldable means tensioned by the movement of said motor for actuating said shaft intermittently, and means controlled by the operation of said code element for imparting intermittent series of rotation to said cam for actuating said contact.

7. In a call transmitter, a motor, a gearing mechanism actuated by said motor, a normally stationary cam, a normally ineffective clutch mechanism operatively connecting said cam to said gear mechanism, a contact actuated by said cam, a code element, a supporting shaft for said element, an escape wheel carried by said shaft, an anchor wheel actuated by said gear mechanism for controlling the operation of said escape wheel, resilient means tensioned by the movement of said gear mechanism for actuating said escape wheel upon the operation of said anchor wheel, a wiper controlled by the operation of said element, and means operated by the movement of said wiper for rendering said clutch mechanism effective relative to said cam for actuating said contact.

8. In a call transmitter, a base, a frame mounted on said base, a motor mechanism supported by said frame, a shaft journaled on said base and said frame, a plurality of code elements and an escape wheel carried by said shaft, a gear wheel mounted for rotation on said shaft, a spring operatively connecting said escape wheel to said gear, a shaft actuated by said motor, having a gear engaging the first-mentioned gear wheel for tensioning said spring, an anchor wheel actuated by said motor for controlling the operation of said escape wheel for actuating said code elements step-by-step, a wiper member, manually operable means for moving said member in operative relation with said elements selectively, a pointer actuated by said manually operable means, a dial mounted on said frame having reference marks indicating the position of the selected element, a normally stationary pulsing cam, a contact disposed in engageable relation with said pulsing cam, and a clutching mechanism controlled by the operation of the selected code element for actuating said cam intermittently for sending a number of pulses corresponding to the selected code element as indicated by the position of said pointer on said dial.

9. In a call transmitter, a shaft, a disc carried by said shaft having series of teeth and notches representing a code, a motor for actuating said shaft, a wiper operatively associated with said code disc, a contact, a pulsing cam for actuating said contact having a clutch element, a cam and ratchet-shaped wheel unit having a clutch element, a rotary and longitudinally movable shaft rotated by said motor and having a duplex clutch element normally ineffective relative to the first and second-mentioned clutch elements, automatic operable means for moving said wiper from one of said teeth into one of said notches for imparting a longitudinal movement to said longitudinally movable shaft for engaging the duplex clutch member with the clutch carried by said cam and ratchet-shaped wheel unit for rotating it, means actuated by the rotation of said unit for withdrawing said wiper from the notch of said disc, spring means tensioned by the operations of said unit, and detent means normally holding said duplex clutch element in engaged relation with the clutch of said unit during the tensioning of said spring, said ratchet-shaped wheel operating said detent means to cause the engagement of said duplex clutch member with the clutch element carried by said pulsing cam for actuating said contact.

10. In a call transmitter, a mounting frame, a motor, a code disc, a supporting shaft for said disc, a second shaft pivoted on said mounting frame in parallel relation to the first-mentioned shaft, a yoke secured to said second shaft, a wiper mounted on said second shaft having means for engaging said yoke for movement as a unit relative to said code disc, a gearing mechanism operatively connecting said motor to the first shaft for rotating said disc, a governor mechanism, a spindle operatively connected to said gear mechanism for actuating said governor for controlling the operation of said motor, said spindle having a coupling element, a longitudinal and rotatable shaft disposed in coaxial relation to said spindle and having a coupling element engaging the first-mentioned coupling element, a normally stationary pulsing cam having a clutch element, a cam and ratchet-shaped wheel unit having a clutch element, a normally ineffective duplex clutch element caried by said longitudinal and rotatable shaft, spring means for holding said wiper in operable relation with said code disc, automatically operable means controlled by the conjoint operation of said wiper on said code disc and said unit for imparting longitudinal movement to the last-mentioned shaft for successively engaging the duplex clutch element with the clutch of said pulsing cam to cause the operation of said contact.

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