

Dec. 19, 1939.

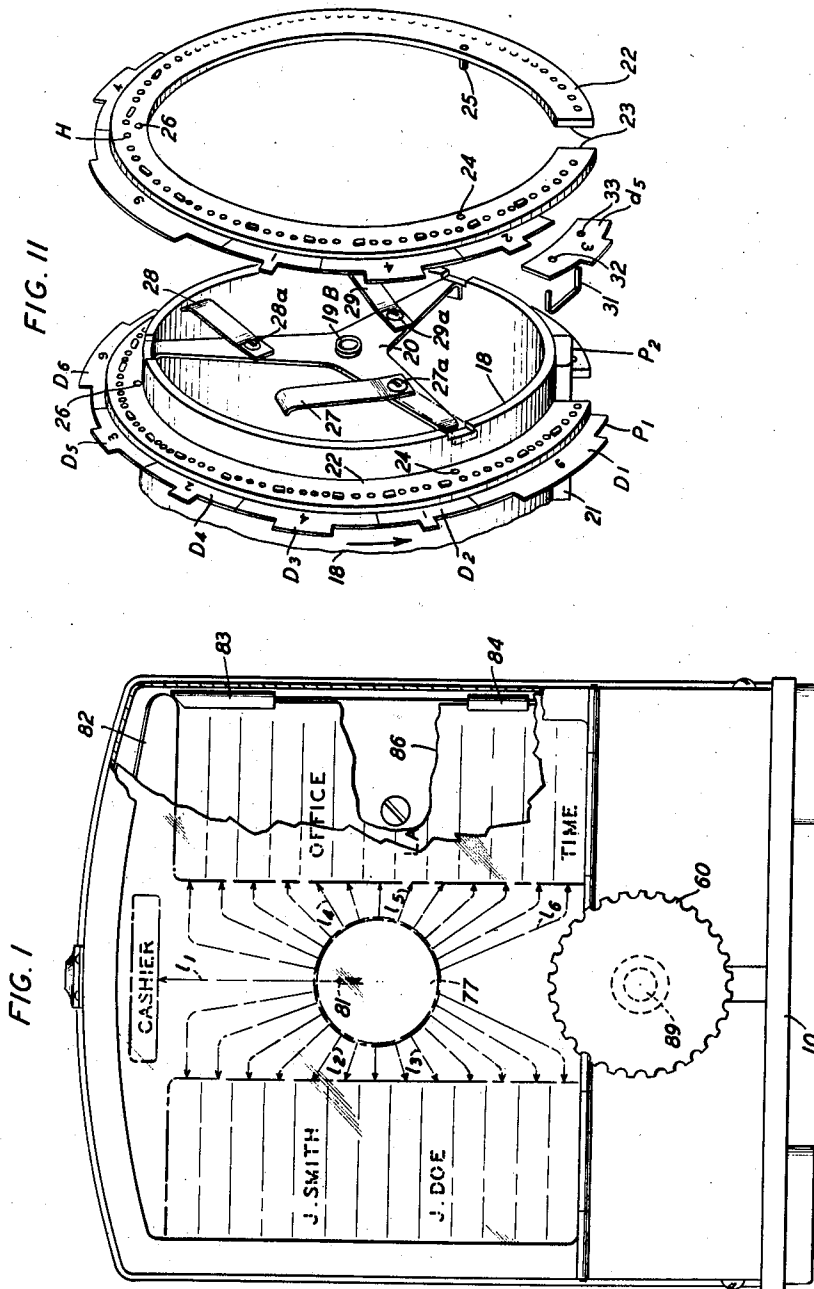
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2,183,713

CALL TRANSMITTER

Filed June 28, 1938

5 Sheets-Sheet 1



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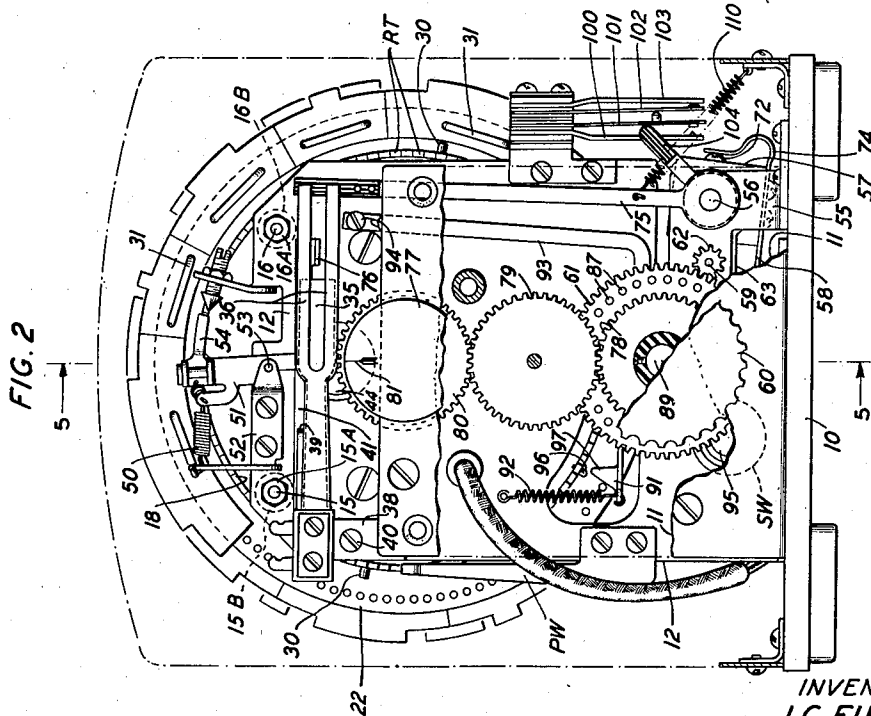
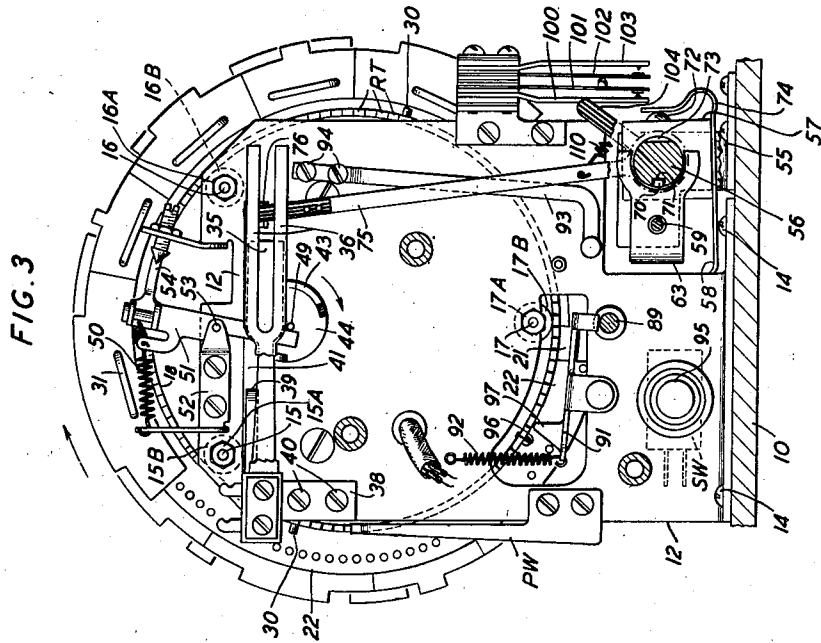
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5 Sheets-Sheet 3

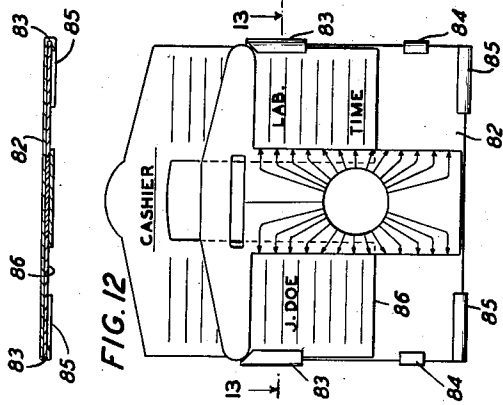


FIG. 12

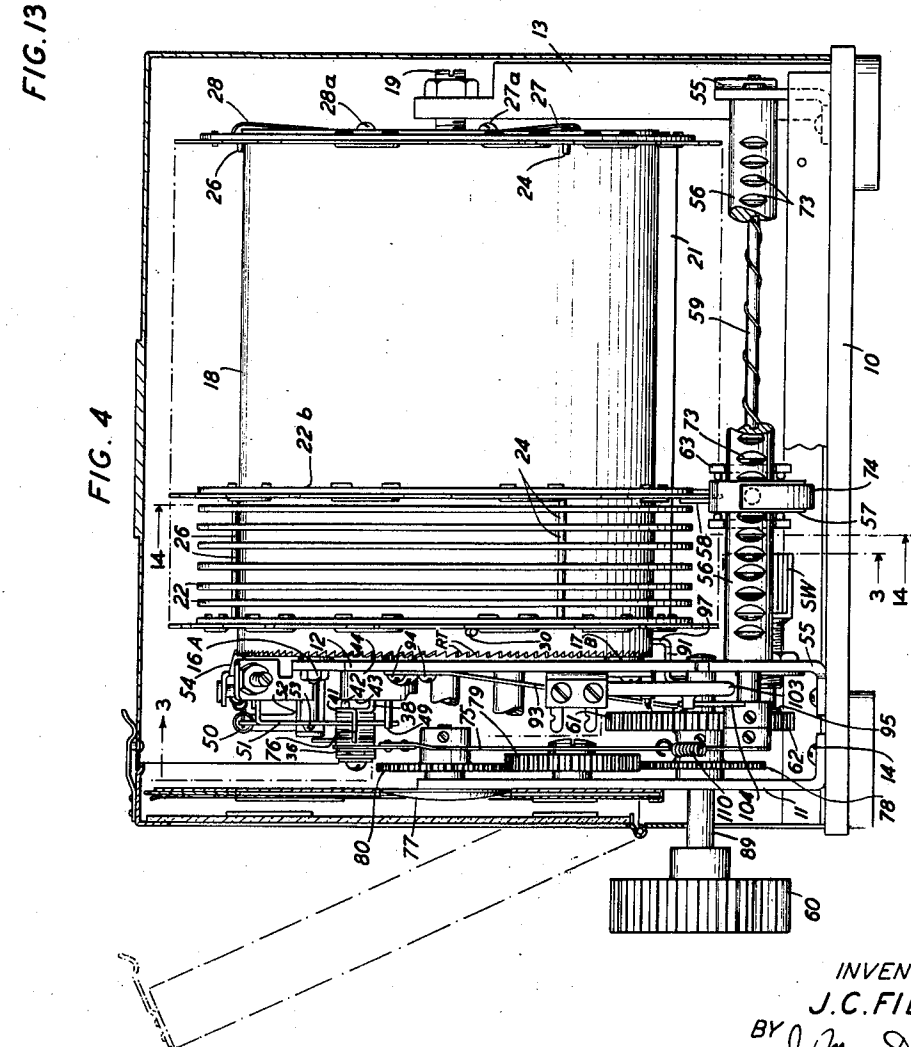


FIG. 13

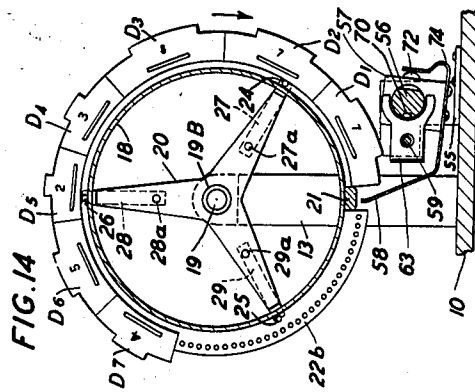


FIG. 14

FIG. 4

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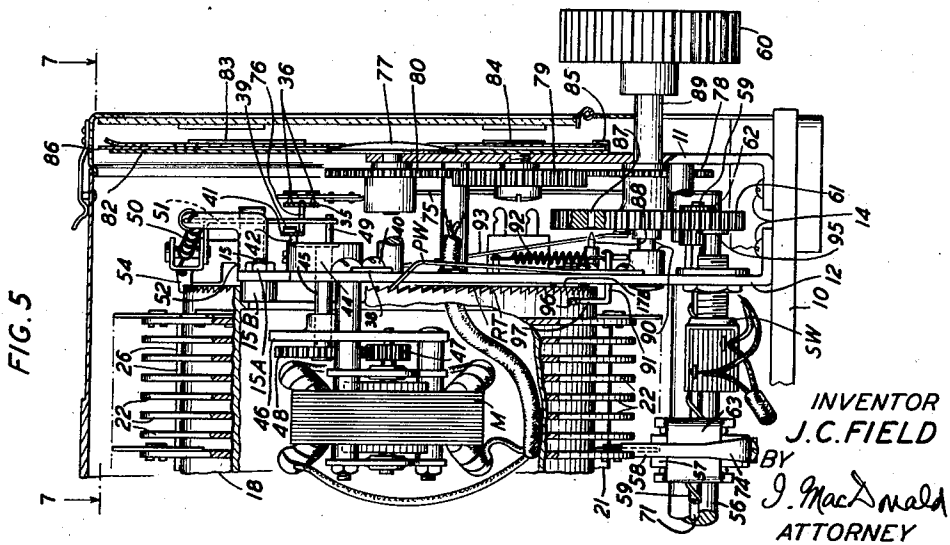
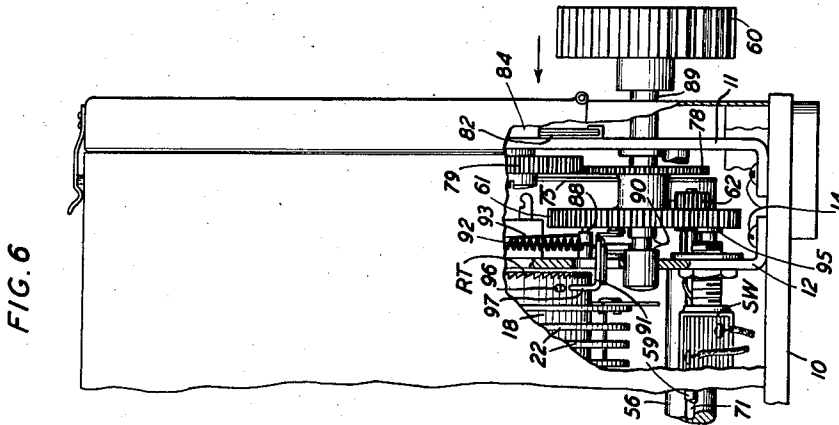
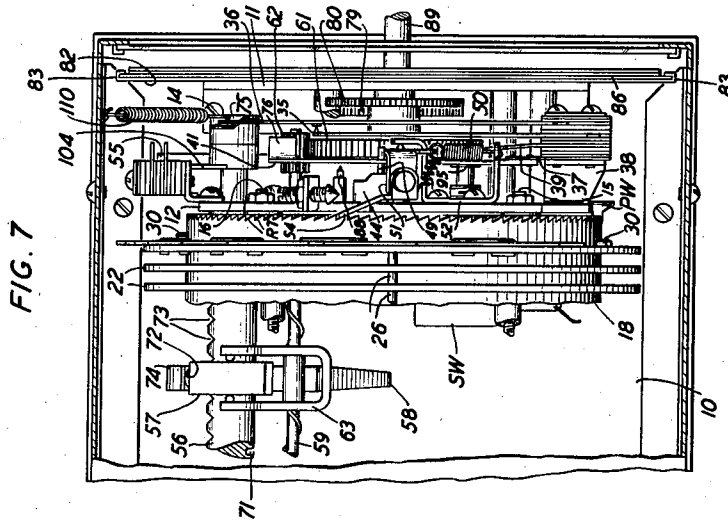
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CALL TRANSMITTER

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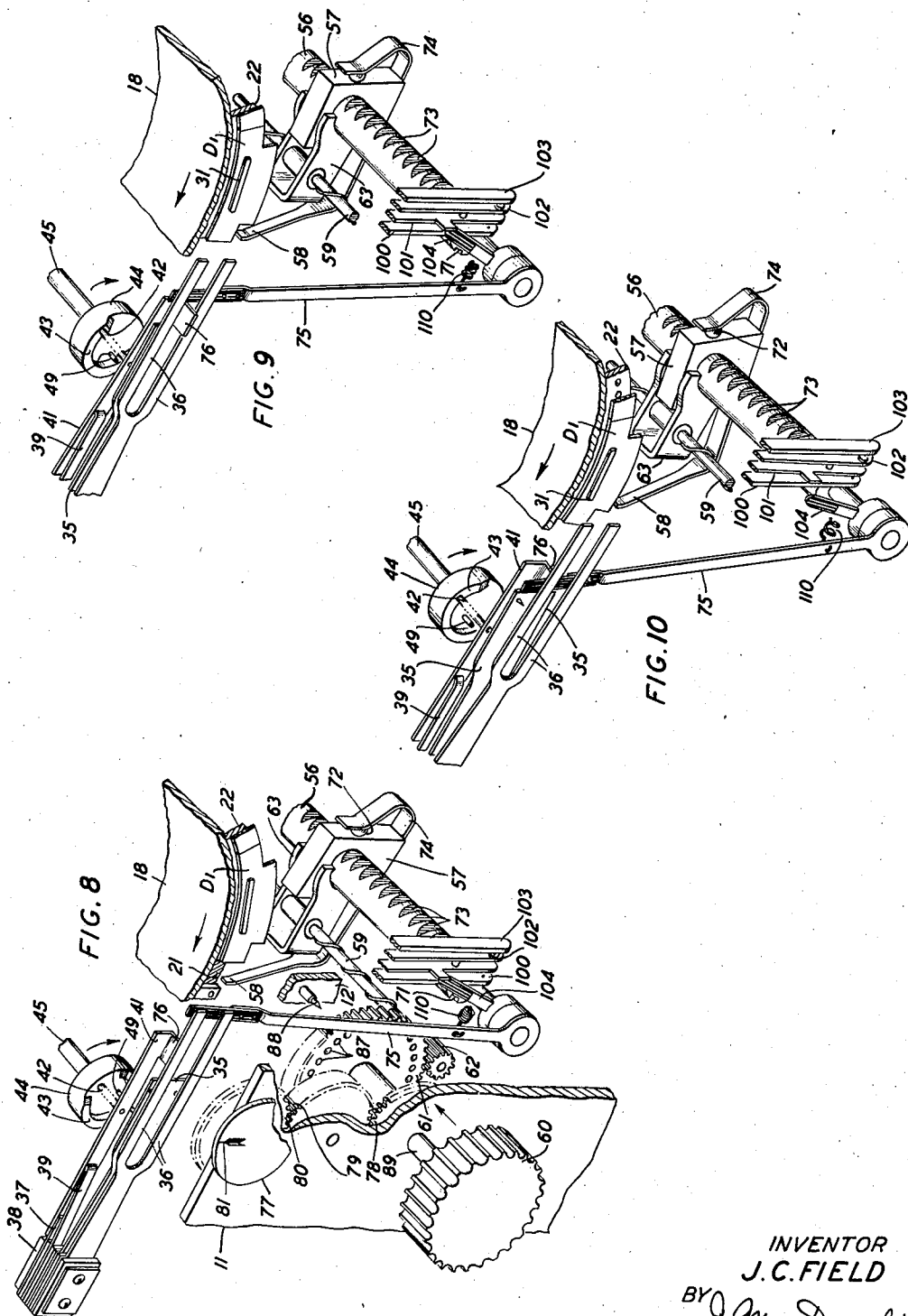
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CALL TRANSMITTER

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UNITED STATES PATENT OFFICE

2,183,713

CALL TRANSMITTER

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Application June 28, 1938, Serial No. 216,224

6 Claims. (Cl. 179-90)

This invention relates to telephone call transmitter devices of the repertory type.

The object of the invention is to improve the construction and operation of such devices.

According to the invention, a call transmitter device of the repertory type is provided in which the manual operation of a knob is effective to move a pointer in registry with a desired subscriber's name printed on a name-plate, and to rotate a lead screw for moving a wiper in operative relation with one of a number of code elements representing the call designation of the desired subscriber as indicated by the pointer, the code elements being formed by mounting segment-shaped cams on rings which are in turn keyed on a rotatable drum-shaped support.

Means in the form of a ratchet mechanism is provided for operatively connecting such a support to a motor housed in the drum-shaped support, such means having a camming element for actuating an arm which cooperates with a lever under control of the selected code element for causing the operation of a pulsing contact in a hit-and-miss operating manner for transmitting a number of pulses corresponding to the call designation selected by the movement of the knob and indicated by the pointer. Means is provided for automatically centering the wiper in operative relation with the selected code element with means for locking the knob and the wiper actuated thereby in the selected position during the pulsing operation of the transmitter, and automatically operable means is provided for unlocking the knob and stopping the operation of the motor at the conclusion of each call transmitting operation.

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

Fig. 1 is a front elevation view;

Fig. 2 is a front assembly view shown with the casing removed and a number of operating parts in section;

Fig. 3 is a cross-sectional view taken on line 3-3 of Fig. 4;

Fig. 4 is a side elevation view showing the casing in section and a number of parts with portions cut away;

Fig. 5 is a partial view showing the code elements, their support and a number of operating parts with portions cut away;

Fig. 6 is a partial view showing the locking mechanism for the knob actuating the selecting

mechanism and the switch for the control of the motor in the locked position;

Fig. 7 is a partial top view shown with the casing in section taken on line 7-7 of Fig. 5;

Fig. 8 is an enlarged view showing the pulsing and the selecting mechanism in perspective;

Figs. 9 and 10 are partial views of the pulsing mechanism showing the contact controlling mechanism in the non-operated and operated position, respectively;

Fig. 11 is an enlarged perspective view showing the clamping arrangement used for securing the code elements in alignment on their supporting drum;

Fig. 12 is a front view of the name-plate and its support;

Fig. 13 is a cross-sectional view taken on line 13-13 of Fig. 12; and

Fig. 14 is a cross-sectional view taken on line 14-14 of Fig. 4.

As shown in the drawings 10 is a base which is formed with an upright support 13 shown in Fig. 4 and on this base are secured as by screws 14, the upright extending mounting plates or flanges 11 and 12. On plate 12 are mounted the studs 15, 16 and 17 shown in Figs. 2, 3 and 5. These studs are held securely on this plate by nuts 15A, 16A and 17A and on these studs are mounted the rollers 15B, 16B and 17B provided for rotatably supporting one end of a drum 18, the other end of this drum being supported by a spindle 19 laterally extending from upright 13 and engaging the bearing 19B carried by a spider-shaped member 20, the arms of which are secured to the end of drum 18 as by rivets or in any other well-known manner.

On drum 18 is mounted a plurality of rings 22 split radially as at 23, Fig. 11, for engaging a key member 21 secured to the drum 18. This key member serves for positioning the rings 22 in aligned position on this drum and each ring 22 is provided with three triangularly disposed pins 24, 25 and 26 extending laterally from one side thereof to serve for holding these rings in spaced relation to each other on the drum 18, the ends of the pins 24, 25 and 26 of one ring abutting against the opposite side of its adjacently disposed ring as shown in Figs. 4, 5 and 7. Rings 22 are held collectively on the drum 18 between retaining radial pins 30 carried by the drum as shown in Figs. 2, 3, 4 and 7 and a plurality of spring arms 27, 28 and 29 carried by the spider-shaped member 20. These arms are pivoted on screws 27a, 28a, and 29a and may be moved from the position shown in Fig. 11 to the position

shown in Figs. 4 and 14 where they may be forced against the ring 22 disposed at this end of the drum by tightening their fastening screws 21a, 28a and 29a. These arms, however, in the position shown in Fig. 11 permit the removal of rings 22 from the drum 18 for replacement by other rings bearing other telephone call designations. The rings 22 are each provided with a row of equally spaced holes 14 any two of which register with holes 32 and 33 in segment-shaped cams as D1, D2, D3, D4, D5, D6 and D7. These cams are made of different angular distance representing the digits 1 to 9, inclusive, and a cipher, the latter meaning 10 as is well known in automatic telephone systems. Each segment-shaped cam may be secured on any one of the rings 22 by a clip member as 31 shown in Fig. 11 engaging the holes as 32 and 33 of such a segment and any two holes as 14 in one of the rings 22, after which the parallel projections of the clip are bent against the opposite side of the ring 22.

The segment-shaped cams D1, D2, D3, etc., may be combined and assembled on any one of the rings 22 to represent any seven-digit telephone call designation desired and serve to control the operation of a pulsing contact in the form of a stationary spring 35 and a duplex operable spring 36 in a manner which will be hereinafter described in detail. The spaces between the cam portions of any two adjacently disposed segments, however, form the so-called interdigit spaces provided for permitting the selector switches at the telephone exchange to distinguish between the sets of pulses included in a given telephone call designation determined as above described by the angular distance or degrees of the arcs of cam portions D1, D2, D3, etc.

Springs 37 and 39 and the pulsing contact springs 35 and 36 are mounted in a pile-up arrangement on a bracket 38 shown in Figs. 2, 3, 7 and 8 in turn secured to the mounting plate 12 by a number of screws 40. On spring 37 is securely mounted a rigid arm 41 shown in enlarged view in Figs. 8, 9 and 10. This arm is provided with a laterally extending pin 42 bearing against a camming ridge 43 of a wheel 44 under the tension of spring 39, the rotating movement of cam wheel 44 in cooperation with spring 39 being effective to impart reciprocating movements to lever 41 for a purpose which will be hereinafter described in detail.

The wheel 44 is securely mounted on a shaft 45 journaled in the upright plate 12 and the plate 46 of a motor M shown in Fig. 5. Shaft 45 is operatively connected to the armature shaft of motor M by a gear reduction train including the pinion 47 and the gear 48 secured to the shaft 45. The wheel 44, in addition to its cam surface 43 is provided with a laterally extending crank pin 49 shown in Figs. 3, 4, 5, 8, and 10 cooperating with a retractile spring 50 for imparting reciprocating movements to a lever 51 best seen in Figs. 2 and 3, pivoted as at 53 on a bracket 52 secured on the upright supporting plate 12 and on the upper disposed end of lever 51 is mounted a pawl 54 disposed in engageable relation with the ratchet teeth RT formed at the front edge of drum 18 for rotating it an angular distance of one tooth for each complete turn of wheel 44, the drum 18 being held in each advanced position by a check pawl PW shown in Figs. 2, 3, 5 and 7.

In the present construction, 108 ratchet teeth are provided at the front edge of the drum 18, thus requiring 108 turns of wheel 44 for each complete turn of this drum and the rings 22 car-

ried thereby, the angular distances of the digit defining portions of the segment-shaped cams D1, D2, D3, etc., are therefore equal to one, two, three, four, five, six, seven, eight, nine and ten teeth; and the angular distances at each side of such a digit defining portion are equal to three teeth RT as to form when in assembled relation on one of the rings 22 interdigit spaces equal to six teeth.

On plate 12 and on upright support 55 shown in Figs. 3 and 4 there is journaled a shaft 56 on which a carriage 57 is slidably mounted. This carriage is prevented from rotating movement relative to shaft 56 by a key 70 engaging a key way 71 and on the carriage 57 is securely mounted an arm or wiper 58 which may be moved in selected position relative to the code elements thus formed through the movement of a yoke member 63 as imparted by the operation of a lead screw 59. The operation of this lead screw is effected by a manually operable knob 60 securely mounted on a shaft 89 and rotating the gear 61, this gear engaging a pinion 62 secured on one end of lead screw 59 and the carriage is provided with a plunger 72 for engaging V-shaped grooves as 73 in shaft 56 under the tension of a spring 74 for centering and yieldably holding the wiper arm 58 in registry with the code element selected.

On one end of shaft 56 is securely mounted an arm 75 which is moved by the pivotal movement of shaft 56 against the resistance of a retractile spring 110 and under control of digit cams D1, D2, D3, etc., from the position shown in Fig. 9 to the position shown in Fig. 10 wherein it is engaged by the lug 76 of arm 41 for actuating the duplex contact spring 36 upon the movement of arm 41 effected as above mentioned by the rotation of cam wheel 44 so that the angular distance of digit cams D1, D2, D3, etc., on each ring 22 determines the number of operations of the duplex contact 36 and thereby the digits included in a given telephone call designation.

On upright extending plate 11 is rotatably mounted a dial 77 shown in Figs. 1, 2, 4, 5 and 8 operatively connected to the knob 60 by gears 78, 79 and 80, the dial 77 having a radial mark 81 which may be positioned in registry with lead lines as B1, B2, B3, B4, B5 and B6 printed on a plate 82 secured to the upright plate 11 and having pairs of inwardly turned edges 83-83, 84-84 and 85-85 serving as guide for a paper card or name-plate 86 on which subscribers' names are printed in position to correspond with lead lines B1, B2, B3, etc. and therefore with their respective code element 22 on the drum 12.

The gear 61 is provided with a circular row of holes 87 shown in Figs. 2, 5 and 8 provided for engaging a pin 88 upon a longitudinal movement of shaft 89 thereby locking the knob 60 and lead screw 59 actuated thereby in the selected position as indicated by the index mark 81 on dial 80 in registry with the lead line indicating the name of the subscriber desired which position coincides with the position of arm or wiper 58 now in operative relation with the code element 22 carrying the digit segments D1, D2, D3, etc., representing the telephone call designation of the subscriber selected.

The shaft 89 as shown in Figs. 5 and 6 is provided with an annular recess 90 which, when this shaft is moved longitudinally from the position shown in Fig. 5 to the position shown in Fig. 6, that is, when the gear 61 is moved in the locked position with pin 88, a latch lever 91 shown in Figs. 2, 3, 4, 5, 6 and 7 engages the collar 90

under the tension of a spring 92 for holding the gear 61 in the locked position with the pin 88 against the tension of a retractile spring 93 having its upper disposed end secured to the upright flange 12 by a number of screws 94 and bearing against the inner disposed side of gear 61.

On upright flange 12 as shown in Figs. 3, 4, 5, and 6 there is mounted a switching device SW provided for controlling the energization of motor M. This switch is provided with a plunger member 95, one end of which engages the inner disposed side of gear 61 under the tension of a spring, not shown, so that the longitudinal movement of shaft 89 and the movement of gear 61 carried thereby from the position shown in Fig. 5 to the position shown in Fig. 6 is effective to operate the plunger 95 for closing the switch SW and thereby starting the operation of the motor for actuating the drum 18 step by step through the operation of the pawl 54 actuated by cam wheel 44. The drum 18 as shown in Figs. 2, 3, 5 and 6 carries a pin 96 provided for imparting a pivotal movement to lever 91 through its engagement with lug 97 carried by this lever upon each complete turn of drum 18 for releasing the shaft 39 which is returned to normal non-operated position by the tension of spring 93 and simultaneously causing the opening of switch SW through the return movement of its operating plunger 95 to normal, thereby stopping the operation of motor M which is timed to occur when the key member 91 carried thereby is in registry with the free end of lever or wiper 58 on carriage 57. In that position the wiper 58 is moved an angular distance determined by the point P1 at the edge of the recess of digit segment D1 to the point P2 at the surface of key member 21 to cause the operation of contact springs 100, 101, 102 and 103 through the angular movement of a radially disposed arm 104 shown in Figs. 2 and 3 carried by the shaft 56, the contact springs 100, 101, 102, 103 being provided to perform switching functions which form no part of the present invention.

In a typical example of operation, supposing that it is desired to transmit the telephone call designation 7783254 as represented by the segment-shaped cams D1, D2, D3, D4, D5, D6 and D7 in assembled relation on the ring 22b shown in Figs. 4 and 14 clamped on the drum 18 by the spring arms 27, 28 and 29 as above described. With the drum 18 and the code elements thus formed in normal position, the operation of knob 60 is effective to rotate the lead screw 59 through gear 61 and pinion 62 for moving the wiper 58 in registry with code element 22b, the position of the wiper 58 being indicated by the position of index mark 81 printed on dial 77 which as above mentioned is actuated by the movement of knob 60 through gears 78, 79 and 80, such index being now in alignment with one of the lines as B1, B2, B3, etc., as the case may be, leading to the name of the subscriber printed on the card 86 and having the telephone designation 7783254 above mentioned.

Following the selective movement of wiper 58 by the turning operation of knob 60 a longitudinal movement is imparted to shaft 89 from the position shown in Fig. 5 to the position shown in Fig. 6 wherein the latch lever 91 is caused to automatically engage the collar 90 adjacent the end of shaft 89 for retaining it in such operated position against the tension of its retractile spring 93. The longitudinal move-

ment of shaft 89 causes the closure of switching device SW through the operation of its operating plunger member 95 in contact with the inwardly disposed face of gear 61. The longitudinal movement of shaft 89 and the consequent engagement of one of the holes of gear 61 with the pin 88 prevents rotation of knob 60 during the operation of motor M which was started upon the closing of the switch SW.

The operation of motor M is effective to rotate the shaft 45 and the camming wheel 44 carried thereby through pinion 47 and gear 48. The movement of this wheel and the crank pin 49 carried thereby is effective in cooperation with spring 50 best seen in Fig. 3 to impart reciprocating movements to lever 51 for intermittently rotating the drum 18 step by step in the direction indicated by the arrow in Figs. 8, 9, 10 and 14 through the engagement of pawl 54 carried by lever 51 with the ratchet teeth RT formed at the end of drum 18, the drum being held as above described in each advanced position by the pawl PW shown in Figs. 2, 3, 5 and 7.

The turning movement of camming wheel 44 through its ridge portion 43 is effective to impart movements to the arm 41, see Figs. 8, 9 and 10, which movements are timed to occur during the rest periods of drum 18, i. e., during the backward stroke of ratchet pawl 54. The operation of arm 41 is rendered ineffective relative to the movable duplex contact 36 due to the arm 75 being positioned out of the path of arm 41 owing to its controlling wiper 58 not being engaged by the cam portion of segment D1. Upon the step-by-step movement of drum 18 from its normal position as shown in Figs. 8 and 14 to the position shown in Fig. 9, and the consequent engagement of the inter-digit portion of segment D1 with the arm 53, this arm is moved downwardly imparting a small angular movement to the shaft 56 for closing the contact springs 100—101 and opening the contact springs 102—103. The continued movement of drum 18 from the position shown in Fig. 9 to the position shown in Fig. 10, when the wiper 58 engages the cam portion of segment D1, imparts another downward movement to wiper 58 and thereby a second turning movement to shaft 56 and the lever 75 carried thereby for positioning it now in the path of arm 41, thus causing the operation of the duplex pulsing contact 36 a number of times corresponding to the angular distance of cam D1, that is, seven pulses.

Upon the release of wiper 58 by the digit portion or cam D1 and the consequent pivotal movement of shaft 56 under the tension of retractile spring 110 the arm 75 is moved from the position shown in Fig. 10 back to the position shown in Fig. 9 wherein the operation of arm 41 is ineffective relative to movable contact 36, the total interdigit space being, as above mentioned, equal to an angular distance of six ratchet teeth RT of the drum 18.

The above-described operation is repeated for each of the other segments D2, D3, D4, etc. Upon a complete turn of drum 18 the pin 96 shown in Figs. 3, 5 and 6 engages the camming portion 97 of lever 91 for pivoting this lever and thereby releasing shaft 89 which is returned to normal under the tension of its retractile spring 93. The return movement of shaft 89 to normal moves the gear 61 from the position shown in Fig. 6 to the position shown in Fig. 5 which is followed by the movement of the plunger 95 for opening the switch SW and thereby stopping the opera-

tion of motor M which is timed to occur when the drum 18 reaches the position shown in Figs. 8 and 14. The longitudinal movement of shaft 89 is also effective to disengage the gear 61 from pin 88 to permit its rotation as effected by the knob 60 for moving the wiper arm 58 in selected position with another ring 22 bearing a different telephone call designation which may be transmitted by the closing of switch SW as above described.

What is claimed is:

1. In a call transmitter, a pulsing contact, a motor, a cam actuated by said motor, means actuated by said cam for actuating said contact, a code element, a ratchet mechanism actuated by the operation of said cam for rotating said element in timed relation with the movement of said means and means actuated by said element for controlling the operation of the first mentioned means relative to said contact.

2. In a call transmitter, a code element, a rotatable support for said element, a motor, a cam wheel geared to said motor, an arm actuated by the movement of said cam, a pulsing contact disposed in operative relation with said arm, a ratchet mechanism actuated by the movement of said cam for rotating said support, and means actuated by said element for rendering predetermined operations of said arm ineffective relative to said contact for transmitting a signal according to the conjoint operation of said arm and said element.

3. In a call transmitter, a base having upright supports mounted thereon, a drum rotatably mounted on said supports, a code element mounted on said drum, a motor mounted on one of said supports and housed in said drum, a cam wheel actuated by said motor, a pawl actuated by said cam, said drum having a ratchet toothed portion engaged by said pawl for rotating said element, an arm operated by the movement of said cam in timed relation with the operation of said pawl, a pulsing contact disposed in operative relation with said arm and a mechanism operable upon the operation of said element for rendering a predetermined operation of said arm ineffective relative to said contact.

4. In a call transmitter, a drum, a motor, a ratchet mechanism, a cam wheel actuated by said motor having means for actuating said mechanism, a plurality of code elements, a support for said elements actuated by said mechanism, a wiper, means movable in one direction for moving said wiper in operative relation with one of said elements and in another direction for starting said motor, a pulsing contact, an arm disposed in operative relation with said cam wheel for actuating said contact, and means actuated by the operation of said code element for rendering a predetermined number of operations of said arm ineffective relative to contact for transmitting a call according to the character of said element.

5. In a call transmitter, a plurality of code elements, a rotatable support for said elements, a wiper, a pivoted shaft for said wiper, a lead screw, a manually operable member for actuating said lead screw for moving said wiper on said shaft, in selected position relative to said elements, spring means for yieldably holding said wiper in engaged relation with the selected element on said support, a lever carried by said shaft, a motor, a cam actuated by said motor, a step-by-step mechanism actuated by the movement of said cam for rotating said support, an arm actuated by said cam and a pulsing contact actuated by said arm under control of said lever.

6. In a call transmitter, a plurality of code elements, a support for said elements, a wiper, a pivoted supporting shaft for said wiper, a lead screw for moving said wiper on said shaft in operative relation with said elements selectively, spring means for yieldably holding said wiper in engaged relation with the selected element, a pulsing contact, an arm operatively associated with said pulsing contact, a motor, a cam rotated by said motor for actuating said arm, a ratchet mechanism actuated by said motor for rotating said support, and a lever member carried by said shaft and movable in the path of said arm by the operation of the selected element for controlling the operation of said arm relative to said contact.

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