Feb. 26, 1946. T. L. DOWEY 2,395,539

TELEPHONE CALL TRANSMITTER

Filed Dec. 31, 1943 4 Sheets-Sheet 1

FIG. 1

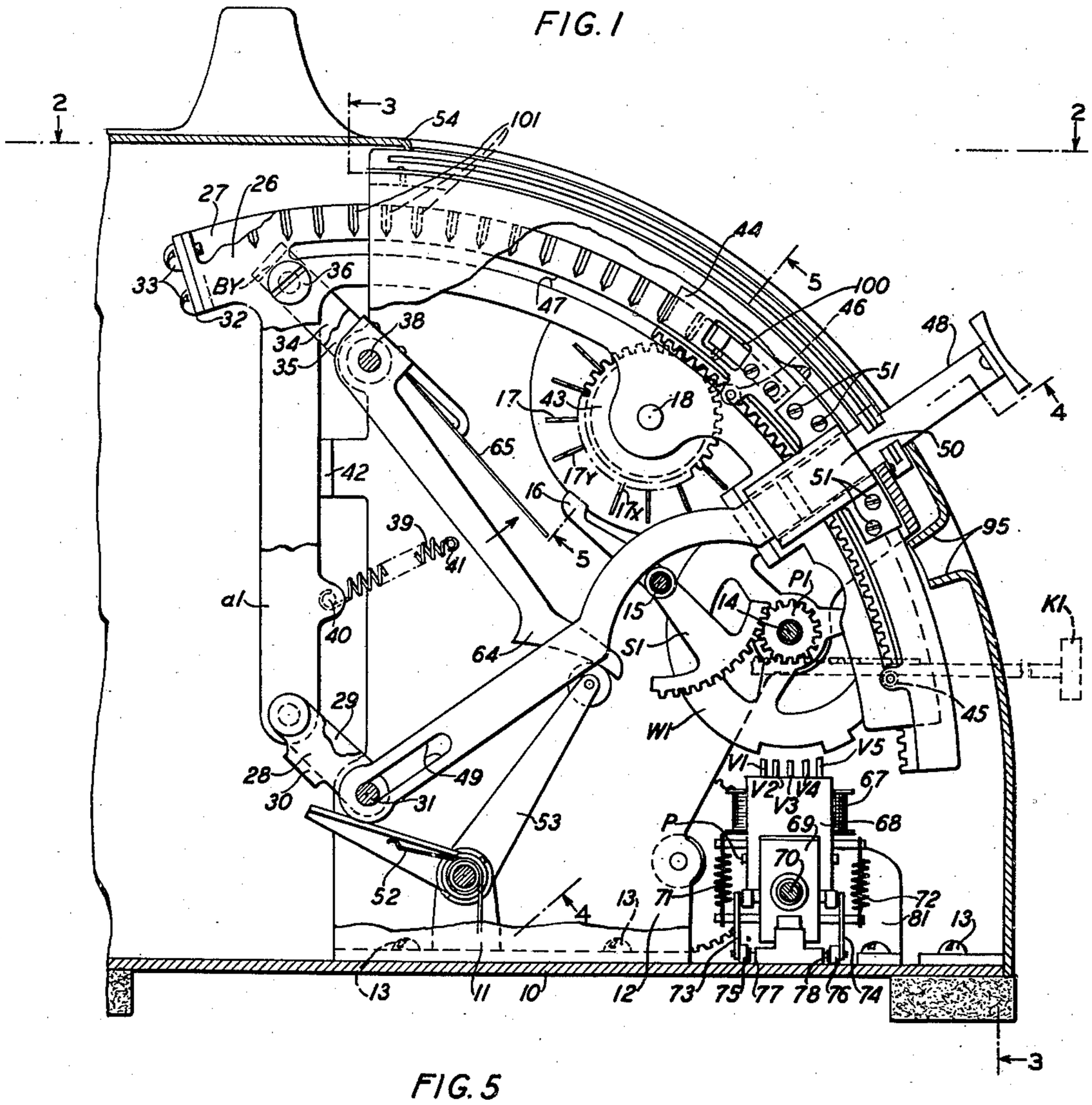
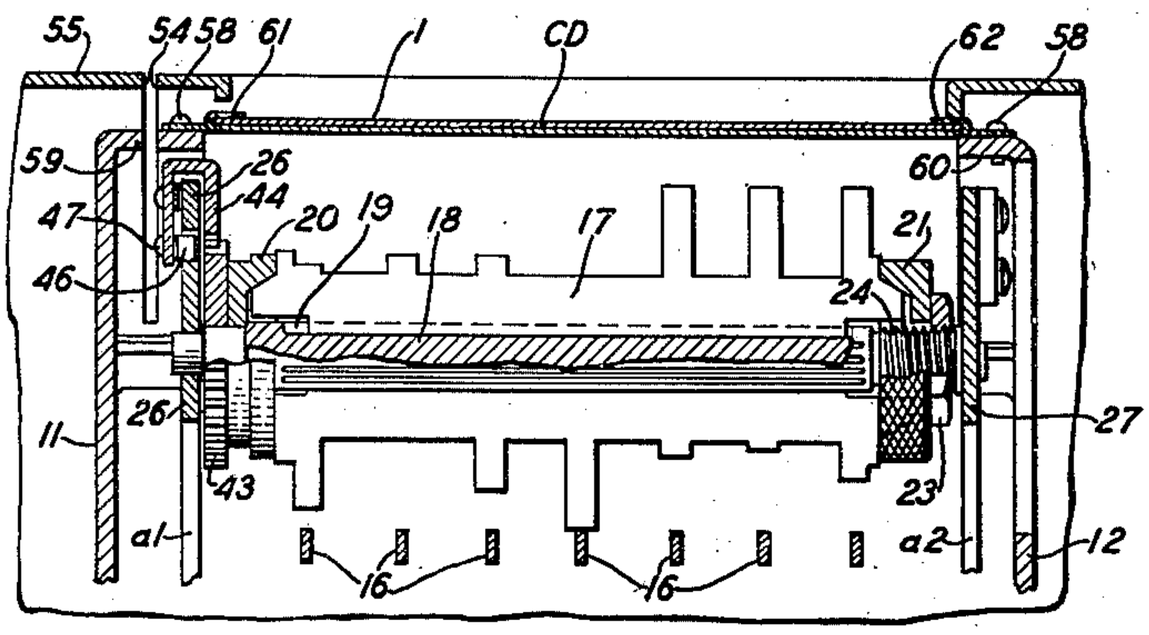


FIG. 5



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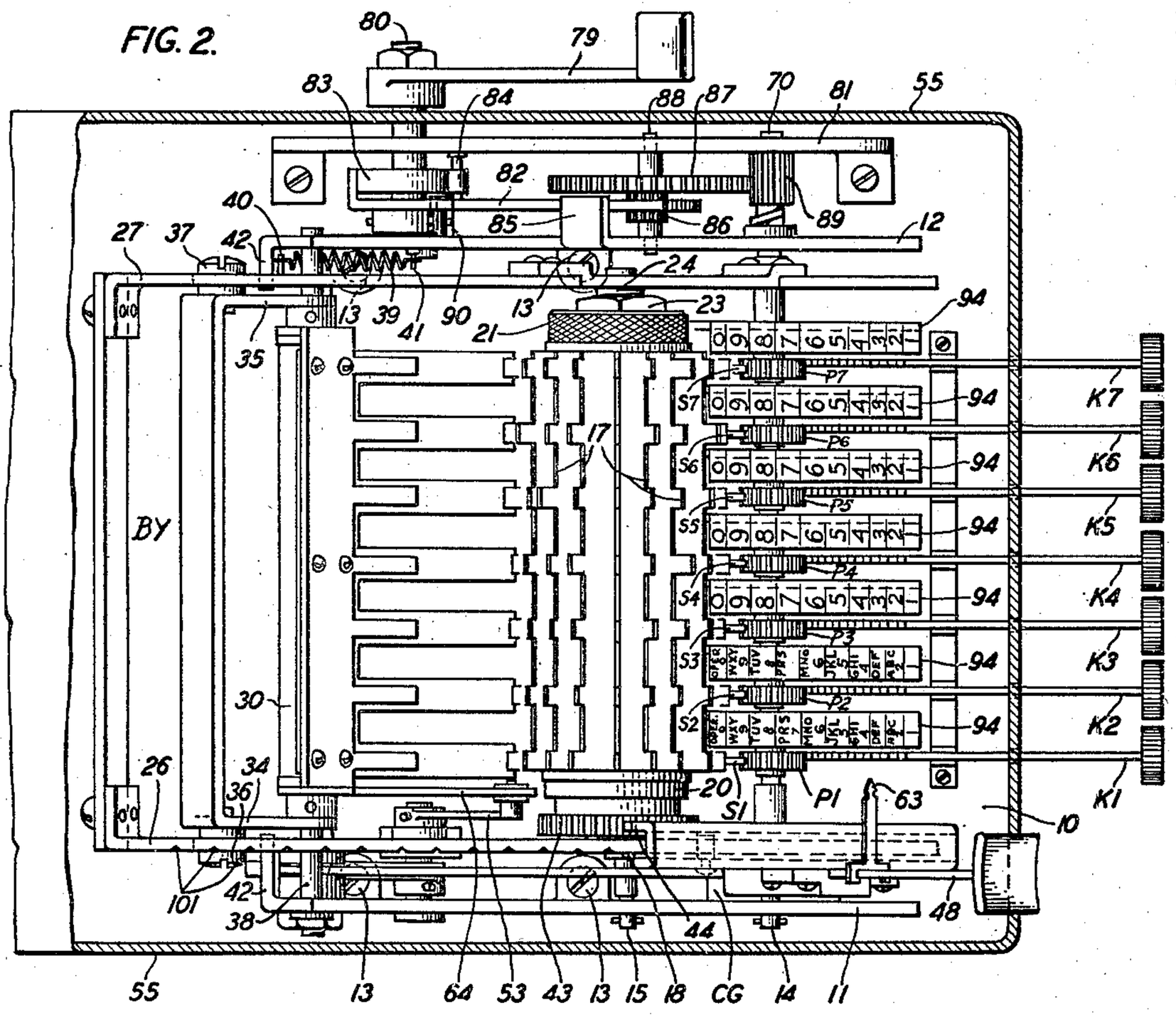
Filed Dec. 31, 1943 4 Sheets-Sheet 2

FIG. 2.



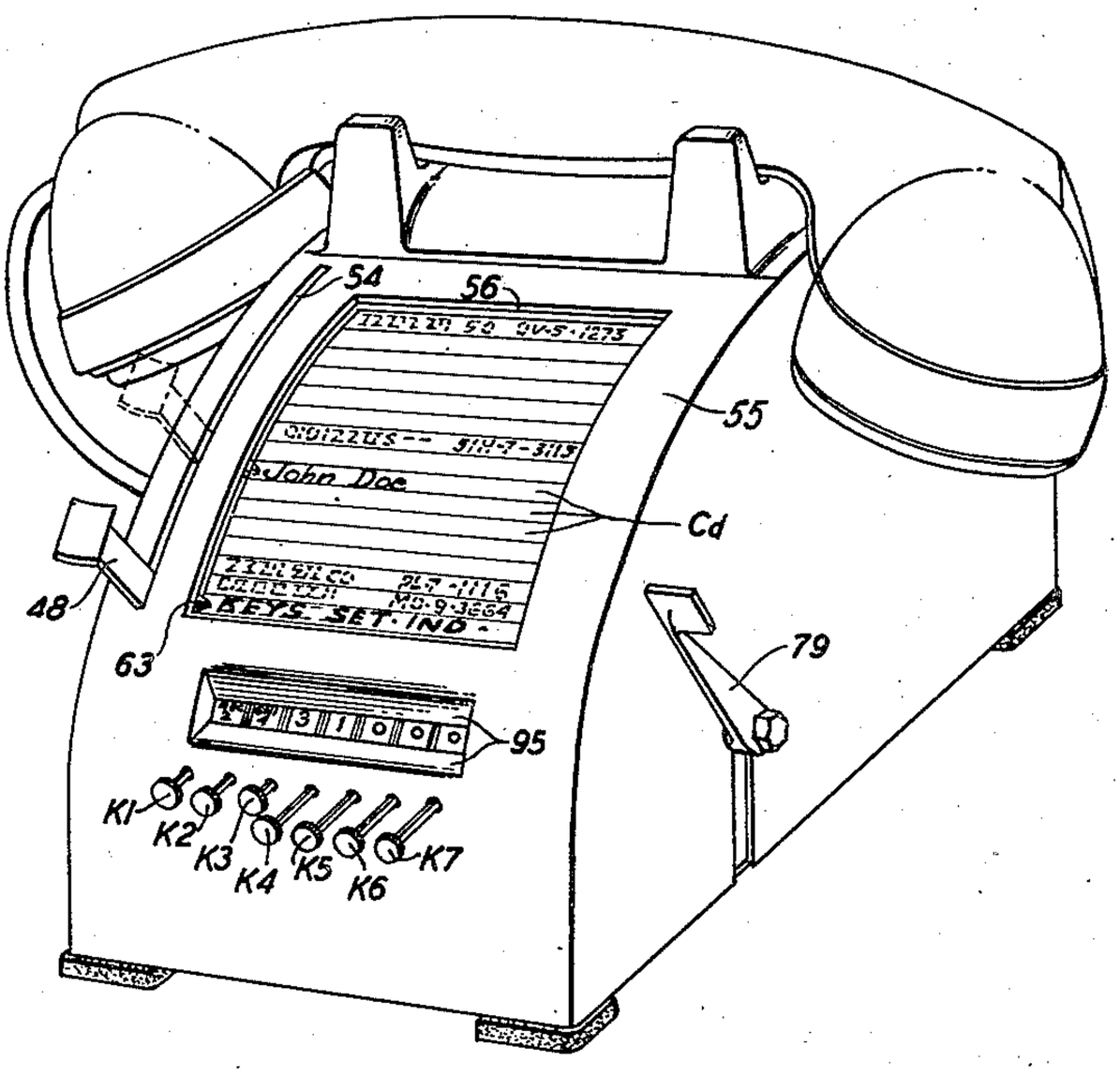


FIG. 8.

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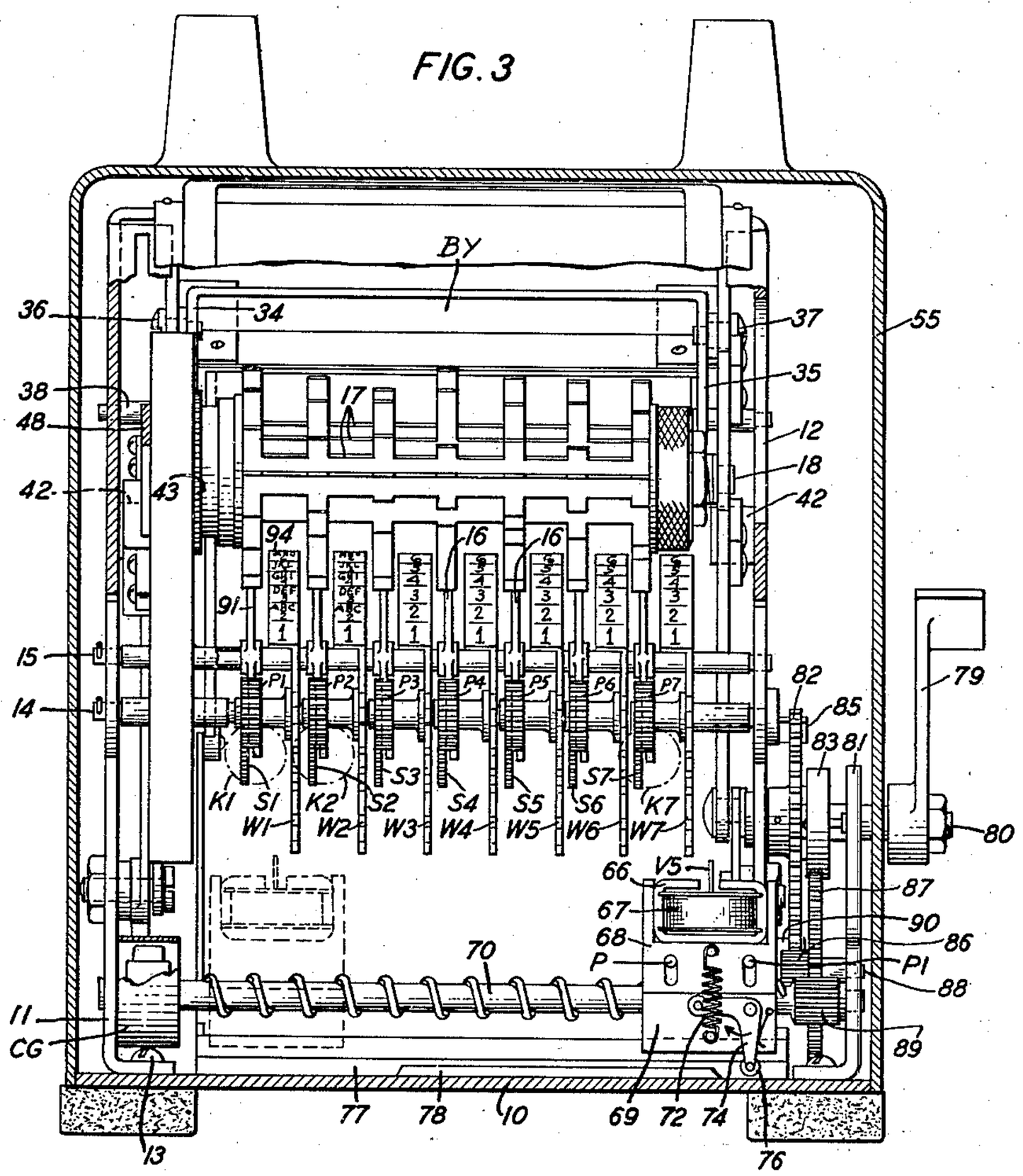
TELEPHONE CALL TRANSMITTER

Filed Dec. 31, 1943 4 Sheets-Sheet 3

FIG. 3



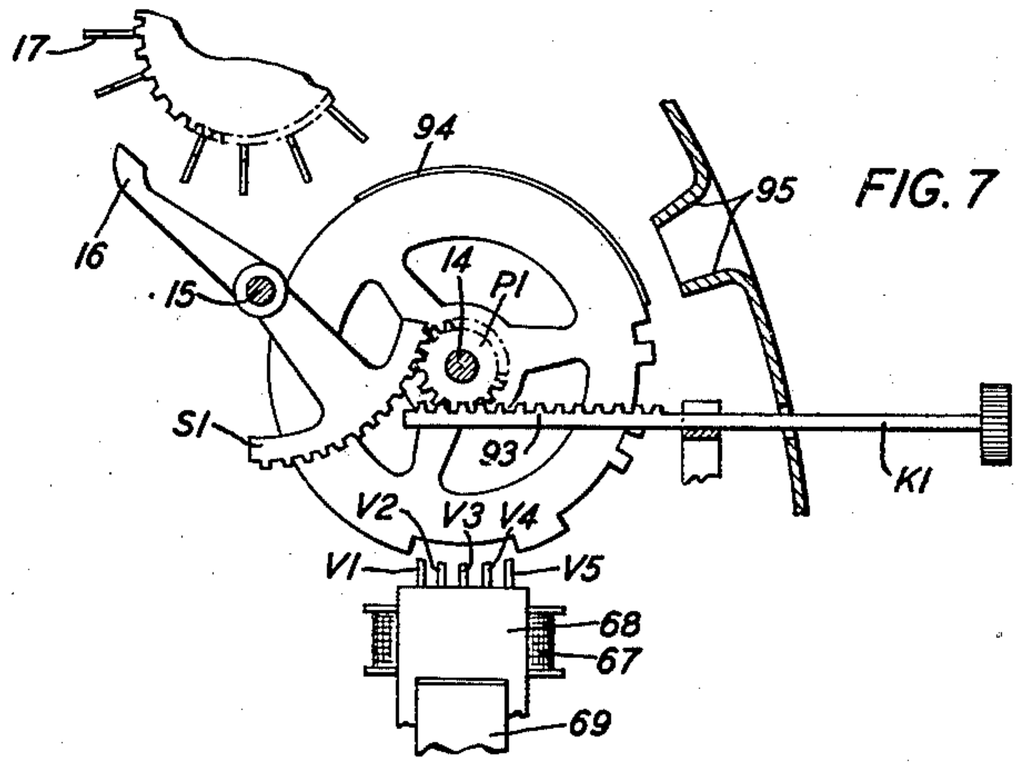


FIG. 7

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Feb. 26, 1946. T. L. DOWEY 2,395,539

TELEPHONE CALL TRANSMITTER

Filed Dec. 31, 1943 4 Sheets-Sheet 4

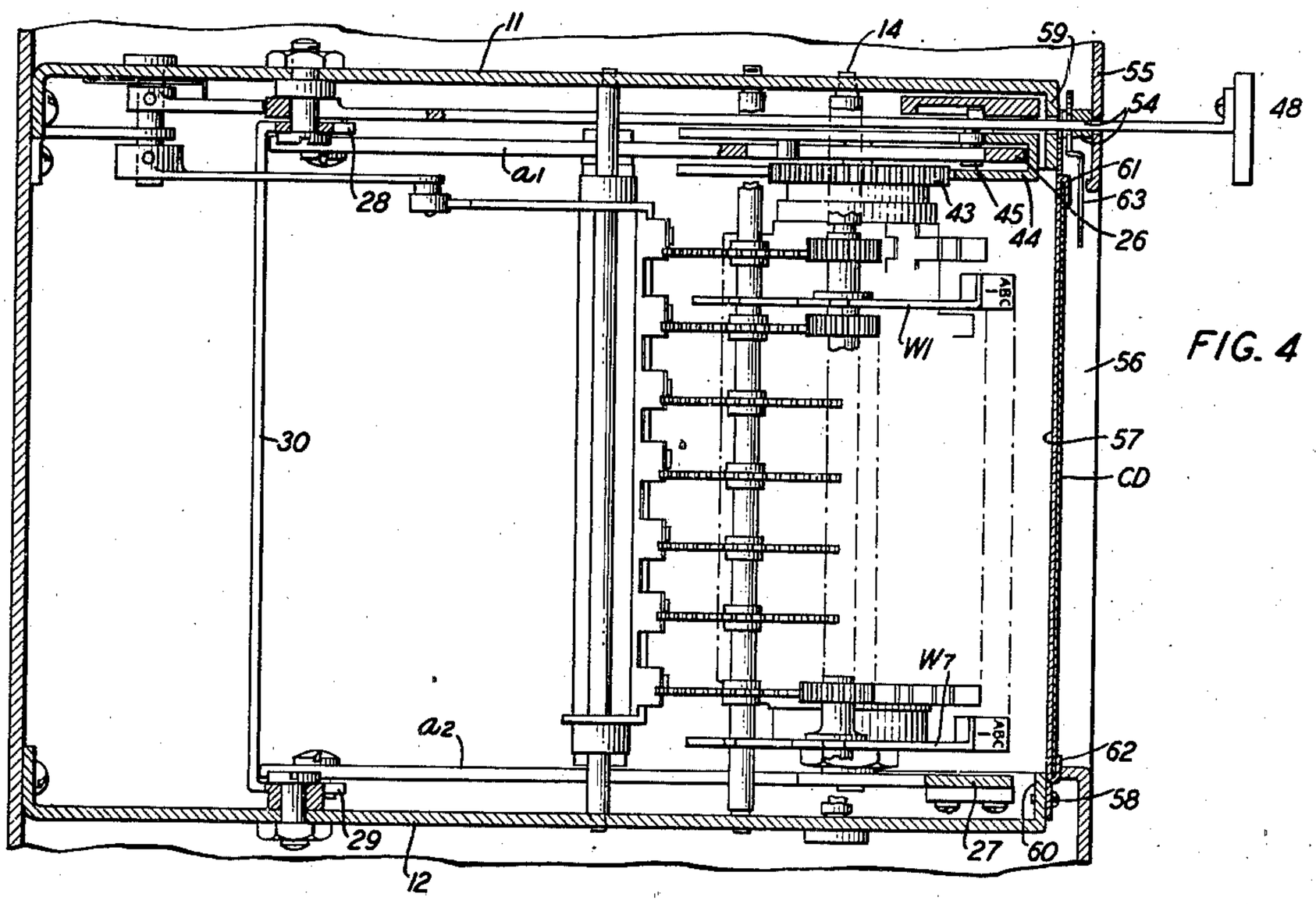

FIG. 4

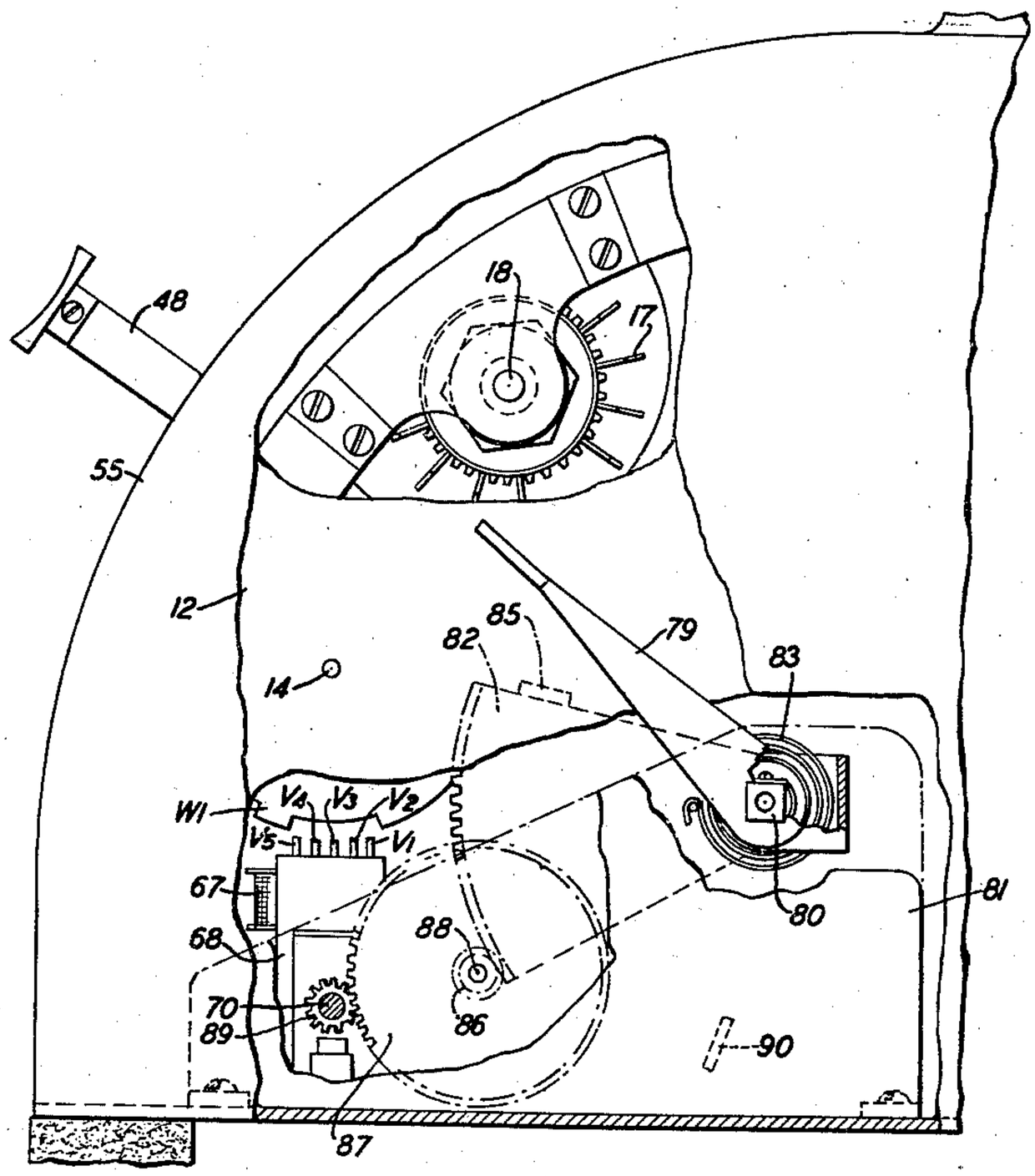

FIG. 6

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UNITED STATES PATENT OFFICE

2,395,539

TELEPHONE CALL TRANSMITTER

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Application December 31, 1943, Serial No. 516,430

7 Claims. (Cl. 179—90)

This invention relates to telephone call transmitters of the repertory type.

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, positive in operation and in which code elements are moved in position for setting a call by the operation of a handle lever or by the operation of key members independently of the repertory setting mechanism, with motor means for moving an alternating current generator transverse of the code elements for transmitting signals corresponding to the setting of these elements.

In the drawings:

Fig. 1 is a left side elevation view shown with the casing housing the transmission mechanism in vertical section, the operating parts being shown in normal non-operated position, and showing a number of these parts with portions broken away;

Fig. 2 is a top view shown with the casing in horizontal section seen on line 2—2 of Fig. 1;

Fig. 3 is a front elevation view seen on line 3—3 of Fig. 1 with the casing and a number of operating parts in vertical section;

Fig. 4 is a partial view in section taken on line 4—4 of Fig. 1;

Fig. 5 is a view of the code elements and mounting shaft shown partly in section;

Fig. 6 is a partial view showing the driving mechanism for the alternating current generator, the casing being shown with portions broken away and the code wheels in normal non-operated position;

Fig. 7 is a partial view showing the key-setting mechanism for the code wheels in normal non-operated position; and

Fig. 8 is an assembly view shown in perspective, the code wheels being shown in the operated position by the operation of the manually operable keys.

In the call transmitter of this invention a base 10 is provided for securing as by a number of screws 13 the upright supporting plates 11 and 12 and on these plates is journaled a shaft 14 on which are mounted for free rotation thereon a plurality of code wheels W1, W2, W3, W4, W5, W6 and W7 having hub portions extending to one side thereof for securely mounting the pinions P1, P2, P3, P4, P5, P6 and P7 best seen in Figs. 2 and 3 engaged by respective gear sectors S1, S2, S3, S4, S5, S6 and S7 mounted for free pivotal movement on a shaft 15. These gear sectors are formed with similar arm portions 16 best seen in Figs. 1, 3 and 5 extending in engageable relation with code elements in the form of metallic strips 17 mounted on a shaft 18 having peripherally longitudinally disposed grooves 19 best seen in Fig. 5 provided for readily locating the code strip 17 in equally spaced relation on the shaft 18 where they are collectively held radially in assembled relation to each other between disc members 20 and 21, disc member 20 being keyed on shaft 18 while disc member 21 is pressed against the code strip ends by a nut 23 engaging the screw-threaded portion 24 of shaft 18 as shown in Fig. 5.

The shaft 18 is journaled at both ends in arcuated mounting elements 26 and 27 formed with vertically disposed arms $a1$ and $a2$ pivoted at their lower ends, one of the ends of link members 28 and 29 formed with a bar 30, while the other ends of links 28 and 29 are pivoted on a shaft 31 journaled in upright supporting plates 11 and 12.

The arcuated mounting elements 26 and 27 are held in spaced relation at a point adjacent the upper disposed end portions of arms $a1$ and $a2$ by a spacer bar 32 secured thereto as by a number of screws 33, while a second pair of links 34 and 35 formed at the ends of a bar BY are pivoted at one of their ends on shoulder screws 36 and 37 carried by the arcuated mounting elements 26 and 27 and their opposite ends on a shaft 38 journaled in upright supporting plates 11 and 12, while a retractile spring 39 having one end hooked to a stud 40 laterally extending from the arm $a2$ and its other end connected to a pin 41 laterally extending from the upright supporting plate 12 serves to yieldably hold the arcuated mounting elements 26 and 27 in the non-operated position as shown in Fig. 1 as defined by the engagement of arms $a1$ and $a2$ with similar stop lugs 42 formed and laterally extending from the upright supporting plates 11 and 12 as shown in Figs. 1, 2 and 3.

On shaft 18 is keyed a gear 43 meshing with an arcuated gear rack 44 mounted for sliding movement on the arcuated mounting element 26 and guided in its movement thereon by roller members 45 and 46, Figs. 1, 4 and 5 running into a guiding slot 47 in the arcuated mounting element 26. A handle lever 48 is provided at its lower end with a slot 49 engaging the shaft 31 while the opposite end of this lever is fitted for sliding movement in a guiding element 50 secured as by a number of screws 51 to the gear sector 44 but held in the retracted or non-oper-

ated position as shown in Figs. 1, 4 and 8 by an angle lever 53 itself under the tension of a spring 52 engaging the horizontally disposed arm of this angle lever. The handle lever 48, as shown in Figs. 1, 4 and 8, extends through a slot 54 in a casing 55 serving for housing the transmitter mechanism. Casing 55, in addition, is provided with a card frame 57 secured as by a number of similar screws 58 onto the inwardly bent portions 59 and 60 of upright supporting plates 11 and 12. Card frame 57 is provided with inwardly bent portions 61 and 62 for holding the cards in the forms of strips C*d* on which are printed subscribers' names and shown in Fig. 8, the cards C*d* being of such width as to correspond to the movement of a pointer 63 carried by the handle lever 48 and the movement of shaft 18 and that of the code strips 17 carried thereby passing in registry with the arms 16 of gear sectors S1, S2, S3, etc., so that the pivotal movement of handle lever 48 from the position shown in Figs. 1 and 8 to the position at the opposite end of guiding slot 64 is effective through the operation of gear sector 44 to rotate the gear 43 and thereby the shaft 18 for successively placing the code strips 17 in registry with the cards C*d* representing the telephone call designations of the subscribers' names which appear in registry or in alignment with the pointer 63.

The longitudinal movement of handle 48 following its movement as to place the pointer 63 in registry with any one of the cards C*d* and thereby the corresponding code strip 17 in registry with the arms 16 of gear sectors S1, S2, S3, etc., is effective to impart a pivotal movement to angle lever 53 against the tension of its retractile spring 52, which movement is imparted to a camming arm 64 secured to link 34 coextensive thereto to actuate this camming arm in the direction indicated by the arrow in Fig. 1 and thereby causing a downward swinging movement of the arcuated mounting elements 26 and 27 on links 34 and 35 and 28 and 29 while the pivotal movement of links 34 and 35 is effective to move a plurality of ribbon-shaped springs 65 toward their respectively associated arms 16 simultaneously with the downward movement of supporting mounting elements 26 and 27 to cause the springs 65 to engage their respective arms 16 formed with gear sectors S1, S2, S3, etc. for rotating the latter and the code wheels W1, W2, W3, etc. to position for placing a portion of each of these code discs which represent the number of the subscriber's name selected in position to be engaged by the vibrative elements V1, V2, V3, V4 and V5 of an alternating current generator best seen in Figs. 1, 3, 6 and 7 upon the movement of the latter transverse of the code elements by a mechanism which will be hereinafter described in detail.

The alternating current generator consists of a permanent magnet 66, best seen in Fig. 3, a coil 67, a mounting 68 to which the vibrative elements V1, V2, V3, V4 and V5 are secured to project in an opening in the core of coil 67 for vibration between the poles of permanent magnet 66, the mounting 68 in turn being fitted as shown in Fig. 6 for sliding movement pins as P and P1 laterally extending from a nut 69 engaging a worm screw 70 while a pair of retractile springs 71 and 72, Figs. 1 and 3, yieldably hold the mounting 68 in position wherein the reeds V1, V2, V3, etc. carried thereby are ineffective to engage the code wheels W1, W2, W3, etc., upon the movement of the generator from the position shown in Fig. 3 to a position at the opposite end of worm 70 due to the pivotal movement of angle levers 73 and 74 away from the under-surface of mounting 68 as effected by the engagement of these angle levers with parallelly disposed cam bars 77 and 78 formed with the base 10, while the return movement of the generator and the consequent pivotal movement of the angle levers 73 and 74 in the direction indicated by the arrow in Fig. 3 is effective to move the generator in an upward direction against the tension of retractile springs 71 and 72 so as to place the reeds V1, V2, V3, etc., in position to successively engage the code wheels W1, W2, W3, etc.

The worm 70 is rotated in one direction by the movement of a handle lever 79 fitted on the square portion of a shaft 80 journaled at one end in the upright supporting plate 12 and its other end in an upright support 81 secured at its lower end to the base 10 and on shaft 80 as shown in Figs. 2, 3 and 6 is secured a gear sector 82 and the inner convolution of a spiral motor spring 83, the latter having its outer convolution hooked to a pin 84 laterally extending from the upright support 81, the motor spring 83 being normally tensioned as to hold the gear sector 82 against a stop in the form of lug 85 and the handle lever 79 in the position shown in Figs. 1, 3, 6 and 8.

Gear sector 82 meshes with a pinion 86 mounted for rotation as a unit with a gear 87 keyed on a shaft 88 while gear 87 meshes with the pinion 89 keyed on one end of worm 70 so that the angular movement of handle lever 79 from stop 85 to stop 90 is effective to rotate the shaft 80 and thereby the gear sector 82 while tensioning the motor spring 83 and rotating the worm 70 for moving the generator transverse of the code wheels W1, W2, W3, etc., to starting positions as shown in dotted lines in Fig. 3. The release of handle lever 79 by the operator and the consequent return of gear sector 82 to normal unoperated position by the tension of motor spring 83 is effective to rotate the worm 70 in the opposite direction for returning the generator transverse of the code elements and thereby engaging the vibrative elements V1, V2, V3, etc., with the code wheels set by the operation of the code strips 17, such movement being effected under control of an ordinary speed governor CG.

As shown in Figs. 1, 3, 7 and 8, longitudinally movable key members K1, K2, K3, K4, K5, K6 and K7 are provided with gear rack portion 93 engaging the pinions P1, P2, P3, etc., of code wheels W1, W2, W3, etc., for manually moving these wheels in position for setting calls independently of the operation of gear sectors S1, S2, S3, etc., by the code strip 17, which settings are indicated by dials as 94 carried by the code wheels W1, W2, W3, etc., appearing through a window 95 in the casing 55 as shown in Figs. 7 and 8.

In a typical example of operation in the transmitting of a call designation by the repertory mechanism, the movement of handle lever 48 from normal position to the position shown in dotted lines in Fig. 8 for placing the pointer 63 in registry with the subscriber's name, John Doe for example, is effective to actuate the arcuated gear rack 44 for rotating the gear 43 and thereby the shaft 18 for positioning the code strip 17 which represents the call designation of the subscriber selected, the gear 44 being held in that position as shown in Fig. 1 by a spring 100 secured to the arcuated gear rack and engaging

one of the notches 101 in the arcuated supporting element 26.

The longitudinal movement of handle lever 48 is effective to move the angle lever 53 against the tension of its retractile spring 52 and through the engagement of the angle lever 53 with the camming portion of arm 64 causes the pivotal movement of this arm and links 34 and 35 on shaft 38 in the direction indicated by the arrow in Fig. 1 simultaneously with a corresponding downward movement of arcuated supporting elements 26 and 27 supporting the shaft 18 so as to engage the springs 65 with their corresponding arms 16 of gear sectors S1, S2, etc., for moving the latter against the code portions or indentations of the code strip 17 selected by the movement of the gear rack 44, thus rotating the wheels W1, W2, W3, etc., for positioning their code portions in engageable relation with the vibrative elements V1, V2, etc., of the generator, the handle lever 48 being returned to normal non-operated position by the tension of retractile spring 52 and the arcuated supporting elements 26 and 27 by the tension of spring 39.

The manual operation of handle lever 79 and that of gear sector 82 is effective to tension the motor spring 83 and to rotate the pinion and gear units 86 and 87 and the pinion 89 for rotating the worm 70 for moving the alternating current generator from normal to the position shown in dotted lines in Fig. 3 at the opposite end of worm 70, the vibrative elements V1, V2, V3, V4 and V5 being in position ineffective to engage the code elements W1, W2, W3, etc. The return of gear sector 82 to normal unoperated position under the tension of motor spring 83 and the consequent operation of worm 70 in the opposite direction under control of governor CG, the angle levers 73 and 74 engage the cam bars 77 and 78 to move the generator upwardly to cause the vibrative reeds V1, V2, V3, etc., to engage the code portion of wheels W1, W2, W3, etc., for transmitting the call designation represented by the selected card in registry with the pointer 63 and the transmitter is now ready for a successive call setting and transmitting operation.

In a typical example in the setting and transmitting of a call designation which does not appear on one of the cards of the repertory mechanism as call designation CH—3—1000, for example, with the handle lever 48 in normal non-operated position as shown in Figs. 1 and 8 the shaft 18 is positioned to place the blank space in juxtaposition to the arms 16 carried by the gear sectors S1, S2, S3, etc., for permitting the pivotal movement of these sectors and thereby the rotation of the code wheels W1, W2, W3, etc., by the operation of the key members K1, K2, K3, etc., for setting the code portion of these wheels in registry with the vibrative elements V1, V2, V3, etc., of the generator, which position is indicated by the dial 94 carried by these wheels, the transmitting of signals corresponding to the call designation thus set being effected by the manual operation of handle lever 79 for actuating the worm 70 in the manner as above described in connection with the transmitting of signals by the repertory mechanism.

What is claimed is:

1. In a call transmitter, a rotatable shaft, code elements mounted radially on said shaft and in parallel relation thereto, a plurality of code wheels, means manually operable in one direction for rotating said shaft to move said elements for positioning one of the latter in selected position, and driving means for said code wheels operated by said manually movable means in another direction for rotating said wheels to position determined by said selected code elements for setting a call.

2. In a call transmitter, a rotatable shaft, a gear secured to said shaft, a manually operable lever member, a gear sector operated by the movement of said lever member and engaging said gear for actuating said shaft, code elements carried by said shaft movable in selected position by the movement thereof, another shaft, code wheels mounted for rotation on said shaft, each of said wheels having a gear, a third shaft, gear sectors mounted for free rotation on said third shaft and having arms extending in engageable relation with the selected code element on said shaft, a lever mechanism actuated by the movement of said manually operable lever member for engaging said selected code element with said arms to cause the rotation of said code wheels, angular movements corresponding to said selected code element for setting a call.

3. In a call transmitter, a pair of upright supports, a pair of arcuated supporting elements pivoted on said supports, a shaft rotatably mounted on said elements and having a gear keyed at one end thereof, a plurality of code elements mounted on said shaft, a gear sector mounted for sliding movement on one of said supporting elements and engaging the gear on said shaft, a handle lever for actuating said gear sector for rotating said shaft for positioning one of said code elements in selected position, a plurality of code wheels, and driving means for said code wheels actuated by the pivotal movement of said mounting elements effected by the movement of said handle lever to cause the selected code element to engage said driving means collectively for actuating said code wheels for setting a call.

4. In a call transmitter, a pair of upright supports, a plurality of code wheels, a supporting shaft for said wheels journaled on said upright supports, a pair of movable supporting members mounted on said supports, a shaft journaled at both ends on said members, code elements carried by the last-mentioned shaft in parallel relation thereto, manually operable means movable in one direction for selecting one of said code elements and in the other direction actuating said supporting members, and resilient means actuated by the movement of said members for actuating means to cause the rotation of said code wheels according to the selected code elements for setting the call.

5. In a call transmitter, a plurality of sets of independently operable code elements, manually operable means movable in one direction for selecting one of said elements in one of said sets, and a gearing mechanism actuated by the movement of said manually operable means in another direction for actuating all the elements of the other set according to the selected element for setting a call.

6. In a call transmitter, a plurality of sets of independently operable code elements, a manually operable lever member movable in one direction for selecting one of said elements in one of said sets, means operated by said manually operable means in another direction for operating all of said elements in the other of said sets according to said selected element in the other set, an alternating current generator, manually operable means, a motor spring tensioned by the

operation of said manually operable means, and a gearing mechanism operated by the tension of said motor springs for moving said generator in a direction transverse of the last-mentioned code elements for transmitting the call.

7. In a call transmitter, a pair of upright supports, a pair of supporting members pivoted on said supports, a shaft journaled in said supporting members, a plurality of code elements disposed in spaced radial position to each other on said shaft, another shaft journaled on said upright supports, a plurality of code elements mounted for free rotation of the last-mentioned shaft, a manually operable lever member pivoted on said supporting members, means actuated by the pivotal movement of said lever member for rotating the first-mentioned shaft for positioning one of said radial code elements in selected position, a card holder mounted on said upright supports having cards printed with subscribers' names represented by said radial code elements, and means carried by said manually operable lever member cooperating with said cards for indicating the selected code element, means operatively connecting said selected elements with said code wheels, said manually operable lever member being movable longitudinally for actuating said connecting means to cause the collective setting of said code wheels according to said selected code element for setting a call, dials carried by said code wheels for indicating the operation thereof, an alternating current generator, a driving mechanism, and motor means for actuating said mechanism for moving said generator in a direction transverse of said code wheels for transmitting the call.

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