

Oct. 9, 1945.

R. F. MALLINA

2,386,486

CALL TRANSMITTER

Filed Aug. 20, 1941

4 Sheets-Sheet 1

FIG. 1

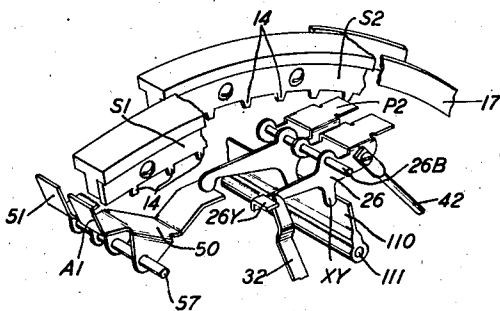
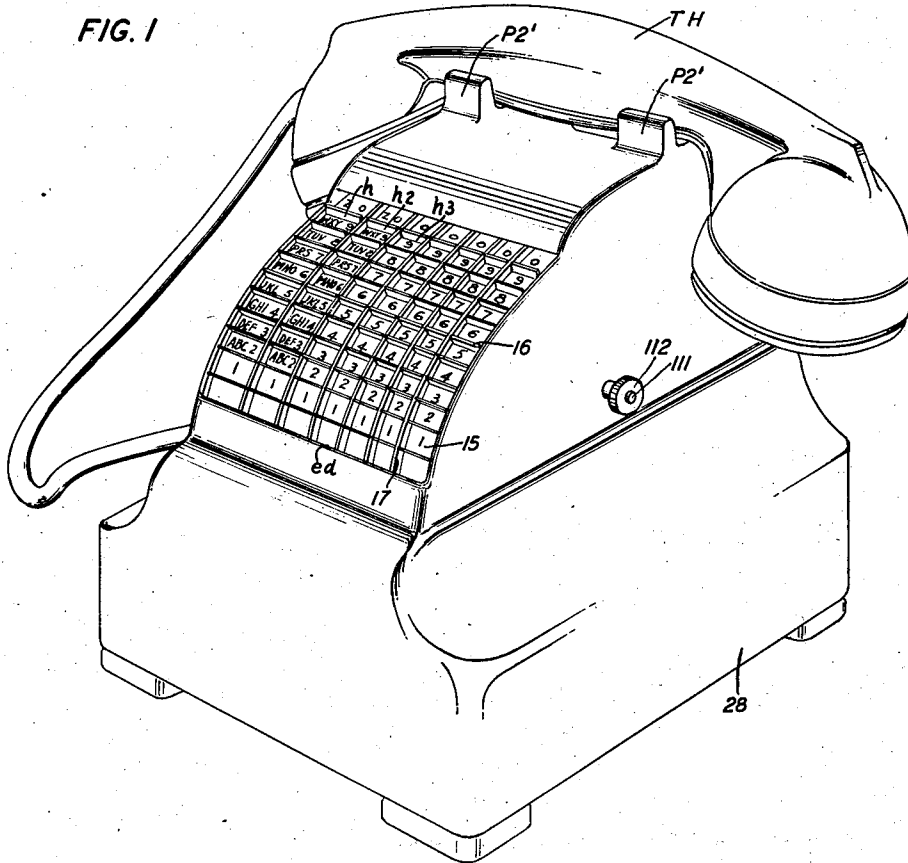


FIG. 8

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4 Sheets-Sheet 2

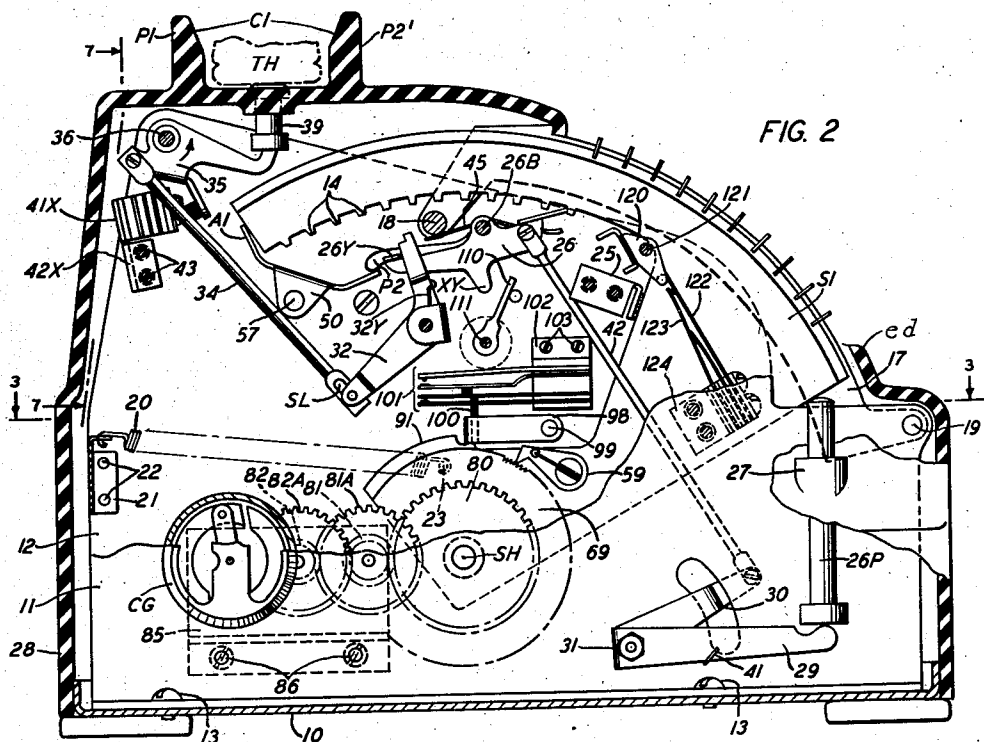


FIG. 2

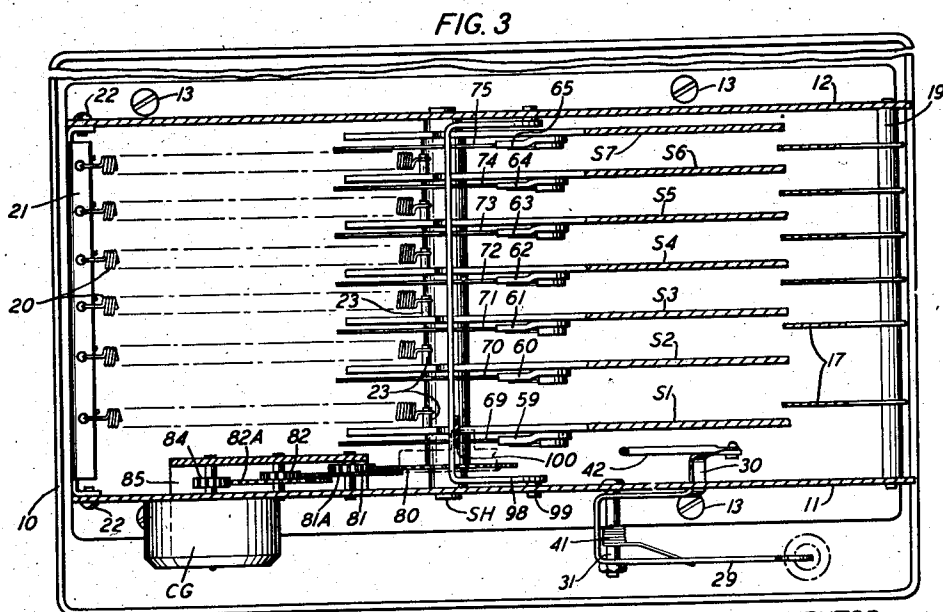


FIG. 3

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4 Sheets-Sheet 3

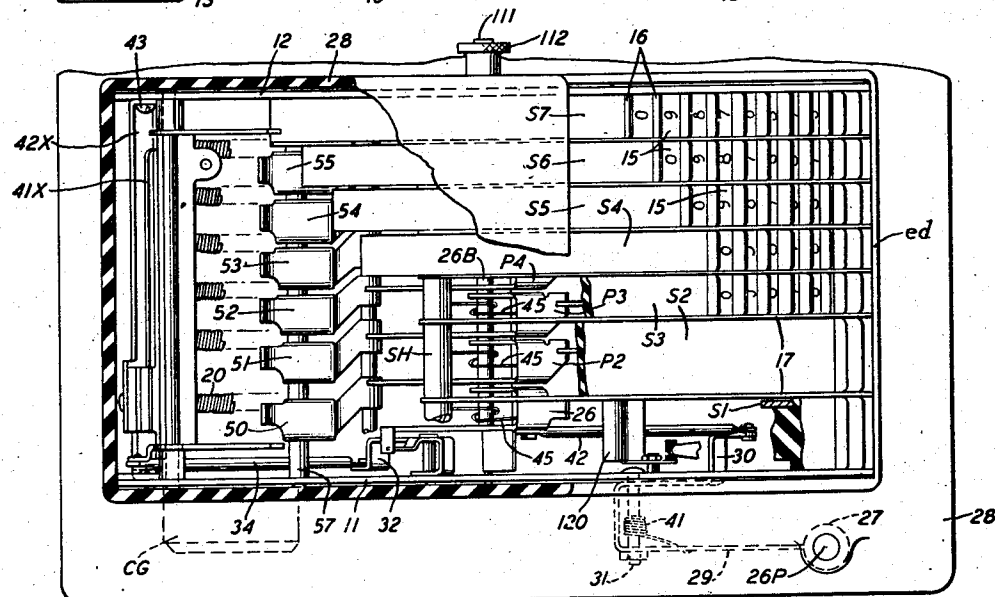
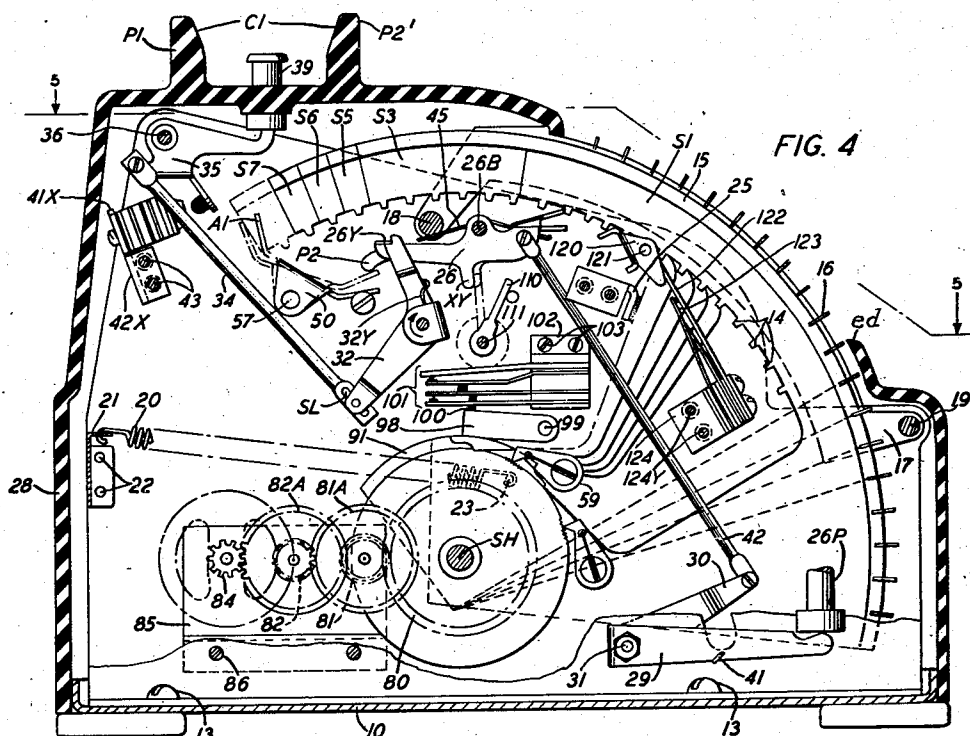


FIG. 5

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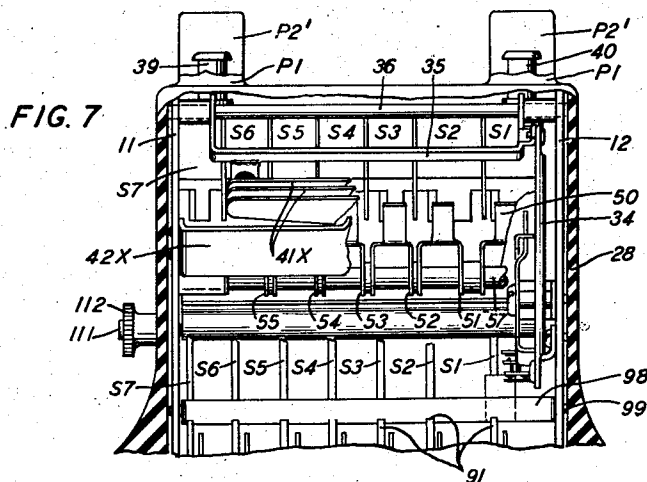
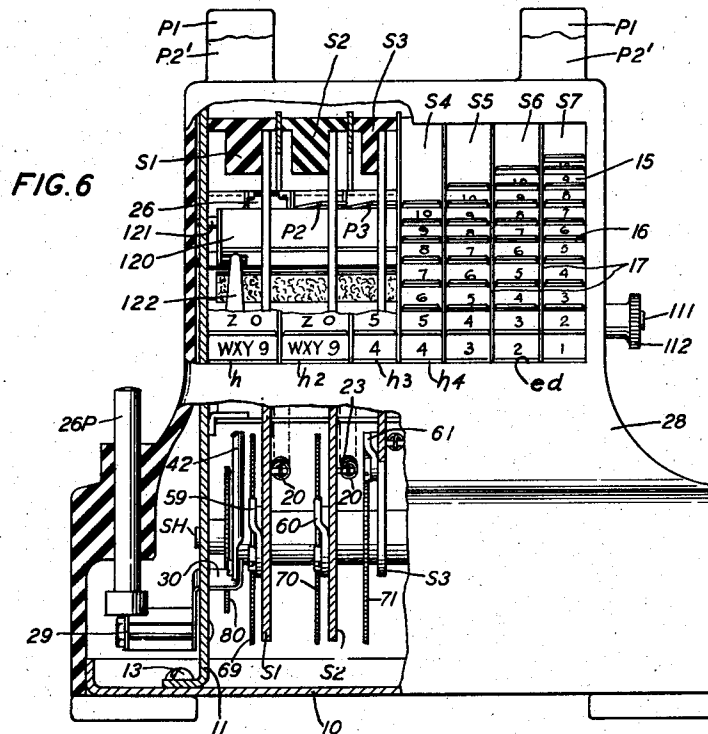
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CALL TRANSMITTER

Filed Aug. 20, 1941

4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

2,386,486

## CALL TRANSMITTER

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Application August 20, 1941, Serial No. 407,520

5 Claims. (Cl. 179-90)

This invention relates to telephone call transmitters and more specifically to call transmitters of the preset type.

The object of the invention is the provision of a call transmitter of the type above referred to which will be simple in construction, convenient in use and positive in operation.

According to the present invention, a call transmitter of the type above mentioned is provided in which pivoted manually operable sector-shaped members having indices printed at their peripheries are moved from normal to preset position with reference to a common stop for positioning pulsing cam elements carried thereby for setting a call. Means is provided for holding each camming sector member in its selected position with means manually operable to cause the release of the holding means of one of the sector members whereby the return of such sector is effective to cause the release of all sector members successively for actuating a pulsing contact through the operation of a common rocking bar actuated by the successive return of these sector members to normal under the tension of their own motor springs and under control of a governor mechanism, these springs being tensioned during the manual operation of the sector members as for the setting of a call, while a normally closed contact is provided for shunting the pulsing contact during the operation of the rocking bar by the manual selecting movement of the arcuated camming members.

Means is provided whereby the removal of the handset from the plungers in the cradle of the handset support causes the automatic operation of a mechanism for opening the shunting contact and removing a latching member from the pawl which holds the manually releasable sector member in the selected position so as to condition in cooperation with the manually operable holding means the operating mechanism for transmitting the telephone call designation thus selected or transmitting call designations digit-by-digit instead of by the preset operation, manually operable means being provided whereby the sector members may be released so as to permit their return to normal position collectively following the setting of a wrong telephone call designation, thus avoiding the loss of time inherent in the return movement of the pulsing sector members to normal individually under control of the governor mechanism.

Other novel features and advantages of the invention will appear from the following description and by the claims appended thereto, refer-

ence being had to the accompanying drawings in which:

Fig. 1 is a perspective view shown with the manually operable sector members in normal non-operated position.

Fig. 2 is a left side elevation view shown with the casing housing the transmitter mechanism in vertical section and one of the upright supports for the mechanism with portions broken away.

Fig. 3 is a horizontal sectional view taken on line 3-3 of Fig. 2.

Fig. 4 is another left side elevation view but showing the manually operable sector members in operated position as for the setting of a call.

Fig. 5 is a top assembly view shown with the casing partly in horizontal section taken on line 5-5 of Fig. 4 showing the sector members in operated position.

Fig. 6 is a front elevation view showing the casing housing the transmitter mechanism, one of the supporting uprights for such mechanism and a number of operating parts in section, the sector members being shown in operated position.

Fig. 7 is a partial rear view of Fig. 6 showing the release or transfer mechanism of the sector members, the casing being shown in vertical section taken on line 7-7 of Fig. 2; and

Fig. 8 is a partial view of the sector members release mechanism shown in perspective.

As shown in the drawings, the call transmitter of the invention consists of a base 10 to which the upright supporting plates 11 and 12 are secured as by a plurality of similar screws 13, and in bearings formed in these plates is journaled at both ends thereof a shaft SH provided for pivotally mounting a plurality of manually operable sector members S1, S2, S3, S4, S5, S6 and S7 which may vary in number according to the digits comprised in the central office number. Each of the sector members S1, S2, S3, etc., is formed at its inner periphery with an arcuated row of cams 14 and on each of the sector members is secured as by a number of screws SC a dial element as 15 best seen in Figs. 1, 6 and 8 preferably made of phenol plastic material having fins or finger holds 16 provided to facilitate the manual operation of the sector members S1, S2, S3, etc., from normal as for setting a call which is indicated by groups of letters and digits printed at the periphery of the dial elements between the fins 16. Arcuated metallic strips as 17 having their ends engaging the supporting shafts 18 and 19 are provided for preventing frictional resistance between the sector members S1, S2, S3,

etc., while in operation, both shafts 18 and 19 being supported at their ends by the upright plates 11 and 12.

The manually operated sector members S1, S2, S3, etc., are held in normal non-operated position against a common stop bar 25 best seen in Figs. 2, 4 and 6 by the normal tension of their helical motor springs 20 having one of their ends hooked to a common bar 21 of L-shaped cross section secured to the upright plates 11 and 12 as by a number of similar screws 22 shown in Figs. 2, 3 and 5 while the other ends of the motor springs are hooked to respective studs 23 extending from cam portion 91 formed with the sector members S1, S2, S3, etc., so that the pivotal movement of these sectors from normal position as shown in Figs. 1 and 2 to the operated position as shown in Figs. 4 and 5, is effective to tension the motor springs 20 for returning these sector members to normal position in a manner which will be hereinafter described in detail.

The sector member S1 and its dial element 15 are normally held in each operated or selected position by a retaining pawl 26 engaging the camming projections 14 of this sector as shown in Fig. 2 by the tension of a spring 45, while a push button in the form of a plunger 26P slidably mounted in a bushing 27 formed with a casing 28, which houses the transmitter mechanism, is provided for imparting a small angular movement as a unit to the arms 29 and 30 on a spindle 31 for moving through a connecting rod 42 the pawl 26 on shaft 26B from the position shown in Fig. 2 to the position shown in Fig. 4 for disengaging it from the camming projections 14 of sector member S1 so as to permit the return movement of this sector to normal by the tension of its motor spring 20.

Pawl 26 as shown in Fig. 4 may be held in the disengaged position from the cam projections 14 of sector S1 by a latch member in the form of a bell crank lever 32. This lever is moved by the tension of spring 32Y in abutting relation with a lug 26Y formed with pawl 26 upon the removal of the telephone handset TH from its cradle C1 causing the movement of the plungers 39 and thereby the pivotal movement of a bar 35 on shaft 36 in the direction indicated by the arrow in Fig. 2, while imparting a longitudinal movement to a rod 34 connected to the bell crank lever 32, the automatic movement of bell crank lever 32 under the tension of retractile spring 32Y as permitted by the slot SL at the lower end of rod 34 following the operation of plunger 26P being effective to engage the lug 26Y of pawl 26 for holding it in the position shown in Fig. 4 thereby permitting the pulsing operation of sector member S1 immediately following each selective operation as for transmitting a call by the so-called digit-by-digit operation of the transmitter mechanism in a manner which will be hereinafter described in detail.

According to this mechanism, the placing of the telephone handset TH in its cradle as formed by the projections P1 and P2 so as to impart longitudinal movement to plungers 39 and 40 from the position shown in Fig. 4 to the position shown in Fig. 2, causes the pivotal movement of bar 35 in direction opposite to that indicated by the arrow in Fig. 2, the movement of connecting rod 34 actuating the bell crank lever 32 in the direction indicated by the arrow in Fig. 4 for disengaging this bell crank lever from the lug 26Y of pawl 26 which is then moved in engageable relation with one of the cam projections 14 of camming

sector S1 by the tension of retractile spring 41 acting on lever unit 29—30 connected as above mentioned to pawl 26 by rod 42 in addition to retractile spring 45, while the operation of bar 35 is effective to actuate the switchhook springs 41X mounted in a pile-up arrangement on a bar 42X secured to the plates 11 and 12 by a number of screws 43.

The sector members S2, S3, S4, S5, S6 and S7 and the dial elements 15 carried thereby are retained in each selected position as defined by a common finger stop ed formed with casing 28 by respective pawls such as P2, P3, P4, as shown in Figs. 5, 6 and 8. These pawls, together with retaining pawl 26 of sector member S1 are mounted for pivotal movement on shaft 26B and like pawl 26 are normally held in engaged relation with their respectively associated sector members S2, S3, S4, etc. by the tension of springs 45 coiled on shaft 26B as shown in Figs. 2, 4 and 5. Pawls P2, P3, P4, etc., are disposed in operable relation with one of the arms of rocking members or yokes 50, 51, 52, 53, 54 and 55 pivoted on a shaft 57 itself supported by the plates 11 and 12, while the other arms of these rocking members are disposed in engageable relation with the sector members S1, S2, S3, S4, S5 and S6 to be successively operated thereby in the following order. Retaining pawl P2, releasing sector member S2 is actuated by the return movement of sector member S1 through the engagement of this camming sector with the yoke 50.

Retaining pawl P3 releasing sector member S3 is actuated by the return movement of sector member S2 through the engagement of this sector member with the yoke 51.

Retaining pawl P4 releasing camming sector S4 is actuated by the return movement of sector member S3 through the engagement of this sector member with the yoke 52.

Retaining pawl P5 (not shown) releasing camming sector S5 is actuated by the return movement of sector member S4 through the engagement of this sector member with the yoke 53.

Pawl P6 (not shown) releasing camming sector S6 is actuated by the return movement of sector member S5 through the engagement of the sector member with the yoke 54 and,

Retaining pawl P7 releasing sector member S7 is actuated by the return movement of sector member S6 through the engagement of this sector member with a yoke 55.

A shaft 111, Figs. 1, 2, 4, 5, 6 and 7, is journaled at both ends in bearings in the upright plates 11 and 12 with one of its ends extending beyond the right side wall of casing 28 for mounting a manually operable knob 112 provided for imparting a small angular movement to this shaft and to a bar 110 carried thereby disposed transverse of the pawls 26, P2, P3, P4, etc., in engageable relation with projections such as XY shown in Figs. 2, 4 and 8 for disengaging these pawls collectively from their respective sector members S1, S2, S3, etc., and thereby permitting the return of these sectors simultaneously following the setting of a wrong telephone call designation so as to avoid the delay inherent to the successive return of the sector members S1, S2, S3, etc., to normal.

On the sector members S1, S2, S3, etc., are mounted spring pressed pawls 59, 60, 61, 62, 63, 64 and 65 best seen in Fig. 3, engaging respective ratchet wheels 69, 70, 71, 72, 73, 74, and 75 keyed on shaft SH for rotating the latter upon the return movement of sector members S1, S2, S3, etc.,

to normal under the tension of their motor springs 20, the return movement of sector members S1, S2, S3, etc., being effected under normal control of a centrifugal speed governor mechanism CG operatively connected to the shaft SH by a gear 80, keyed on one end of this shaft and actuating the pinion 81 and gear 81A as a unit with gear 81A engaging the pinion 82 movable as a unit with gear 82A, the latter engaging a pinion 84, keyed on the shaft of the centrifugal speed governor CG best seen in Figs. 2, 3 and 4, the shafts of pinion and gear units 81—81A and 82—82A and the shaft of speed governor CG being supported at one of their ends to the upright plate 11 and their other ends by a plate 85 secured to the upright plate 11 by a number of screws 86.

A pulsing bar 120 disposed transverse of the movement of sector members S1, S2, S3, etc., is pivoted as at 121 in the upright plates 11 and 12 and is held in operative relation with the cam portions 14 of the sector members by the tension of an operable contact spring 122 which cooperates with spring 123 to form a pulsing contact these springs being mounted in a pile-up arrangement on a bracket 124 secured to the upright plate 11 as by screws 124Y.

Each sector member S1, S2, S3, etc., is provided concentric to its bearing portion with a camming surface as 91 serving for imparting movement to a common bar 98 pivoted on a shaft 99 itself journaled at both ends in plates 11 and 12, this bar having a projection 100 of insulating material disposed in engageable relation with the so-called off-normal springs 101 for operating them upon the movement of the sector members S1, S2, S3, etc., and holding them in the operated position until all the pulsing sector elements have been returned to non-operated position, these springs being disposed in a pile-up arrangement on a bracket 102 secured to the upright disposed plate 12 as by a number of screws 103.

In the operation of the call transmitter of the invention, supposing that, for example, it is desired to transmit the telephone call designation WY-44321. The sector member S1 having the letter W, the first letter of the call designation printed thereon is moved from the position shown in Fig. 1 to the position wherein the finger hold *h* of this sector member reaches a position registering with the finger stop *ed* formed by the edge of casing 28 as shown in Figs. 1, 2, 4, 5 and 6 and with the handset TH in its cradle C1 and consequently with the plungers 39 and 40 in the position shown in Fig. 2, the bell crank 32 is prevented from engaging the lug 26Y of pawl 26 which now holds the sector member S1 in its selected position through its engagement with one of the pulsing projections 14. The movement of sector member S1 from the position shown in Fig. 1 to the position shown in Figs. 4 and 6 causes the cam 91 of this sector to actuate the bar 98 and thereby the off-normal contact 101 while causing the operation of pulsing bar 120 and thereby the opening of pulsing springs 122 and 123. The opening of this contact, however, is ineffective to transmit pulses due to the telephone line being shunted by the closure of the switchhook spring pile-up 41X by the bar 35 now in position as shown in Fig. 2.

The camming sector S2 having the letter designation Y, the second digit of the call designation WY-44321 above mentioned is moved to the position wherein the finger hold *h2* is in reg-

istry with the finger stop *ed* where this sector member is held in the selected position by the pawl P2. The sector member S3 is moved from the position shown in Fig. 1 to the position wherein the finger hold *h3* is in line relative to the finger stop *ed* and in line relative to the selected position of letters W and Y above mentioned of sector members S1 and S2, where sector member S3 is held in the selected position by the retaining pawl P3. The sector member S4 is moved to the position wherein the finger hold *h4* is in registry with the finger stop *ed* where this sector member is held in the selected position by pawl P4 and the manual operation of sector members S5, S6 and S7 is effected in a manner similar to that described in connection with sector members S1, S2, S3 and S4 that is moved in position wherein the digits 3, 2, 1, the fifth, sixth and seventh digits of the call designation WY-44321 appear in registry with the common stop *ed* of casing 28 where they are retained in selected position by pawls P5, P6, P7, not shown.

The handset TH is then removed from its cradle C1 causing the upward movement of plungers 39 and 40, the pivotal movement of bar 35 in the direction indicated by the arrow in Fig. 2 for operating the shunt spring 41X and causing the longitudinal movement of rod 34 which through its slot SL frees the bell crank 32 for movement in latching position with the lug 26Y of pawl 26 as effected by the tension of its spring 32Y. The manual operation of plunger 26P as for imparting a small angular movement to the lever unit 29—30 and thereby to the pawl 26 through the connecting rod 42 causes the disengagement of pawl 26 from the cam projection 14 of sector member S1 so as permits the return movement of this sector to normal position for operating the pulsing bar 120 and the contact springs 122 and 123 for sending nine pulses, the first digit of the call designation above mentioned. The movement of pawl 26 by plunger 26P permitting the free end of bell crank 32 to move under the lug 26Y of pawl 26 for holding it in the disengaged position relative to cam projection 14 of this sector member.

The return movement of sector member S1 under the tension of its motor spring 20 is controlled by the operation of the speed governor CG as imparted by the spring-pressed pawl 59 engaging the ratchet wheel 69, see Figs. 2, 3 and 4 keyed to the shaft SH and the gear units 81—81A and 82—82A with the gear 82A engaging the pinion 84 keyed to the shaft of governor CG. It is to be noted that upon the downward movement of plunger 26P as effected by the operator following the removal of the handset TH from its cradle, the bell crank 32 as above mentioned was moved by the tension of its spring 32Y from the position shown in Fig. 2 to the position shown in Fig. 4 in latching relation with the lug 26Y of pawl 26 for holding it in disengaged position during the successive return movement of the sector members S2, S3, S4, etc., for a purpose which will be hereinafter described in detail.

The return movement of camming sector S1 for transmitting the nine pulses corresponding to the letter W following the operation of plunger 26P is effective upon reaching a small distance from its normal position to engage the arm A1 of yoke 50 for pivoting it and thereby imparting a similar movement to pawl P2 for releasing the sector member S2 which is returned to normal position by the tension of its own motor spring 20 thus operating the pulsing bar 120 for trans-

mitting nine pulses the second digit of the call designation WY-44321. Upon the return movement of sector member S2 at a point a small distance from its normal position this sector member engages the yoke 51 for operating the pawl P3 and thereby releasing the sector member S3 which is returned to normal under the tension of its own motor spring 20, the release of the sector members S4, S5, S6 and S7 being effected in the order and in the manner above described in connection with the release of sector members S2 and S3, for successively operating the pulsing bar 120 under control of governor CG a number of times corresponding to each digit appearing in line with the finger stop ed that is 9944321, each train of pulses thus transmitted being distinguished by a lapse of time occurring during the operation of the releasing elements of the sector members. Upon placing of the handset TH in its cradle CI, at the conclusion of the telephone conversation the downward movement of plungers 39 and 40, that is, from the position shown in Fig. 4 to the position shown in Fig. 2, is effective to impart a pivotal movement to the bell crank lever 32 against the tension of its retractile spring 32Y so as to release the pawl 26 which is then moved in position for engagement with the cam projections 14 of sector member S1 under the tension of its retractile spring 45 in addition to the spring 41 acting as above described on the lever unit 29-30 and the call transmitter mechanism is now ready for a successive call setting operation.

The cancelling of a telephone call designation may be effected by the rotation of the manually operable knob 112 secured at the end of shaft 111 to which the plate 110 is keyed, the free edge of this plate being disposed in engageable relation with lugs XY of pawls 26, P2, P3, P4, P5, P6 and P7 for disengaging them simultaneously from their associated sector members S1, S2, S3, etc., which are returned to normal by the tension of their motor springs 20 and under control of governor CG.

In the call transmitter of the invention, telephone call designations may be transmitted by the successive operation of sector member S1 upon the removal of the handset TH from its cradle which is followed by the operation of the plunger 26P so as to cause the release of sector member S1 by pawl 26 which remains locked in the disengaged position by the bell crank lever 32, the disengagement of pawl 26 from camming sector S1 permitting the successive operation of this sector member for transmitting any telephone call designation desired.

What is claimed is:

1. In a call transmitter, a plurality of manually movable arcuated elements, each of said elements having at its inner periphery a row of cams and indicia at its outer periphery representing digits, a pivoted bar extending transverse of the movement of said elements in operable relation with said rows of cams, fin members carried by each of said elements for moving the latter in selected position for setting a call, a plurality of spring pressed pawls engaging said cams for holding said elements in said selected position, a pulsing mechanism actuated by the movement of said bar, normally closed switch springs for negating the operation of said bar during the setting operation of said elements, manually controlled means for operating said switch springs to render the operation of said bar effective upon the return movement of said

elements for transmitting the call, a set of off-normal contacts, a bar, and means carried by said elements for controlling the operation of said bar for operating said off-normal contacts.

2. In a call transmitter, arcuated elements, each of said elements having a plurality of pulsing cams disposed inwardly thereof, a shaft for pivoting said elements, dials carried by said elements having symbols printed at their peripheries, means carried by said dials dividing said symbols into groups and serving for moving said elements to selected positions, a second shaft, pawls pivoted on said second shaft for engaging said cams for holding said elements in the selected position, a manually operable push-button, an arm and lever units actuated by said push-button, means operatively connecting said lever to one of said pawls for moving the latter from its engaged pulsing cam for releasing this element, spring means for returning said elements to normal non-operated position following the operation of said push-button, a pivoted bar engaged by said pulsing cams during the selective and return movement of said elements, a pulsing contact actuated by the movement of said bar, means to render the movement of said bar ineffective relative to said pulsing contact during the selective movement of said elements, a third shaft, a yoke member mounted for pivotal movement on said third shaft and operated by the return movement of said released elements for operating the holding pawl of one of the other elements for releasing the latter to cause the operation of said bar and that of said contact and a governor mechanism driven by each of said elements for controlling the operation of said contact.

3. In a call transmitter, a plurality of arcuated elements having cams at their inner peripheries, fin members at the outer peripheries of said elements for moving the latter from normal to selected position, means engaging said pulsing cams for holding said elements in said selected position, a manually operable bar for actuating said holding means for disengaging them from said pulsing cams for permitting the return movement of said elements to normal collectively, motor springs tensioned by the movement of said elements toward selected position, a pulsing mechanism disposed for operation by the cams of said elements, a governor mechanism for controlling the return movement of said elements under the tension of said motor springs and means for negating the collective return movement of said elements to normal non-operated position as for cancelling a call.

4. In a call transmitter, a casing having a cradle for receiving a telephone handset, a shaft, an arcuated manually operable element mounted for free rotation on said shaft, said element having a plurality of pulsing cams formed at its inner periphery, a contact, a mechanism disposed for operation by said cams for actuating said contact, an arcuated dial secured to said element, said dial having fin members serving for moving said element from normal to selected position, a motor spring tensioned by the movement of said element, means engaging said pulsing cams for holding said element and said dial in said selected position against the tension of said motor spring, a manually operable mechanism for actuating said means for releasing said element for permitting the latter to return to normal position for actuating said mechanism, a mechanism operable upon the removal of the telephone set from its supporting cradle for locking said



means in disengaged position from said pulsing cam during the return movement of said element, the last-mentioned mechanism releasing said holding means to cause the latter to reengage the pulsing cams upon the placing of the telephone handset in its supporting cradle.

5. In a call transmitter, a plurality of pulsing elements movable in position for setting a call, a dial carried by each of said pulsing elements for indicating such call, motor means for returning said elements from selected to normal position, a bar disposed for engagement with

each of said elements, a pulsing contact actuated by the movement of said bar for transmitting the call, a normally closed contact for shunting said pulsing contact during the operation of said pulsing elements toward selected position, other cams carried by said pulsing elements, another bar disposed for operation by the movement of said other cams upon the movement of any one of said pulsing elements from normal position, and an off-normal contact controlled by the operation of said other cams.

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