

Nov. 20, 1945.

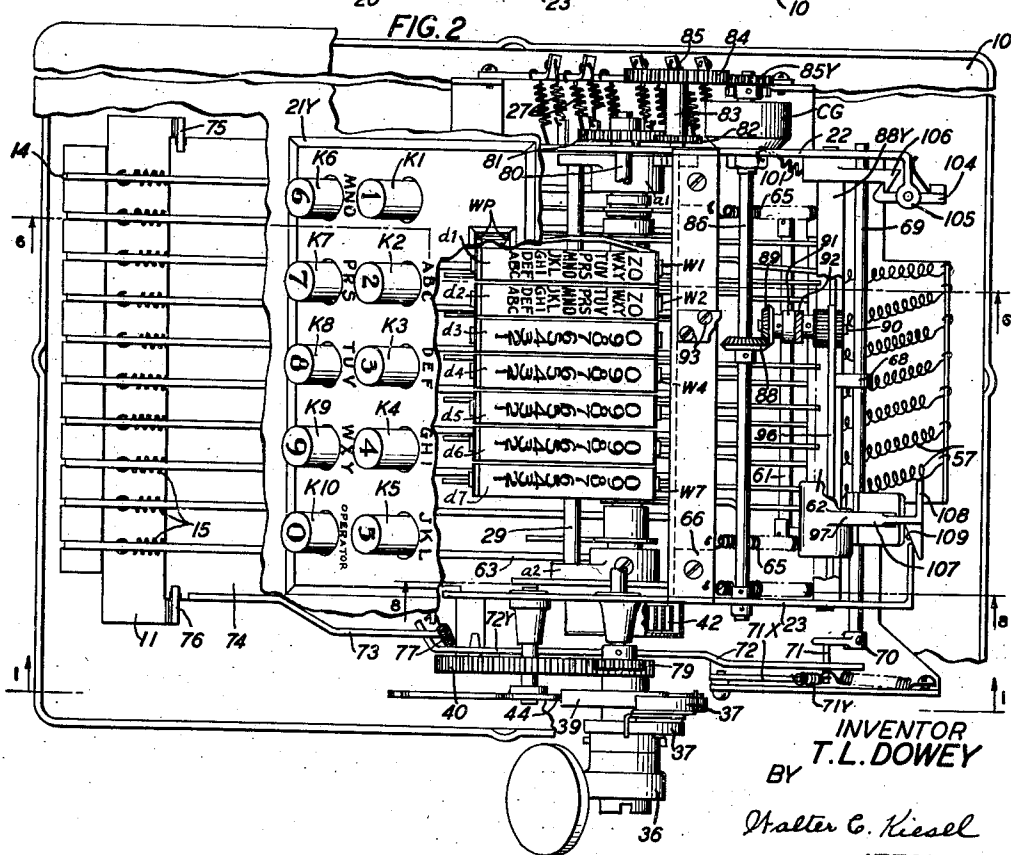
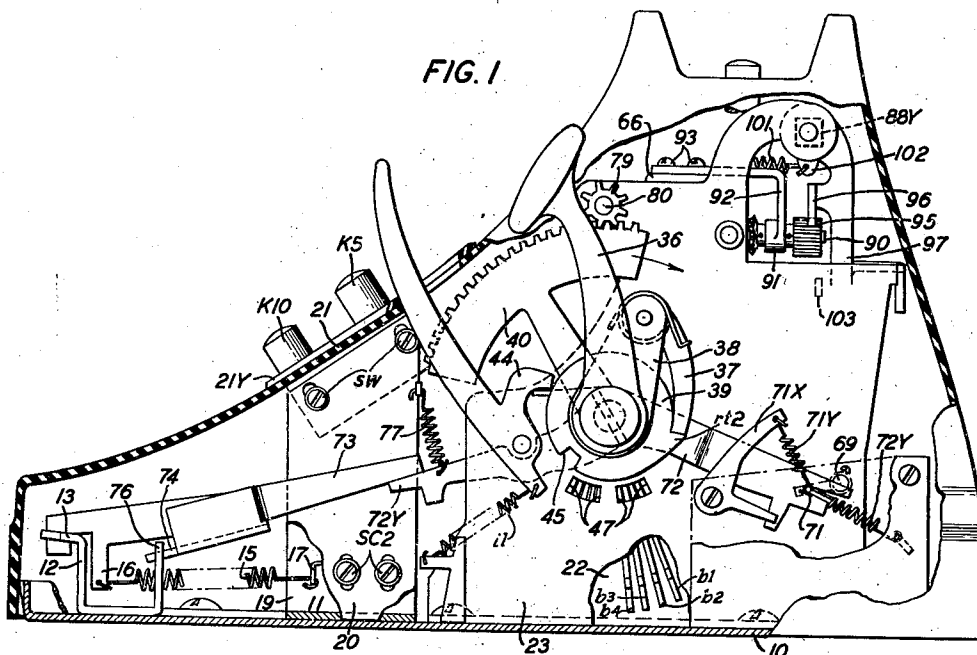
T. L. DOWEY

2,389,247

TELEPHONE CALL TRANSMITTER

Filed Dec. 31, 1943

7 Sheets-Sheet 1



Nov. 20, 1945.

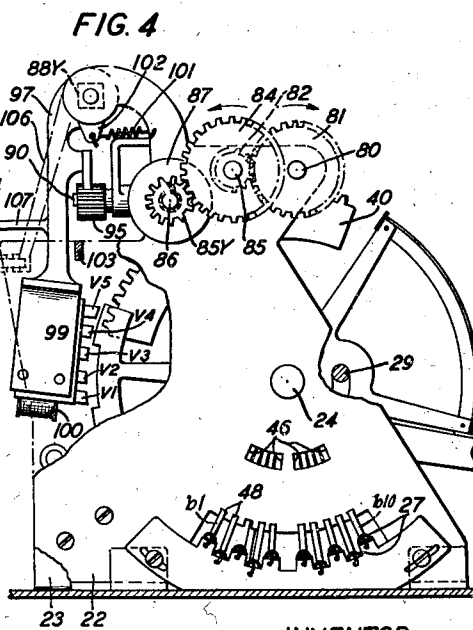
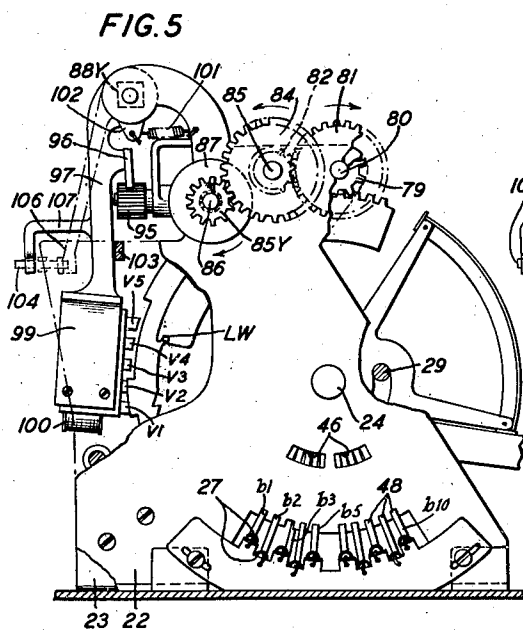
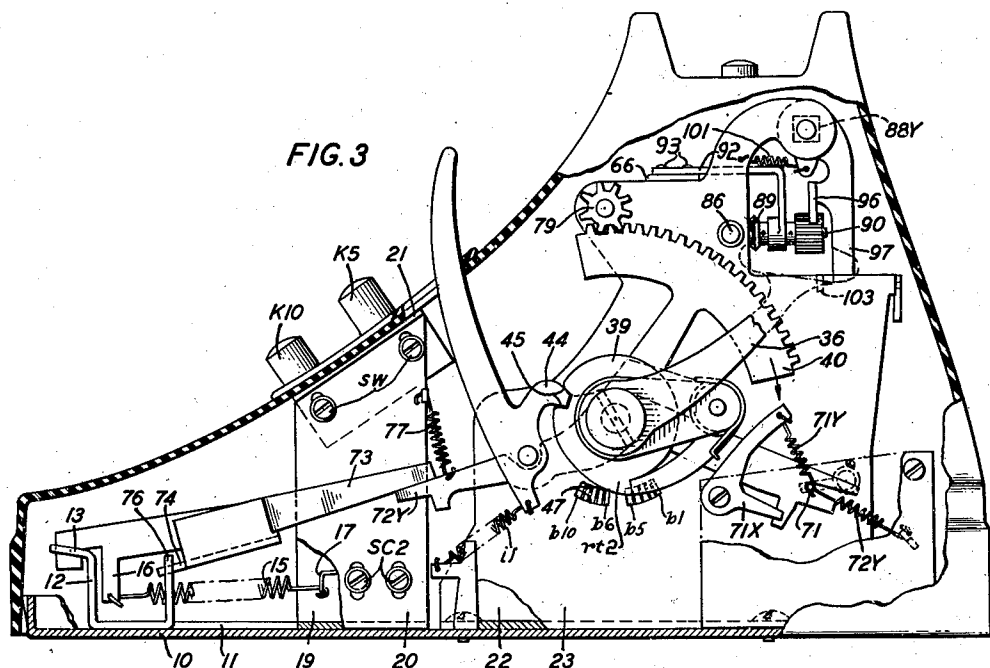
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7 Sheets-Sheet 2



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TELEPHONE CALL TRANSMITTER

Filed Dec. 31, 1943

7 Sheets-Sheet 4

FIG. 8

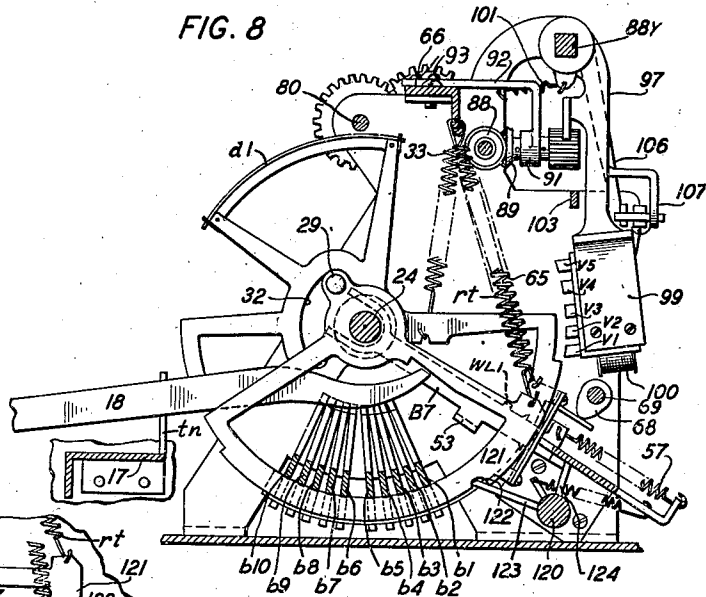


FIG. 9

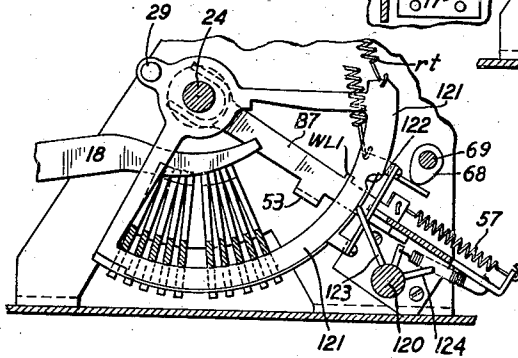


FIG. 10

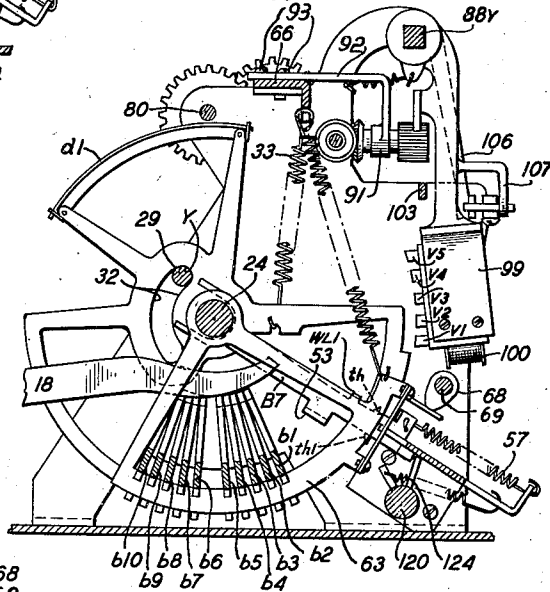
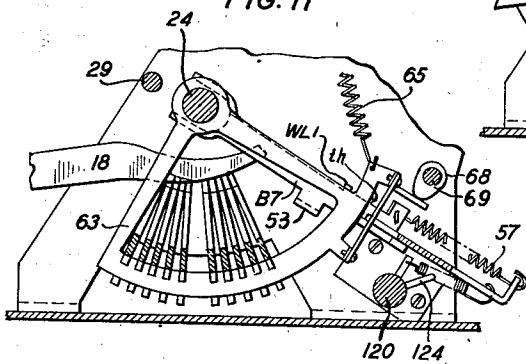


FIG. 11



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TELEPHONE CALL TRANSMITTER

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7 Sheets-Sheet 5

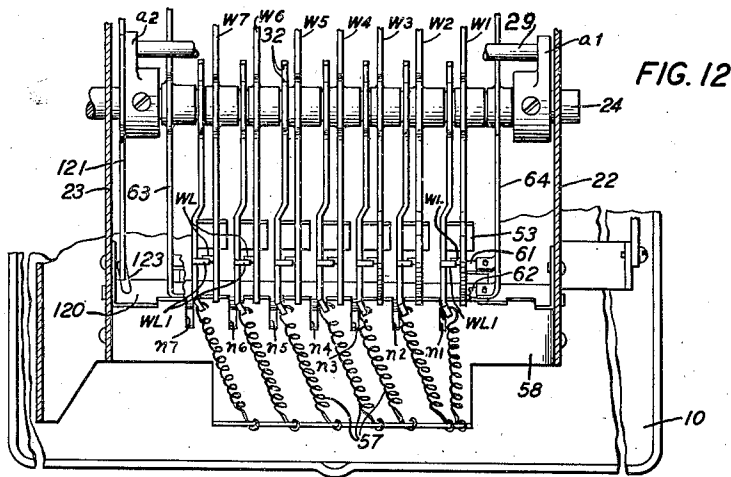


FIG. 12

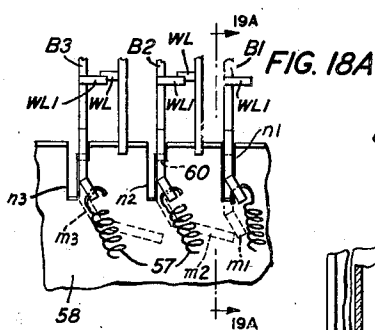


FIG. 18A

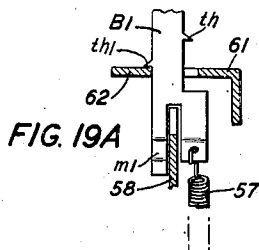


FIG. 19A

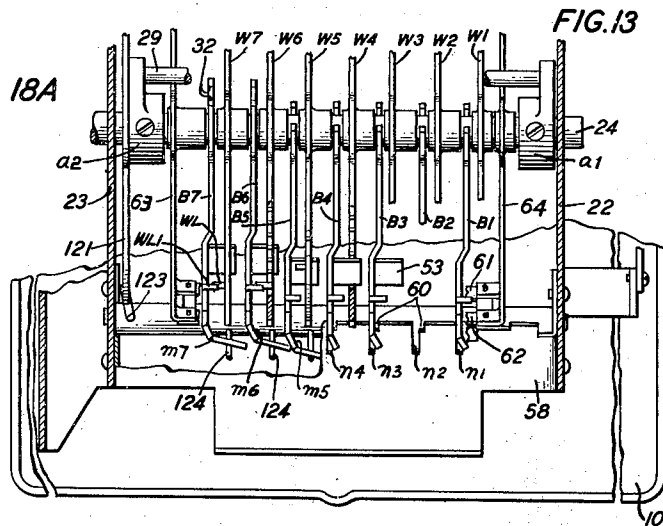


FIG. 13

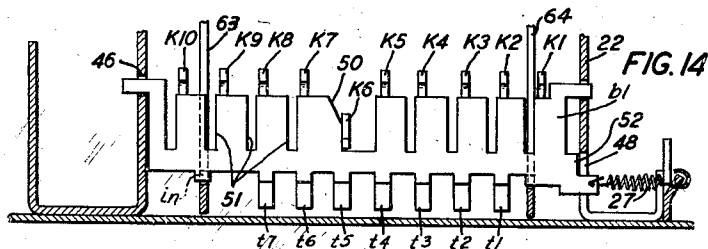


FIG. 14

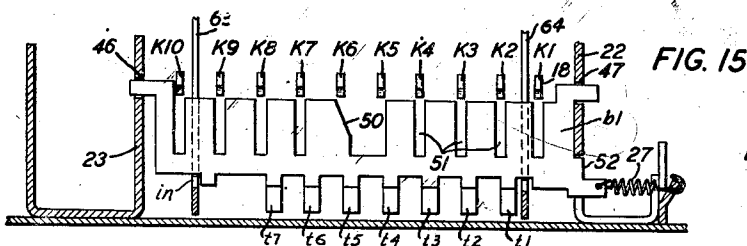


FIG. 15

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2,389,247

TELEPHONE CALL TRANSMITTER

Filed Dec. 31, 1943

7 Sheets-Sheet 6

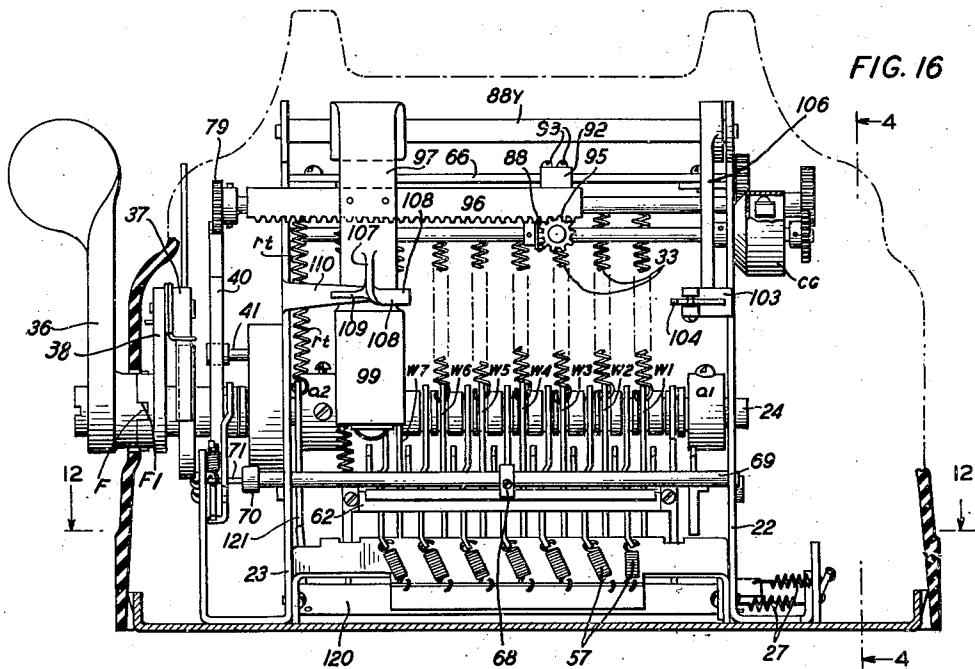


FIG. 17

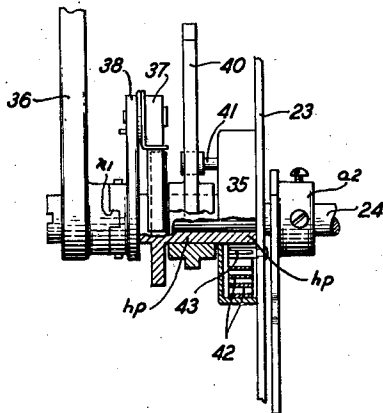
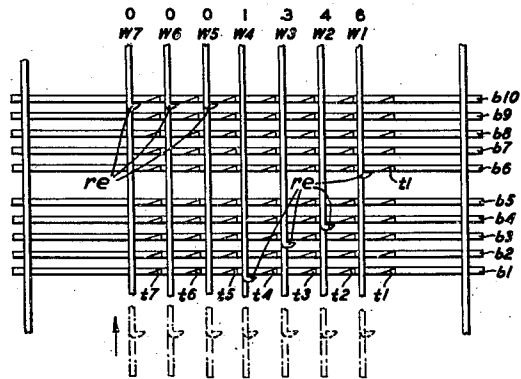


FIG. 18



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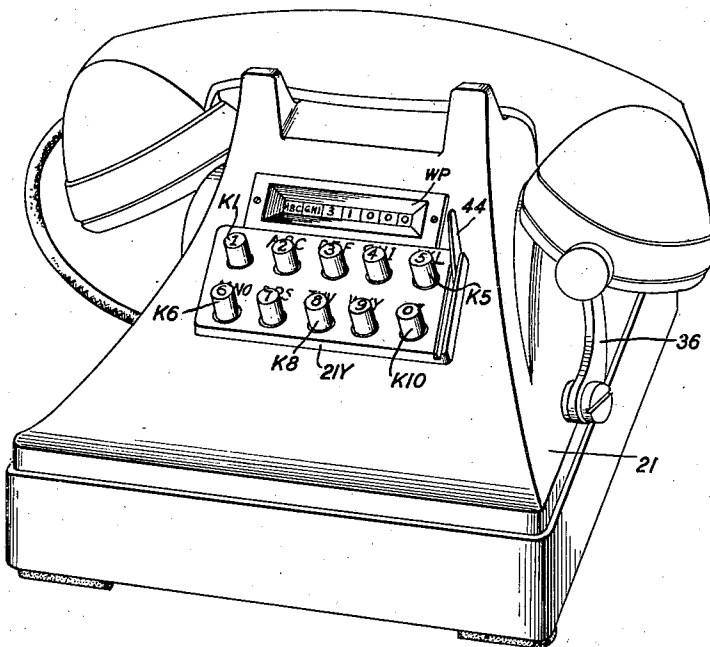
2,389,247

TELEPHONE CALL TRANSMITTER

Filed Dec. 31, 1943

7 Sheets-Sheet 7

FIG. 19



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UNITED STATES PATENT OFFICE

2,389,247

TELEPHONE CALL TRANSMITTER

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Application December 31, 1943, Serial No. 516,429

10 Claims. (Cl. 177—380)

This invention relates to telephone call transmitters of the type in which the successive operation of key members is effective to set combined code-indicator elements in position to cause the operation of vibrative elements in an alternating current generator for transmitting signals corresponding to the successive operation of the keys and to indicate the number of such keys prior to the transmitting of signals.

The object of this 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.

In the drawings,

Fig. 1 is a right side elevation view shown with the keys in normal non-operated position, the base and the casing housing the transmitter mechanism being shown partly in vertical section;

Fig. 2 is a top view of Fig. 1 showing the casing with portions broken away;

Fig. 3 is another right side elevation view shown with the motor spring tensioning mechanism in the operated position;

Fig. 4 is a partial view seen from line 4—4 in Fig. 16 showing the motor mechanism for moving the generator transverse of the combined code-indicator wheels, the generator being shown in position for movement ineffective relative to the code elements;

Fig. 5 is a view similar to that of Fig. 4 but showing the combined code-indicator wheels in the set position and the generator in position for engaging the code portions of the wheels upon its operation transverse thereof as effected by the motor mechanism;

Fig. 6 is a vertical sectional view taken on line 6—6 of Fig. 2, the code wheels being shown in normal non-operated position.

Fig. 7 is a view similar to that of Fig. 6 but showing one of the keys and a code wheel in the operated position;

Figs. 8, 9, 10 and 11 are partial views of the code indicator wheel setting and resetting mechanisms with elements of the transfer mechanism in the operated position;

Figs. 12 and 13 are detail views of the transfer mechanism used for the successive release of the combined code indicator wheels for movement to operated position seen from line 12—12 of Fig. 16;

Figs. 14 and 15 are partial views of the code wheels setting mechanism;

Fig. 16 is a rear elevation view showing the generator in normal non-operated position;

Fig. 17 is a view showing the motor spring ten-

sioning handle and the releasing handle for the motor spring in normal non-operated position, a number of parts being shown in section;

Fig. 18 is a diagrammatical view of the code wheels setting;

Fig. 19 is an elevation view of the transmitter of this invention shown in perspective;

Fig. 18A is a partial view showing a number of code wheels held in normal non-operated positions; and

Fig. 19A is a section view taken on line 19A—19A of Fig. 18A.

In the call transmitter of this invention a base 10 is provided for mounting a rectangularly-shaped plate 11 formed at its front disposed end with a vertically extending portion 12 and a portion 13 coextensive to portion 12 and substantially at right angles thereto. The portion 13 is provided with a plurality of notches 14 best seen in Figs. 2, 6 and 7 for pivotally receiving a set of key members K1, K2, K3, K4, K5, K6, K7, K8, K9 and K10. These key members are held in normal non-operated position by similar retractile springs 15 having one of their ends hooked to downwardly extending lug portions 16 formed with the body portion of the keys and their other ends to the lower edge portion of an angularly-shaped spacer member 17 shown in Figs. 1, 3, 6, 7 and 8 disposed transverse of the key members K1, K2, K3, etc. Spacer member 17 is provided with notches 18, Figs. 6, 7 and 8, in its upper disposed vertical portion serving as guides for similar projections 18 formed with the keys K1, K2, K3, etc., while screws 19 secure the spacer member 17 to upright supports 19 and 20 formed with the plate 11 and to the top disposed end of these supports is secured as by a number of similar screws 21 an inverted U-shaped plate 21 supporting a substantially rectangularly shaped cover element 21Y. The plate 21 and the cover element 21Y are provided with registering openings to serve as guides for the button portion of the keys K1, K2, K3, etc., while the cover element 21Y in addition is provided with a window WP, Figs. 1, 2, 6 and 7, for visual observation of dials d1, d2, d3, d4, d5, d6 and d7 carried by a plurality of combined code indicator elements in the form of wheels w1, w2, w3, w4, w5, w6 and w7, shown in Figs. 2, 6, 7, 8 and 9 mounted for free rotation on a shaft 24 supported at both ends on upright supporting plates 22 and 23 formed as above mentioned with the plate 11.

The dials d1 and d2 carried by wheels w1 and w2 as shown in Fig. 2 are provided with similar groups of letters which correspond to similar

groups of letters printed on the cover plate 21Y in registry to their digit equivalent printed on the keys, while the wheels *w3*, *w4*, *w5*, *w6* and *w7* are provided with similarly-numbered dials *d3*, *d4*, *d5*, *d6* and *d7* respectively. All the wheels *w1*, *w2*, *w3*, etc., however, are provided with similar sector-shaped code portions CP, see Figs. 6 and 7, and similar interiorly disposed ratchet teeth PR provided to be engaged by lugs as 53 carried by longitudinally movable bars B1, B2, B3, B4, B5, B6 and B7 following the successive setting of these wheels as will be hereinafter described in detail.

The shaft 24 is provided with arms *a1* and *a2* for securely mounting a shaft or bar 29 in the manner of a crank. This bar passes through curved openings as 32, Figs. 6, 7, 8 and 10, in the flange portion of wheels *w1*, *w2*, *w3*, etc. The end *y* of curved openings 32 forms abutting surfaces engaged by the bar 29 upon its movement as effected by the manual operation of a handle 36 in the direction indicated by the arrow shown in Figs. 1 and 3 for returning the wheels *w1*, *w2*, *w3*, etc., to normal non-operated position following each call transmitting operation, while tensioning their respective retractile springs 33.

The shaft 24 as shown in Figs. 16 and 17 is operatively connected to the handle lever 36 by the clutch elements F and F' formed respectively in the hub portion of handle 36 and the hub portion of an arm 38 keyed on the shaft 24. The arm 38 carries a spring-pressed pawl 37 engaging a ratchet tooth *rt2* formed at the periphery of a disc 39 having a hub portion *hp* mounted for free rotation on the shaft 24, and on the hub portion of this ratchet wheel is keyed a gear sector 40 provided with a pin 41, to which is secured the end of the outer convolution of a spiral motor spring 42 located in a drum element 35 secured to the upright supporting plate 23, while the inner disposed convolution of spring 42 is hooked to a pin 43 laterally extending from upright supporting plate 23 so that the operation of handle 36 from the position shown in Figs. 1 and 2 to the position shown in dotted line in Fig. 3 is effective to rotate the shaft 24 and bar 29 carried thereby for collectively returning the wheels *w1*, *w2*, *w3*, etc., to normal unoperated position and collectively tensioning their retractile springs 33, while the rotation of the one tooth ratchet wheel 39 through pawl 37 is effective to move the gear sector 40 from the position shown in Fig. 1 to the position in Fig. 3 for tensioning the motor spring 42, the gear sector 40 being held in the operated position against the tension of spring 42 by a pawl 44 engaging under the tension of its retractile spring *i1* a notch 45 in the one-tooth ratchet wheel 39 thus permitting the return movement of handle 36 and bar 29 carried by shaft 24 to normal non-operated position under the tension of a retractile spring *rt*, Fig. 16, having one end connected to a sector member 121 keyed on shaft 24 while the other end of this spring is hooked to a spacer member 66 best seen in Figs. 8 and 9, the movement of bar 29 toward the opposite end of curved slot 32 in wheels *w1*, *w2*, *w3*, etc., permitting the individual movement of these wheels as effected by the tension of their retractile springs 33 under control of an escapement mechanism actuated by the movement of the key members K1, K2, K3, etc., as will be hereinafter described in detail.

The upright supporting plates 22 and 23 as shown in Figs. 1, 3, 5 and 6 are provided with similar pairs of openings 46 and 47, respectively,

while supporting plate 22 in addition is provided with a row of indentations 48 disposed radially to shaft 24 and spaced to correspond to the space relation of the code portions and of the groups of letters and the digits printed on the wheels *w1*, *w2*, *w3*, etc., these indentations cooperating with the openings 46 and 47 for guiding longitudinally movable bars *b1*, *b2*, *b3*, *b4*, *b5*, *b6*, *b7*, *b8*, *b9* and *b10*, Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15 and 18. These bars are moved against the tension of similar retractile springs 27 from the position shown in Fig. 15 to the position shown in Fig. 14 by the operation of their respectively associated key members K1, K2, K3, K4, K5, K6, K7, K8, K9 and K10 through the engagement of the projections 18 formed with these keys engaging respective camming portions 50 formed in these bars. The bars *b1*, *b2*, *b3*, etc., in addition are provided with slots 51 for permitting the individual movement of the key projections 18 in engagement with their respectively associated cams 50 while the longitudinal movement of any one of the bars *b1*, *b2*, *b3*, etc., from the position shown in Fig. 15 to the position shown in Fig. 14 is effective to position its teeth *t1*, *t2*, *t3*, *t4*, *t5*, *t6* and *t7* in the path of projections *re*, Figs. 6, 7 and 18, carried by the combined code-indicator wheels *w1*, *w2*, *w3*, etc., while the top edge of bars *b1*, *b2*, *b3*, etc., furnish stops for preventing the operation of any other unoperated key from that position until the return of the operated key to normal, when the operated bar respective to that key is returned by the tension of its retractile spring 27 to the position shown in Fig. 15 following its engagement by the operated wheel as will be hereinafter described in detail.

The retractile springs 27 as shown in Fig. 2 are disposed at an angle relative to the longitudinal movement of their associated bars *b1*, *b2*, *b3*, etc., so as to cause a small sideway movement of these bars when operated in a direction opposite to the movement of the wheels toward setting position for engaging their shoulder portions 52 with the inner disposed surface of plate 22 for individually and momentarily holding these bars in their operated position until engaged and moved by the operation of their respectively associated wheels *w1*, *w2*, *w3*, etc., under tension of their retractile springs 33 in registry with their guiding indentations or slots 48 to permit the return movement of these bars to normal under the tension of their respectively associated springs 27.

The wheels *w1*, *w2*, *w3* are normally held in the non-operated position against the tension of their retractile springs 33 by the engagement of lugs WL formed with these wheels with lugs WL' carried by the longitudinally movable bars B1, B2, B3, B4, B5, B6 and B7, these bars having fork-shaped end portions as best seen in Figs. 6, 7, 8, 9, 10 and 11 for sliding movement on the shaft 24 and are supported at their opposite ends by a spacer plate 58 best seen in Figs. 12, 13, 18 and 19 having a straight slot *n1* for the bar B1 and a plurality of two-step slots *n2*, *n3*, *n4*, *n5*, *n6* and *n7* engaged by the ends of bars B2, B3, B4, B5, B6 and B7 movable therein by the tension of similar retractile springs 57 but under control of an escapement mechanism comprising two parallelly disposed bars 61 and 62 secured at their ends to sector members 63 and 64 in turn mounted for free rotation as a unit on shaft 24 and ratchet teeth *th* and *th1* carried by the bars B1, B2, B3, etc., best seen in Figs. 6, 7, 8, 9, 10, 11 and 19 in addition to lugs 53, the bars B2

to B1 being held in normal unoperated position through their engagement with the shoulder portions 60 forming one of the steps in the plate 58 while the bar B1 is normally positioned in its guiding slot *n1*, see Fig. 12, but held from operating under the tension of its retractile spring 57 by the bar 61 of the escapement mechanism engaging the tooth *th1* of this bar by the tension of a retractile spring 65, having one of its ends hooked to sector 63 and its opposite end to the edge of a spacer plate 66 in turn secured to the top of supporting plates 22 and 23.

The bar 62 of the escapement mechanism is formed with a reinforcing rim 67 disposed in engageable relation with a cam 68 keyed on a shaft 69 journaled in upright extending plates 22 and 23 and on one end of this shaft is keyed a lever member 70 to the free end of which is secured a laterally extending pin 71 fitted in a longitudinally disposed slot in the end of an arm 72 of a yoke best seen in Figs. 1, 2 and 3 pivoted on shaft 24, the opposite arm 72Y of this yoke being bent at an angle as shown in Fig. 2 into operable relation with an arm 73 formed at one end of a rectangularly-shaped plate 74.

Plate 74 is pivoted on lugs 75, 76 extending perpendicularly from the plate 11, with its free edge held in operative relation with the keys K1, K2, K3, etc., by a retractile spring 77 so that the operation of any one of the keys is effective to impart a small angular movement to the plate 74 and through its arm 73 operates the yokes 72, 72Y against the tension of the retractile spring 77 for actuating an angle lever 71X for tensioning a spring 71Y, having one of its ends hooked to the pin 71 for tensioning a retractile spring 72Y while causing the rotation of shaft 69 and cam 68 and thereby operating the so-called anchor bars 61 and 62 of the escapement mechanism which, as above mentioned, controls the operation of the longitudinally movable bars B1, B2, B3, etc., and the consequent release of the combined code-indicator wheels *w1*, *w2*, *w3*, etc., in a sequence of operations which will be hereinafter described in detail while the sector member 64 as shown in Figs. 14 and 15 is provided with indentations *m* engaged by the bars b1, b2, b3, etc., for preventing the operation of the escapement bars 61 and 62 under the tension of retractile spring 65 until the return movement of any one of the bars b1, b2, b3, etc., to normal non-operated position.

The movement of handle lever 36 from the position shown in Figs. 1 and 2 to the position shown in Fig. 3 as above mentioned is effective to rotate the shaft 24 and thereby the gear sector 40 while tensioning the motor spring 42 and returning the code-indicator wheels *w1*, *w2*, *w3* to normal non-operated position by their engagement with the crank arm 29. The rotation of shaft 24 is effective to impart a small angular movement to a shaft 120 shown in Figs. 6, 7, 8, 9, 12 and 13 through a sector member 121 keyed on this shaft and having a notch 122 engaging the free end of a pin 123 in the manner of a Geneva-gear. The movement of shaft 120 from the position shown in Fig. 9 to the position shown in Fig. 8 is effective to engage a plurality of pins 124 carried by this shaft with the end of bars B1, B2, B3, etc., for returning the latter to normal non-operated position as shown in Fig. 12 simultaneously with the return movement of the wheels *w1*, *w2*, *w3*, etc., to normal non-operated position whereby these wheels are held from operating by the normal tension of their respec-

tively associated retractile springs 57 through the engagement of the lugs WL carried by these wheels with the lugs WL1 carried by the bars B1, B2, B3, etc., now in normal non-operated position while the bars B2 to B7 are themselves held in normal non-operated position against the respective shoulder portions 60 in the spacer plate 58 and the bar B1 by its escapement tooth *th1* resting against the anchor bar 61 but in registry with its guiding slot *n1* in the spacer plate 56. The bars B1, B2, B3, etc., are provided with camming portions *m1*, *m2*, *m3*, *m4*, *m5*, *m6* and *m7* the function of which is to impart a side-way movement to their consecutive bars for moving them in registry position with their respective slots for permitting their movement therein when released by the escapement mechanism.

Upon the movement of shaft 24 as effected by handle lever 36 for returning the code-indicator wheels *w1*, *w2*, *w3*, etc., and the bars B1, B2, B3, etc., to normal non-operated position, the movement of gear-sector 40 is imparted to a pinion 79 keyed on one end of a shaft 80 journaled on the upright supporting plates 22 and 23 and on the other end of this shaft is keyed a gear 81, the latter meshing with the pinion 82 having a hub portion 83 on which is secured a gear 84. The pinion and gear unit 82-84 thus formed is mounted for free rotation on a spindle 85 laterally extending from the upright supporting plate 22 as shown in Fig. 2. The movement of gear 84 is imparted to a pinion 85Y keyed to one end of a shaft 86 journaled at this end in a screw-threaded hub portion formed with the drum of a centrifugal governor CG while the other end of shaft 86 is journaled in the upright supporting plate 23. On shaft 86 is keyed an angle gear 88 which meshes with a similar gear 89 keyed to one end of a spindle 90 mounted for free rotation in a bearing 91 formed at the free end of a bracket 92 secured by a number of screws 93 to the spacer bar 66 in turn secured at its ends as best seen in Fig. 2 to lugs projecting from the supporting plates 22 and 23, and to the other end of spindle 90 is secured a spur gear 95 engaged by a gear rack 96 securely mounted on a carriage in the form of a downwardly extending arm 97, see Figs. 2, 4, 5, 8 and 10 mounted for sliding movement on a shaft 88Y of square cross-section but pivoted at both ends in supporting plates 22 and 23.

To the free end of carriage arm 97 is securely mounted an alternating current generator 99 having a coil 100 and a set of differently tuned vibrating elements *v1*, *v2*, *v3*, *v4* and *v5* best seen in Figs. 4, 5, 8 and 10 provided for engaging the code portions of combined code-indicator wheels *w1*, *w2*, *w3*, etc., following the manual operation of handle lever 36 as will be hereinafter described in detail, the alternating current generator being normally held in position from engagement with the code portions of wheels *w1*, *w2*, *w3*, etc., under the tension of a retractile spring 101 by a pawl 104 pivoted on lugs as 105 formed with the supporting plate 22 and engaging a pawl-shaped arm 106 keyed to the square shaft 88Y, the retractile spring 101 having one end hooked to a lug 102 formed with the arm 106 and its other end hooked to the upward extending arm of supporting plate 22 as shown in Figs. 4, 5, 6 and 7 while a stop 103 cooperates with arm 106 for limiting the engagement of the vibrative reeds *v1*, *v2*, *v3*, etc., relative to the code portions of wheels *w1*, *w2*, *w3*, etc., as effected by the tension spring 101.

The carriage arm 97 is formed with a projection 107 best seen in Figs. 2, 4, 5, 8, 10 and 16, terminating in the form of an arm 108 provided for operating the pawl 104 for releasing the arm 106 to permit the pivoted movement of the generator by the tension of its retractile spring 101 in position against the stop 103 wherein the vibrative reeds $v1$, $v2$, $v3$, etc., will engage the code portions of wheels $w1$, $w2$, $w3$, etc., for transmitting the call upon its return movement to normal position under the tension of motor spring 42 while the engagement of lug 110 formed with supporting plate 23 with the cam portion 109 formed with projection 107 opposite the arm 108 causes the pivotal movement of carriage arm 97 in position ineffective relative to the code portions of wheels $w1$, $w2$, $w3$, etc., to a point wherein the pawl 104 reengages the arm 106 for holding the generator and the vibrative reeds $V1$, $V2$, $V3$, etc., away from engagement from the code portions of wheels $W1$, $W2$, $W3$, etc., as shown in Fig. 4.

In a typical operation in the setting and transmitting of a call as MH-3-1000, for example, the movement of handle lever 36 from the position shown in Fig. 1 to the position shown in Fig. 3 is effective through the rotation of shaft 24 and therefore that of crank bar 29 to position the combined code indicating wheels $W1$, $W2$, $W3$, etc., in normal non-operated position as shown in Fig. 2 when the handle lever 36 is returned to normal position by the tension of retractile spring rt hooked to sector 121 keyed on shaft 24. The gear sector 40, however, remains in the operated position as shown in Fig. 3 against the tension of motor spring 42 due to the pawl 44 engaging the notch 45 of disc 39 under the tension of its retractile spring ti . Rotation of gear sector 40 as effected by the handle 36 actuates the pinion 79 on the shaft 80 and thereby the gears 81, 82, 84, 85Y and angle gear 88 on shaft 86 and through angle gears 88 and 89 the spur gear 95 meshing with the gear rack 96 thus moving the alternating current generator 99 on bar 88Y from the position shown in Fig. 2 to the position at the opposite end of bar 88Y wherein the lug 108 carried by the arm 107 of the generator engages the pawl 104 for releasing the arm 106 and thereby permitting the pivotal movement of shaft 88Y against the stop 103 as shown in Figs. 1, 4 and 5 under the tension of its retractile spring 101 for positioning the vibrative elements $V1$, $V2$, $V3$, $V4$ and $V5$ of the generator in position for engaging the code portions of combined code indicating wheels $W1$, $W2$, $W3$, etc., upon the return of the generator to normal non-operated position by the tension of motor spring 42 following the setting of the code indicating wheels and the manual operation of pawl 44.

The rotation of the shaft 24 and that of sector member 121 (see Figs. 8, 9, 12 and 13) is effective to return the longitudinally movable bars $B1$, $B2$, $B3$, etc., to normal non-operative position as shown in Fig. 12 against the tension of their retractile springs 57 through the engagement of the notch 122 in sector 121 with the end of rod 123 imparting a small angular movement to shaft 120 for engaging the arms 124 carried thereby with the end portions of their respectively associated longitudinally movable bars $B1$, $B2$, $B3$, etc., for positioning the lug elements $WL1$ carried by these bars in the path of lugs WL carried by the wheels $w1$, $w2$, $w3$, etc., for holding these wheels from operating under the tension of their retractile springs 33, the bars $B1$, $B2$, $B3$, etc., being themselves prevented from operating

under the tension of their retractile springs 57 by the engagement of tooth $th1$ of bar $B1$ with the escapement bar 61 and the bars $B2$, $B3$, $B4$, etc., in engagement with their respective shoulder portions 60 formed in the spacer bar 58.

In the setting operation of the combined code-indicator wheels as for transmitting the telephone call designation MH-3-1000 above mentioned, the operation of key K6 in registry with the group of letters MNO printed on cover plate 21Y and representing the first number of the call designation is effective to actuate the pivoted plate 74 which movement is imparted to the pivoted double armed lever 72-72Y and thereby to the angle lever 71X, see Figs. 1, 2 and 3 for rotating the cam shaft 69 by the tension of spring 71Y. The movement of cam shaft 69 in turn is effective to tension the spring 72Y which serves to return the cam shaft 69 to normal upon the release of any one of the operated keys as in this example key K6. Rotation of cam shaft 69 and cam 68 keyed thereon from the position shown in Fig. 7 to the position shown in Fig. 6 by the tension of spring 71Y permits the movement of parallel escapement bars 61 and 62 under the tension of retractile spring 65, Figs. 8 and 9 to cause the bar 61, Figs. 6 and 7 of this escapement to release the tooth $TH1$ of longitudinally movable bar $B1$ which as above described is positioned as shown in Figs. 12 and 18 in the guiding slot $n1$ of spacer bar 58. The longitudinal movement of this bar as effected by the tension of its retractile spring 57 causes the disengagement of lug $LW1$ carried by this bar from the lug LW carried by the combined code-indicating wheel $W1$ which is then rotated by the tension of its retractile spring 33 to a position wherein as shown diagrammatically in Fig. 18 the tooth re of wheel $W1$ engages the tooth ti of bar $b6$ which has been moved longitudinally by the engagement of projection 18 of key K6 with the cam surface 50 of the bar $b6$ for engaging its respective notch in in disc 64 of its escapement bars 61 and 62 followed by a small side-way or pivotal movement of the opposite end of this bar as imparted automatically by its retractile spring 27 for positioning its shoulder portion 52, see Fig. 14, against the inner disposed surface of upright supporting plate 22 during the continued movement of the key to the lower end of the cam portion 50. The movement of indicating wheel $W1$ under tension of its retractile spring 33 and the consequent engagement of its lug re with the tooth ti of bar $b6$ is effective to return this bar in registry with its slot 48 in the upright support 22 for permitting its return movement to normal position as shown in Fig. 15 but following the return of the operated key to normal non-operated position, while the combined code indicating wheel $W1$ is held in the operated position by the lug 53 of its longitudinally movable bar $B1$ engaging the sixth tooth of ratchet portion PR in the wheel $W1$ which position is indicated by the group of letters MNO appearing through the opening WP in the casing, the return of bar $b6$ to normal non-operated position and the consequent freeing of disc 64 by this bar followed by the return movement of cam 68 to the position shown in Fig. 7 causes the escapement bar to move in the path of tooth $th1$ of bar $B2$ for arresting the movement of the latter under the tension of its retractile spring 57 following its disengagement from the shoulder portion 60 as effected by the engagement of cam portion $m1$ and of bar $B1$ with the free end of bar $B2$, and this cycle of operation is repeated for

each key depressed, the groups of letters MNO—GHI and the digits 31000 appearing in the window WP in the casing, the entire setting being indicated in the diagrammatic view in Fig. 18.

The release of the gear sector 40 by the manual disengagement of the spring pressed pawl 44 from the notch 45 of disc 39 permits the return of this gear sector to normal unoperated position under the tension of motor spring 42 for returning the alternating current generator to normal non-operated position causing the vibrative elements V1, V2, V3, V4 and V5 to engage the code portions of wheels W1, W2, W3, etc., which have been positioned by the operation of the keys K6, K4, K3, K1, K10, the latter operated three consecutive times, the cam 109 carried by arm 107 of the generator mounting engaging the arm 110 carried by upright supporting plate 23 to move the generator in position wherein the pawl 104 reengages with arm 106 thus positioning the vibrative elements in a path ineffective to engage the code portions of wheels W1, W2, W3, etc., when the generator is moved to starting position as above described and the transmitter is now ready for a successive call setting and transmitting operation.

What is claimed is:

1. In a call transmitter, a set of manually operable key members, a set of movable bars having means engaged by said key members to cause said bars to move longitudinally, a plurality of code wheels, normally tensioned retractile springs for actuating said wheels, other bars disposed at right angles to the first-mentioned bars for holding said wheels in normal non-operated position against the tension of said springs, means actuated by the operation of each of said key members to cause the operation of the last-mentioned bars for successively releasing said wheels to cause the movement thereof, and means carried by said wheels engaging means carried by the first-mentioned bars for limiting the movement of said wheels to position corresponding to the operation of said key members.

2. In a call transmitter, a set of key members, a plurality of bars disposed transverse of said key members, a shaft, a plurality of combined code-indicator wheels mounted for free rotation on said shaft, said bars being disposed in spaced relation to each other in a row concentric to said shaft, normally tensioned motor springs for actuating said wheels, a plurality of longitudinally movable bars disposed transverse of the first-mentioned bars, means carried by the last mentioned bars normally engaging means carried by said wheels for holding the latter in normal non-operated position against the tension of said motor springs, an escapement mechanism and means carried by said key members for moving the first-mentioned bars in position for limiting the movement of said wheels following the operation of the last-mentioned bars and the operation of said escapement mechanism under control of said key members.

3. In a call transmitter, a pair of mounting plates, a shaft journaled in said plates, a plurality of combined code-indicating wheels mounted for free rotation on said shaft, retractile springs for said wheels, a pair of crank-arms keyed to said shaft, a bar having its end portions secured to the free end of said arms for movement concentric to said shaft, said wheels having portions forming abutments disposed for engagement by said concentrically movable bar, manually operable means for rotating said shaft

to cause said bar to engage said portions for moving said wheels to normal non-operated position and tensioning said retractile springs and a plurality of spring retracted slidable bars having means engaging means carried by said wheels for holding the latter in normal non-operated position against the tension of said retractile springs.

4. In a call transmitter, a plurality of combined code-indicator elements, normally tensioned retractile springs for actuating said elements, a plurality of movable bars disposed for predetermining the extent of movement of said indicating elements, but normally ineffective thereto, means carried by said key members engaging means carried by said bars for moving the latter in position effective relative to said elements, an escapement mechanism means actuated by the operation of each of said key members for controlling the operation of said mechanism to cause the successive operation of said elements under the tension of said retractile springs for setting and indicating a call, an alternating current generator having vibrative reeds, motor means for moving said generator in direction transverse of said combined code indicator elements to cause the operation of said reeds for transmitting a call, a support for said combined code-indicator elements manually operable for returning said elements and said escapement mechanism to normal unoperated position simultaneously following the transmitting of the call.

5. In a call transmitter, a set of key members, a pair of supporting plates, a shaft mounted for free rotation on said plates, a pair of crank-arms keyed on said shaft, a bar secured to said arms for movement concentric to said shaft, a plurality of combined code indicating wheels mounted for free rotation on said shaft having means engaging by said bar for rotating said wheels to normal non-operated position, retractile springs for said wheels tensioned by the movement thereof, a handle mounted on said shaft having a clutch element, a lever member keyed on said shaft and having a clutch element connecting with the clutch element of said handle, a sleeve mounted for free rotation on said shaft, a disc member carried by said sleeve having a ratchet tooth engaged by means carried by said lever member, a gear sector keyed to said sleeve, a motor spring having one end connected to said sleeve and its other end to means carried by one of said supporting plates for tensioning said springs upon the operation of said handle while moving said wheels to normal by the concentric movement of said bar, a manually operable spring-pressed pawl pivoted on one of said supporting plates engaging means in said disc for holding said motor spring tensioned for permitting the return of said handle and said bar to normal non-operated position for permitting the movement of said wheels by said retractile springs under control of said key members for setting a call, a current generator having vibrative elements operatively connected to said gear sector and movable under the tension of said motor spring for engaging the code portions of said wheels for transmitting a call.

6. In a call transmitter, a set of key members, a shaft, combined code-indicator wheels mounted for free rotation on said shaft, normally tensioned retractile springs for rotating said wheels, a pair of supporting plates for said shaft, a spacer member secured at both ends to said supporting plate, longitudinally movable bars respectively asso-

ciated with said wheels and having one of their ends slidably mounted on said shaft and their other ends slidably engaging said spacer member, retractile springs for said bars, means in said spacer member cooperating with means carried by said bars for holding the latter from operating against the tension of their retractile springs, means carried by said bars for normally holding said wheels from operating under the tension of their retractile springs, each of said bars having oppositely disposed ratchet teeth, a pair of parallelly disposed bars for alternately engaging said ratchet teeth for controlling the sequence of movement of said bars upon the operation of said key members to cause the successive operation of said wheels to angular positions corresponding to the operation of said key members for setting a call, ratchet teeth carried by said wheels, and other means carried by said bars for engaging said ratchet teeth for holding said wheels in said angular positions an alternating current generator having vibrative reeds, a normally tensioned motor spring, a gearing mechanism actuated by said motor spring for moving said generator for engaging said reeds with the code portions of said wheels for transmitting the call.

7. In a call transmitter, a set of pivoted key members, a pair of upright supporting plates, a plurality of bars one for each of said key members mounted for longitudinal movement in guiding means formed in said plates, each of said bars having a plurality of indentations and a cam element, said cam element being disposed in engageable relation with its respective key in said set whereby the operation of any one of said key members is effective to impart a sliding movement to its respective bar, a set of combined code-indicator elements, normally tensioned spring means for actuating said elements, an escapement mechanism for normally holding said elements in normal non-operated position against the tension of said spring means, means actuated by the operation of each of said key members for actuating said escapement mechanism for releasing one of said code-indicator elements, means carried by said operated bar engaged by means carried by the released element for arresting the movement of the latter to positions corresponding to the digit value of the operated key member, the indentations of the operated sliding bar preventing the operation of the other keys in said sets from normal non-operated position until the return of the operated key to normal non-operated position, and spring means to effect such return movement.

8. In a call transmitter, a set of key members, a set of bars one for each of said key members, retractile springs for said bars, a pair of supporting plates having guiding means for said bars, means carried by said key members cooperating with means carried by said bars for moving the latter longitudinally against the tension of said retractile springs, said retractile springs being dis-

posed to impart a shifting movement to similar ends of said bars in position for engaging one of said guiding plates whereby said bars when operated are held from returning to normal under the tension of said retractile springs, a shaft mounted on said supporting plates, a set of combined code-indicator elements mounted for free rotation on said shaft for movement at right angles to said bars, normally tensioned retractile springs for actuating said elements, means carried by said elements engaging means carried by said bars when the latter are in the operated position for determining the position of said elements according to the operation of said key members for setting a call, the engagement of the means carried by said bars imparting a movement to the latter for disengaging them from said supporting plates to cause their return movement to normal position, other means controlled by the operation of said key members for holding said elements in their set position, an alternating current generator having vibrative reeds, a handle, a motor spring tensioned by the operation of said handle, a gearing mechanism actuated by said motor spring for moving said generator in a direction for engaging the reeds thereof with the code portions of said elements for transmitting the call and a governor mechanism for controlling the operation of said motor spring.

9. In a call transmitter a set of key members, a set of longitudinally movable bars disposed in parallel relation to each other in an arcuate row and actuated by the operation of said key members, a shaft, a plurality of combined code indicator elements mounted for free rotation on said shaft, an escapement mechanism actuated by the movement of any one of said key members to cause the successive operation of said elements upon the operation of said bars, motor means for actuating said elements, and means carried by said bars in said arcuate row for engaging with means carried by said code indicating elements for controlling the angular movement of the latter in their movements as effected by said motor means for setting and indicating the call.

10. In a call transmitter, a set of key members, a set of bars arranged in an arcuate row, cam portions formed with said bars, means carried by each of said key members for engaging said cam portions for imparting longitudinal movement to said bars individually, other bars disposed at right angles to the first-mentioned bars, code elements, spring means for actuating said code elements but normally held against movement by said other bars, an escapement mechanism actuated by the operation of said key members to cause the successive operation of said other bars for successively operating said code elements to position determined by the engagement of means carried by said elements with means carried by said bars in said arcuate row for setting a call.

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