Sept. 19, 1944. C. E. NEWELL 2,358,586

TELEPHONE CALL TRANSMITTER

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FIG. 1

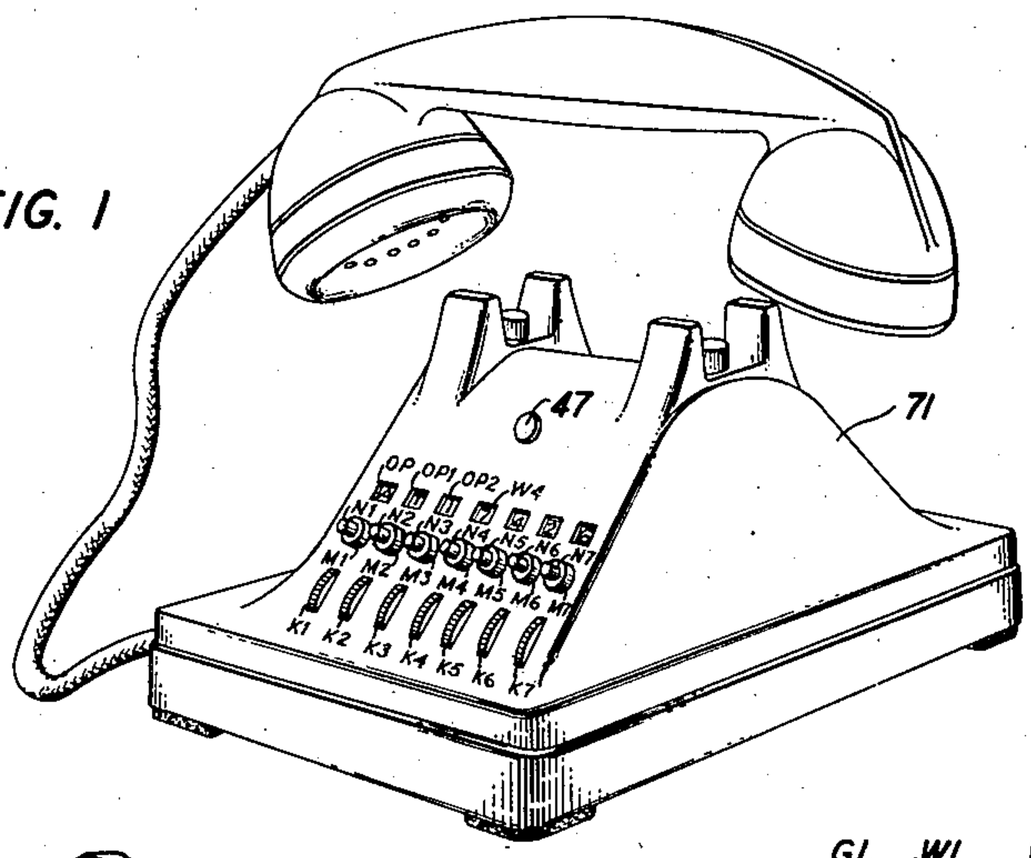


FIG. 18

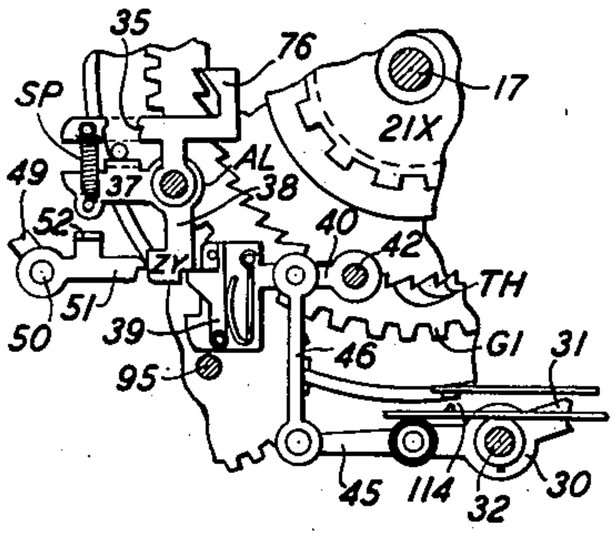


FIG. 17

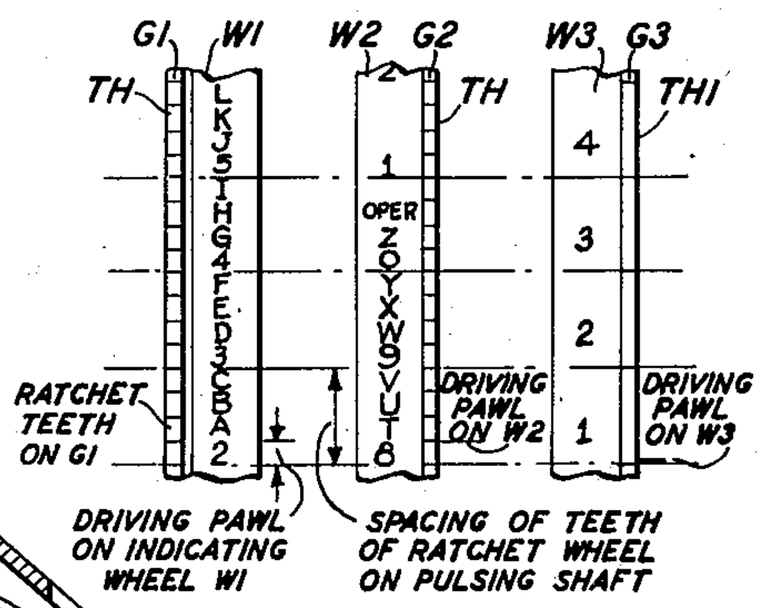
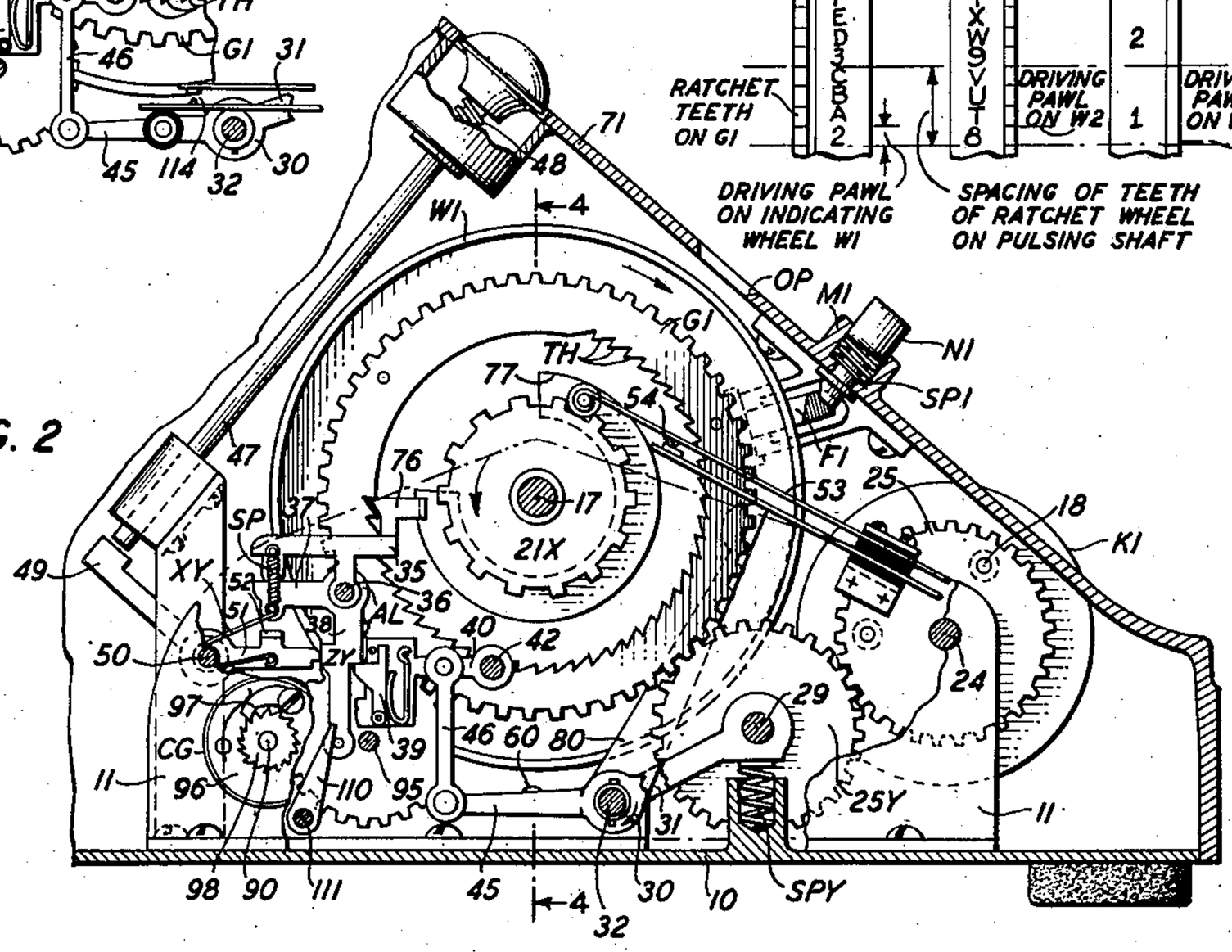


FIG. 2



INVENTOR,
C. E. NEWELL
BY
William R. Ballard
ATTORNEY

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FIG. 3

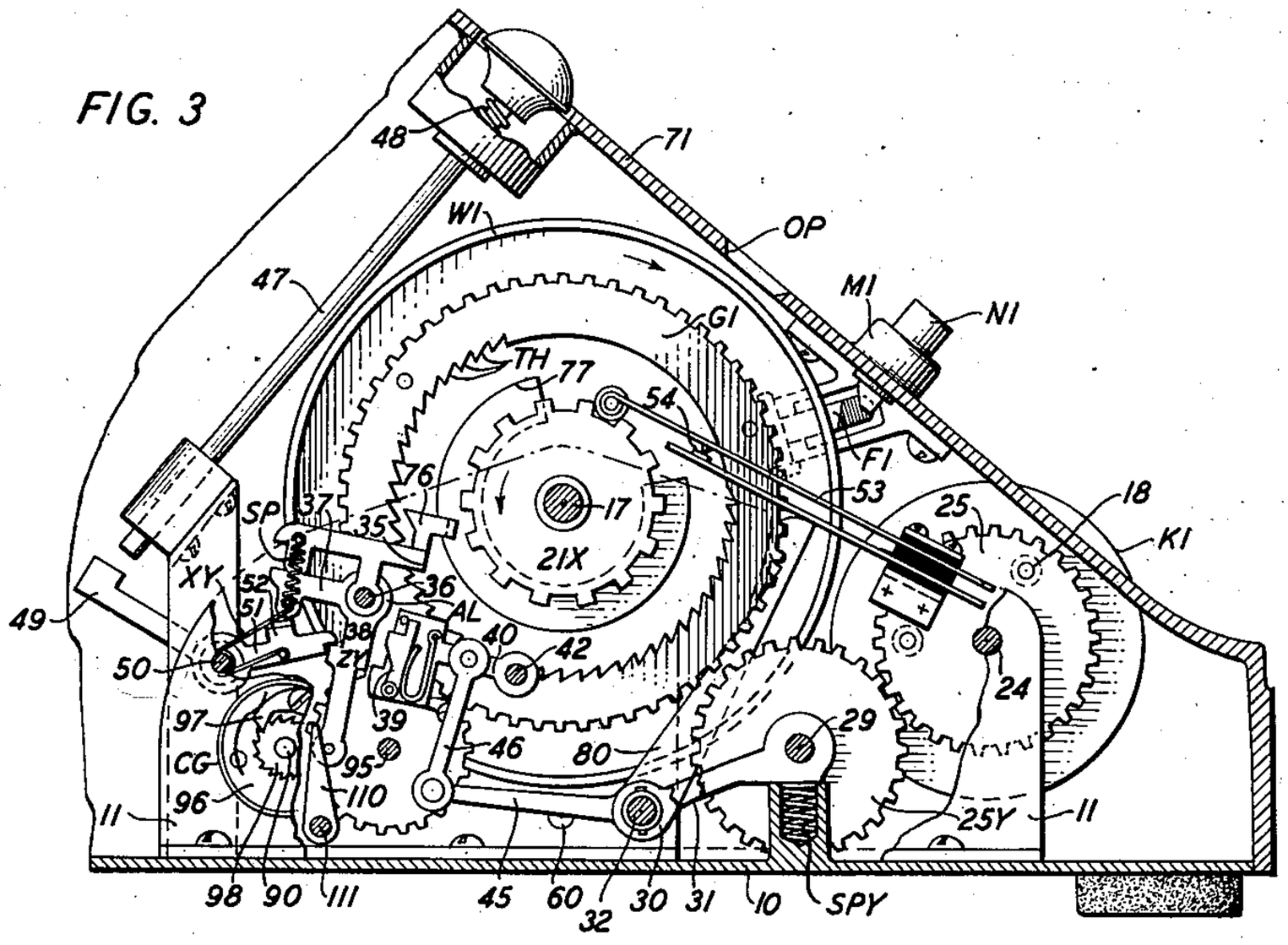


FIG. 9

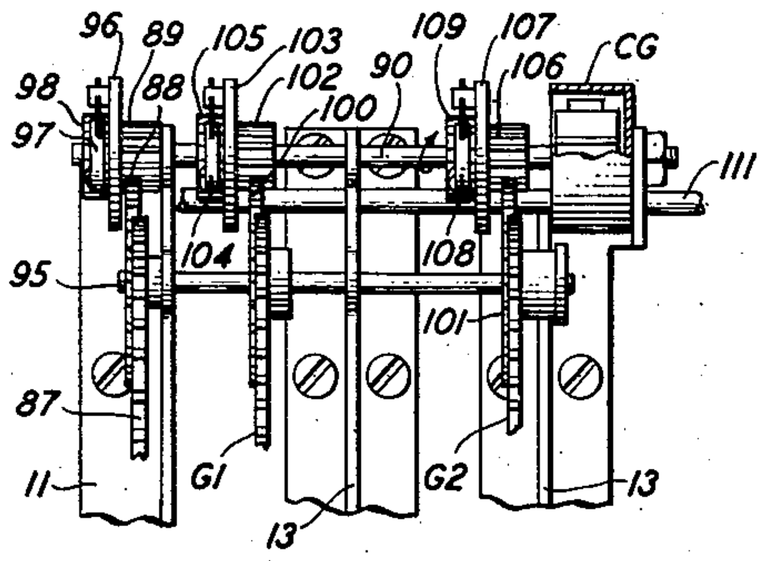


FIG. 10

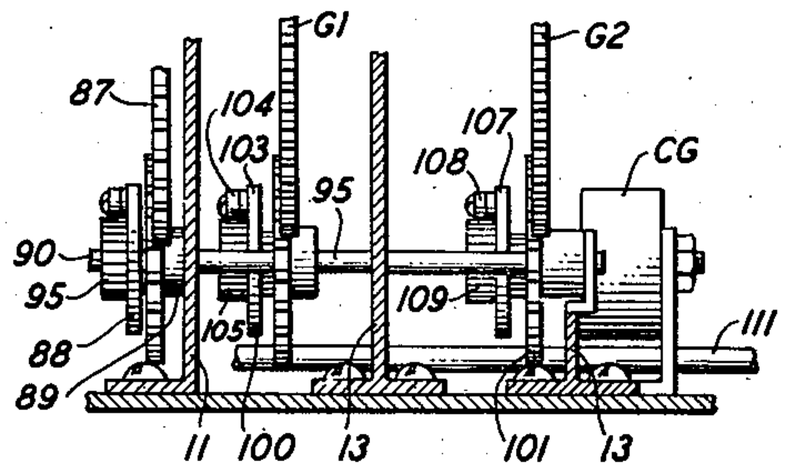


FIG. 14

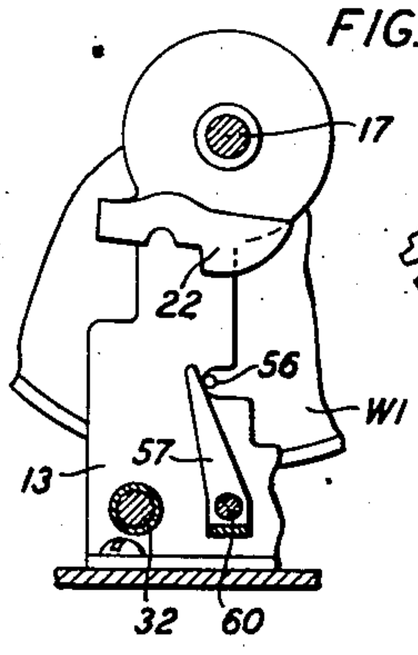


FIG. 15

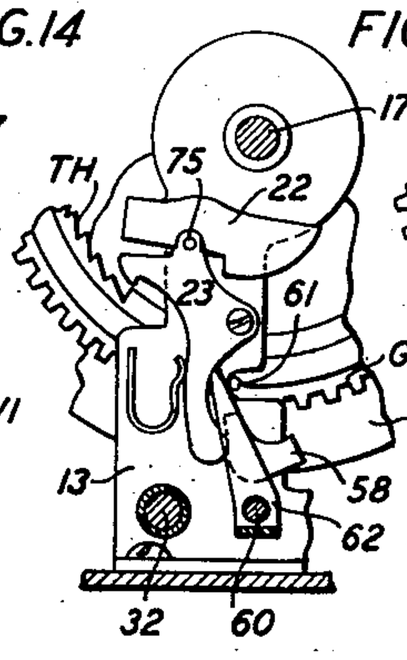
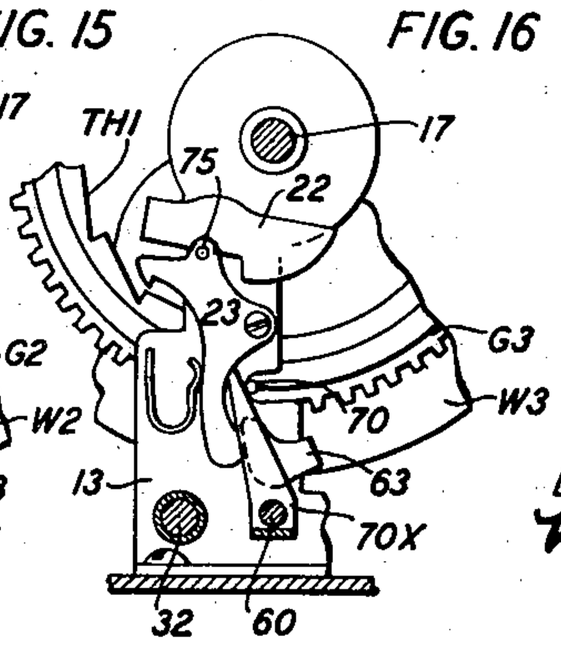


FIG. 16



INVENTOR
C. E. NEWELL
BY William R. Ballard
ATTORNEY

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TELEPHONE CALL TRANSMITTER

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FIG. 4

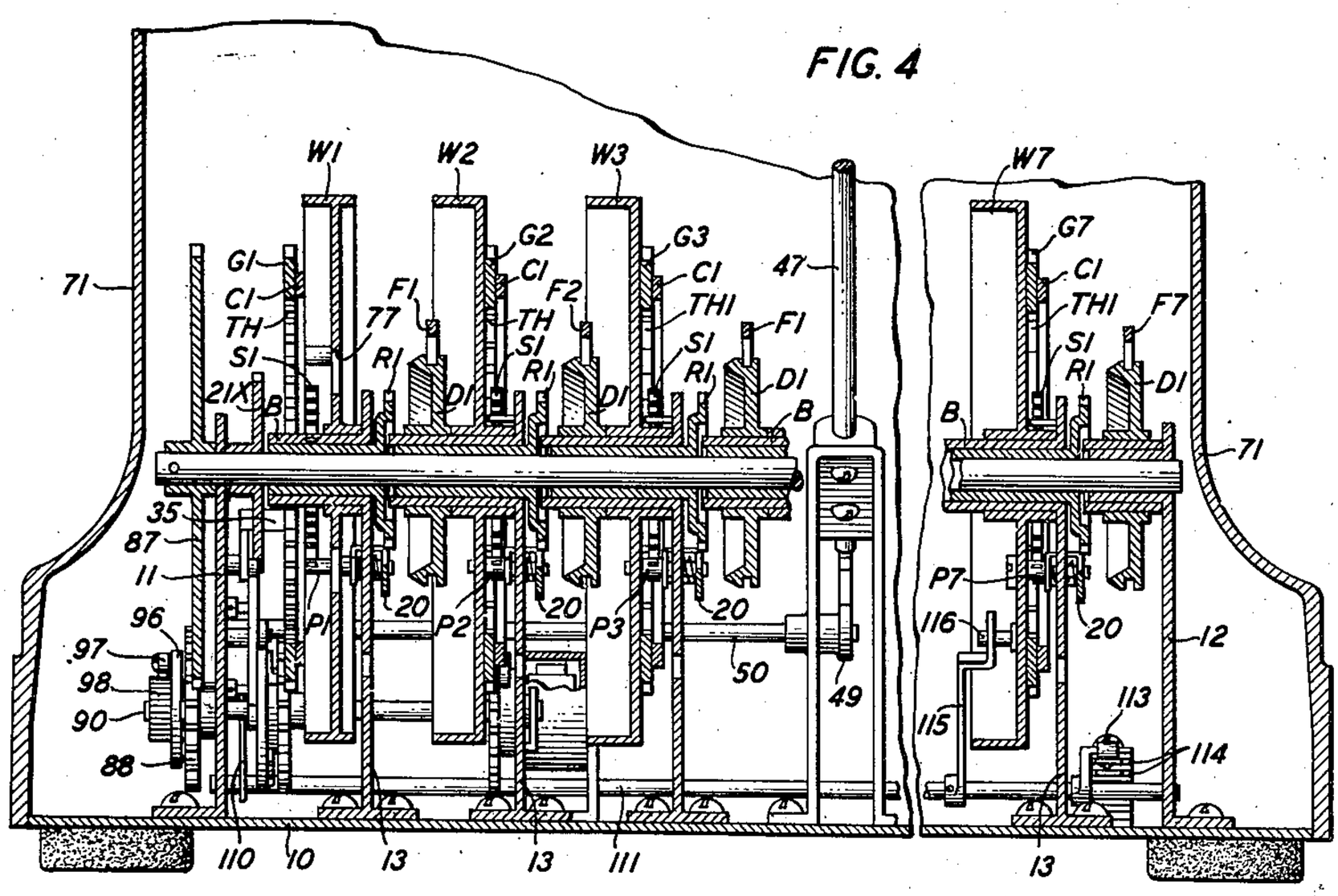


FIG. 5

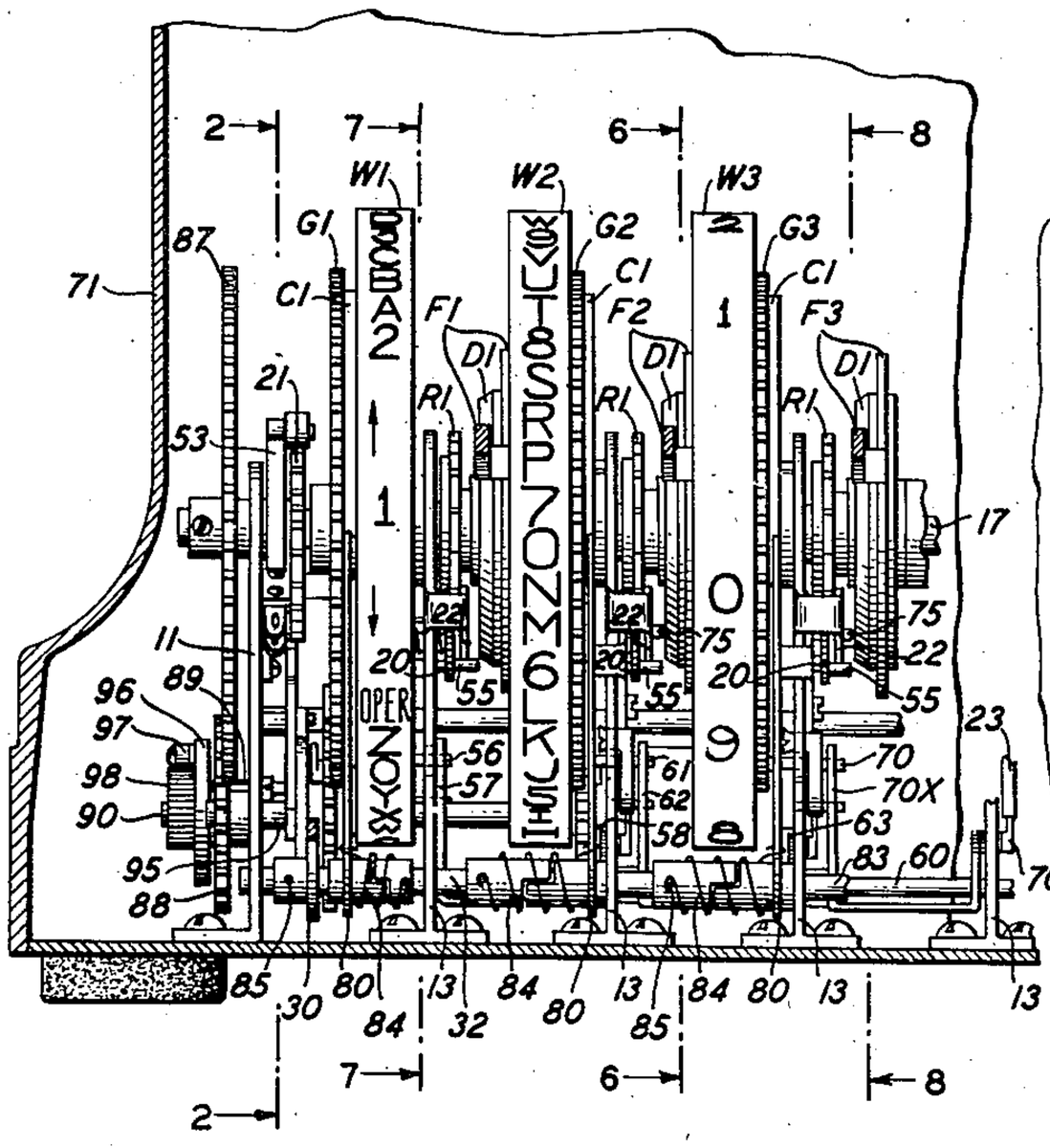
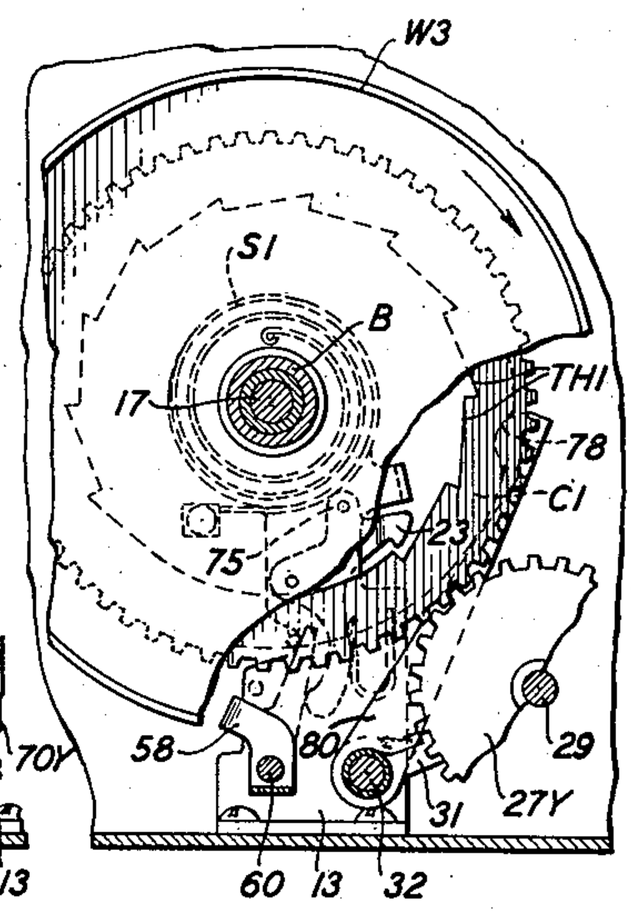


FIG. 6



INVENTOR
C. E. NEWELL
BY
William R. Brund
ATTORNEY

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TELEPHONE CALL TRANSMITTER

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FIG. 7

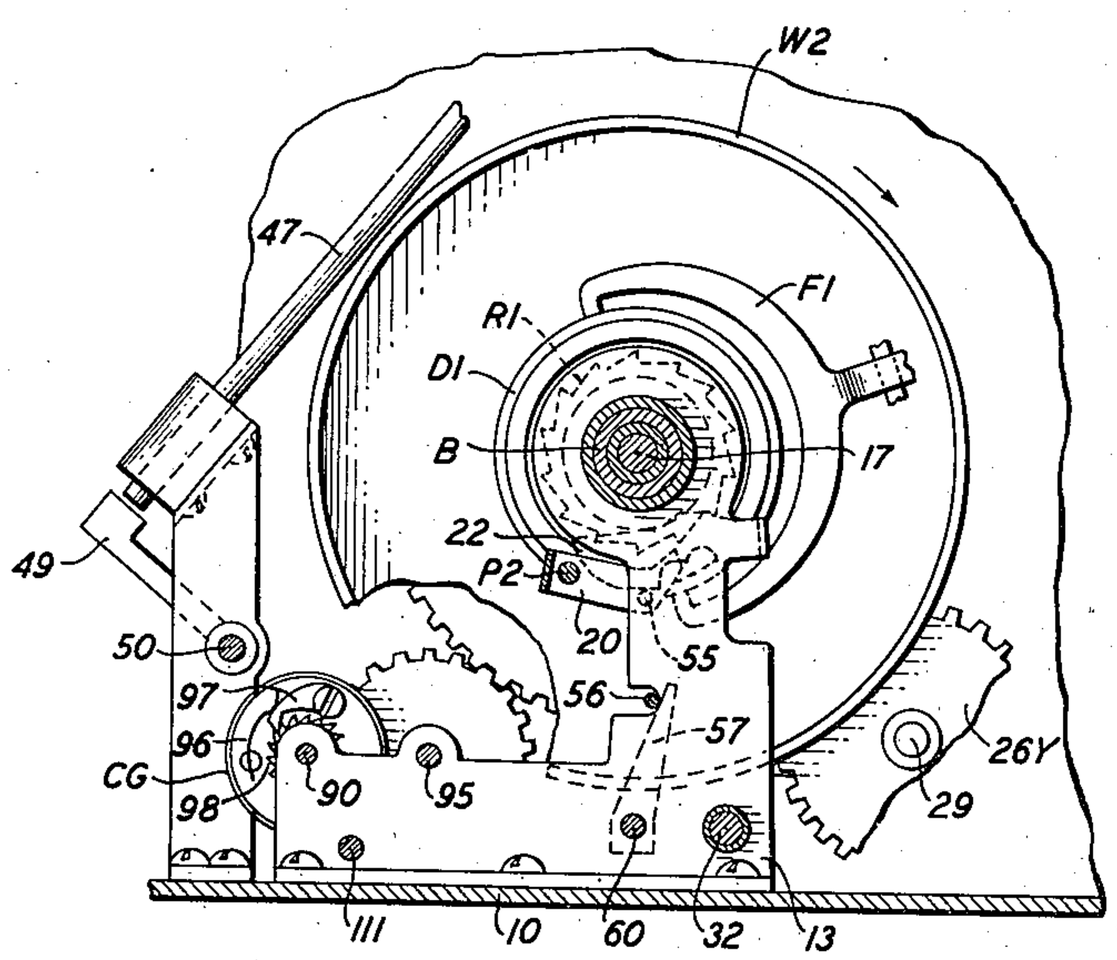


FIG. 11

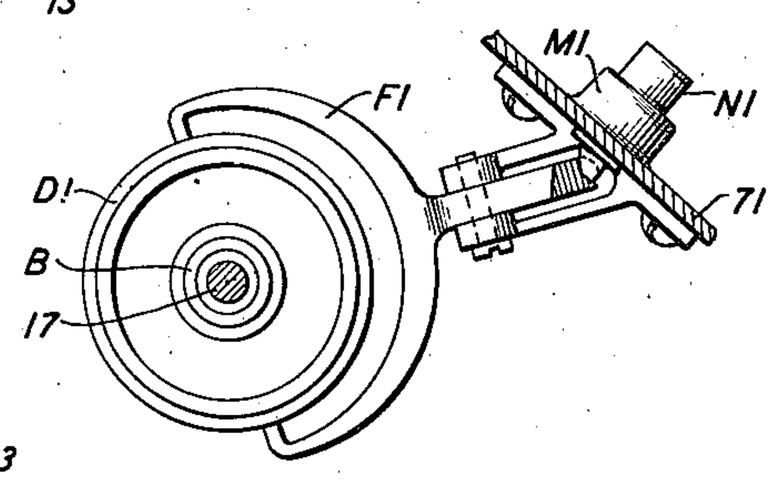
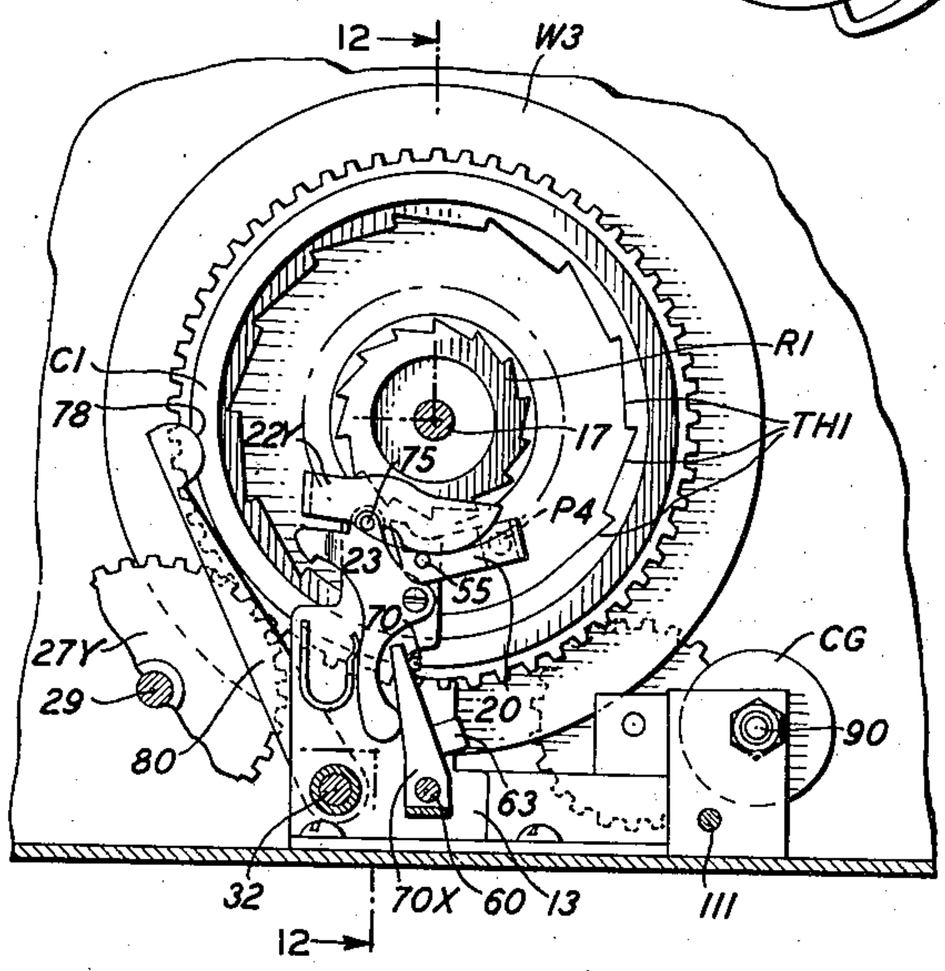


FIG. 8



INVENTOR
C. E. NEWELL
BY
William R. Ballard
ATTORNEY

Sept. 19, 1944. C. E. NEWELL 2,358,586

TELEPHONE CALL TRANSMITTER

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FIG. 12

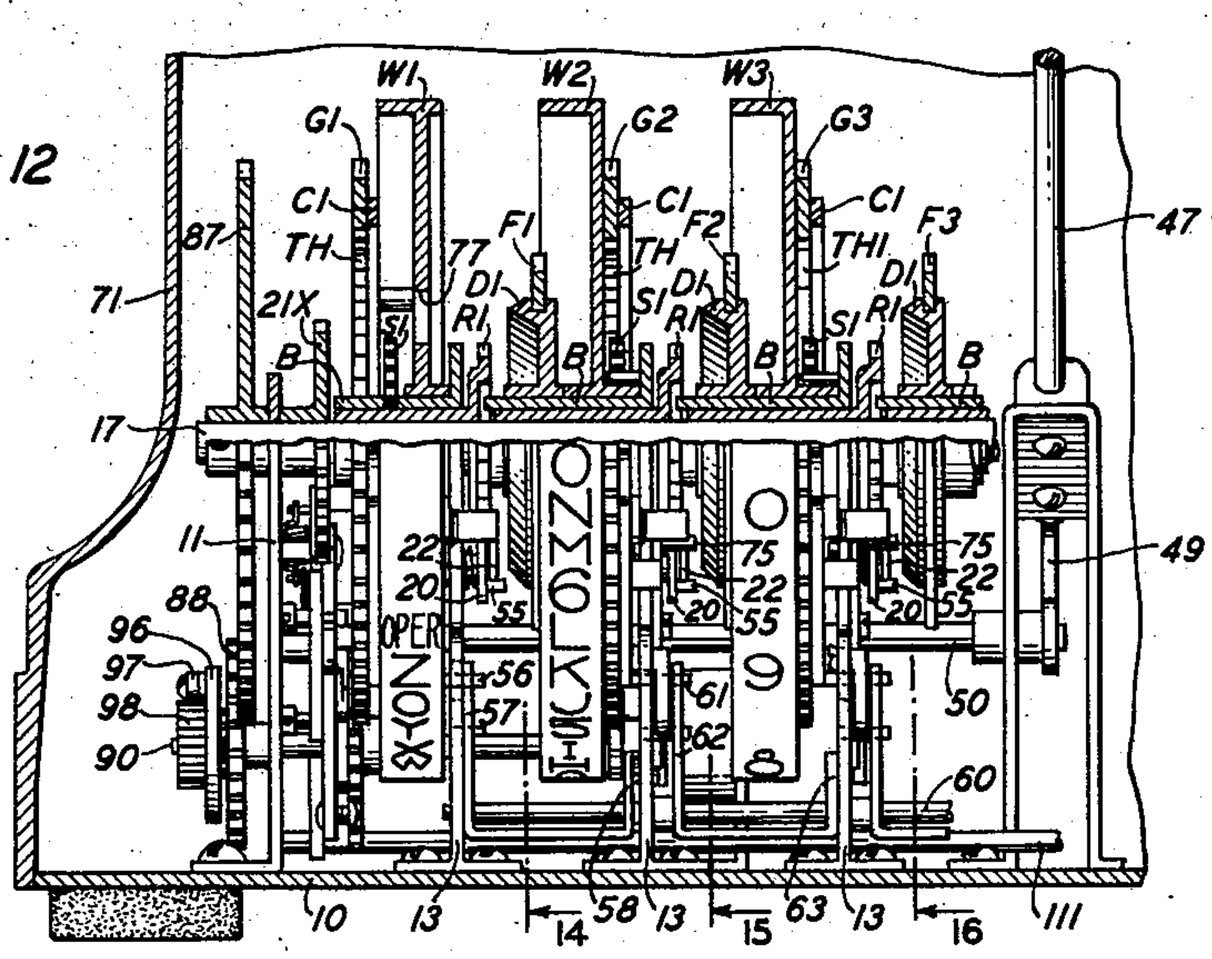
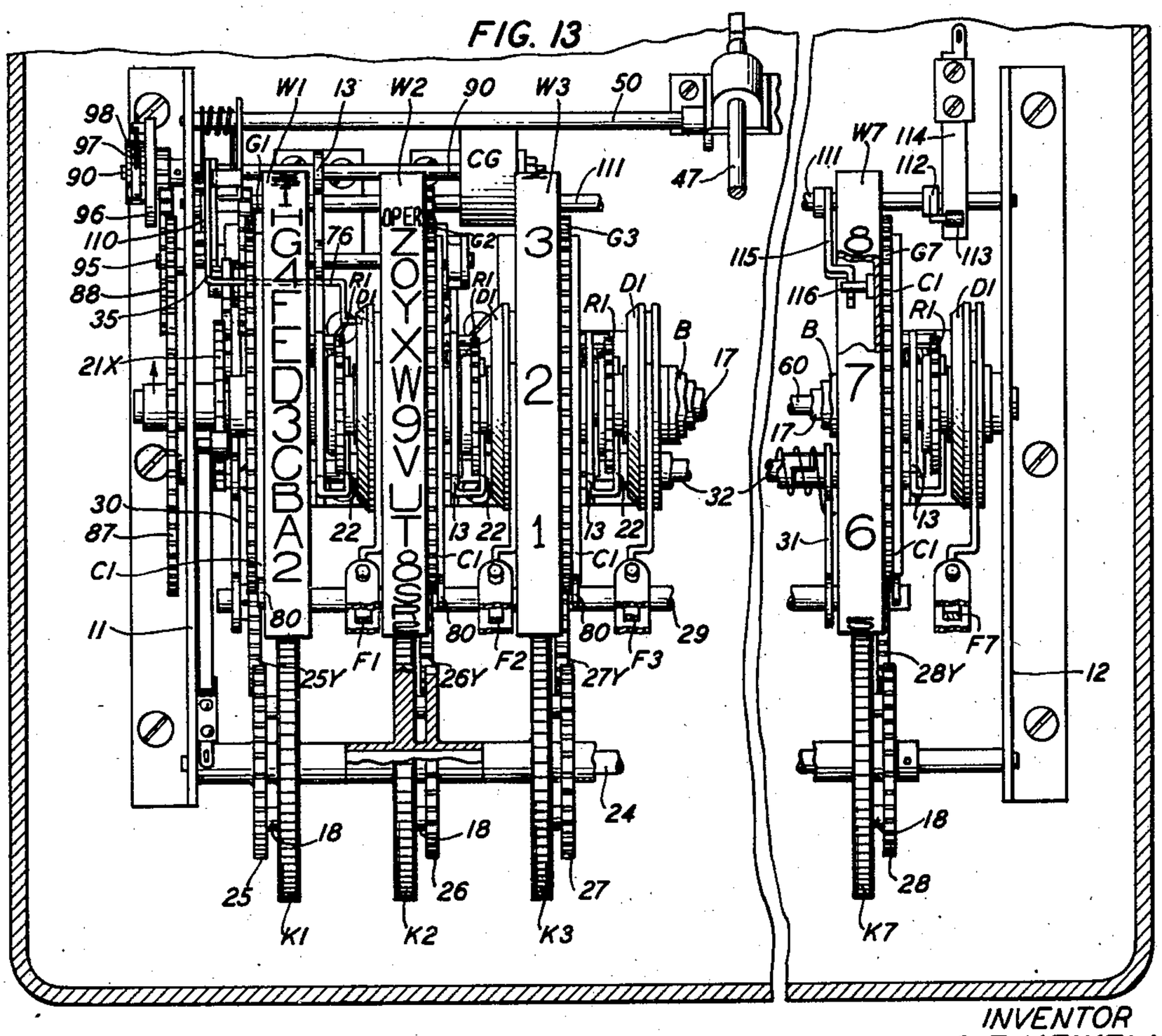


FIG. 13



INVENTOR
C. E. NEWELL
BY
William R. Ballard
ATTORNEY

Patented Sept. 19, 1944 2,358,586

UNITED STATES PATENT OFFICE

2,358,586

TELEPHONE CALL TRANSMITTER

Charles Earnest Newell, Temple City, Calif., assignor to American Telephone and Telegraph Company, a corporation of New York

Application October 20, 1942, Serial No. 462,705

13 Claims. (Cl. 179—90)

This invention relates to telephone call transmitters and more particularly to a type of call transmitters in which the manual rotation of knobs is effective to position wheels for setting a telephone call designation and indicating the number of such designation.

The object of the invention is the provision of a call transmitter of the type above referred to which will be convenient in use, simple in construction, accurate in operation and in which a minimum number of manual operations is required for the setting and the transmitting of telephone call designations.

A feature of the invention is the provision of a plurality of manually operable means for actuating gearing mechanisms normally connecting with wheels operable for indicating the number of the telephone call to be transmitted.

Another feature is the provision of means in the form of motor springs tensioned by the manual operation of the indicating wheels and means provided for holding each indicating wheel in its preset position during the complete setting of the call.

Another feature is the provision of means carried by each of the indicating wheels for rotating a common pulsing shaft under the tension of the motor springs following the manual operation of a release key for successively transmitting series of pulses representing the digits of the call designation.

Another feature is the provision of means operable upon the setting operation of the indicating wheels for moving the mounting frame for the gearing mechanisms in a manner to disconnect the knobs from the indicating wheels during the operation of the pulsing shaft by the motor springs.

Another feature is the provision of manually operable means whereby the digit indicating wheels are returned to normal by the tension of their motor springs individually and ineffectively relating to the pulsing shaft for canceling and correcting wrong call setting operations.

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

Figure 1 is an assembly view of the call transmitter of the invention shown in perspective;

Fig. 2 is a left side view shown with the casing housing the transmitter mechanism in vertical section taken on line 2—2 of Fig. 5, the operating parts being in normal non-operated position;

Fig. 3 is a view similar to Fig. 2 but showing a number of parts in their operated position;

Fig. 4 is a partial view shown in vertical section taken on line 4—4 of Fig. 2;

Fig. 5 is a partial front view;

Fig. 6 is a vertical cross-sectional view taken on line 6—6 of Fig. 5;

Fig. 7 is a vertical cross-sectional view taken on line 7—7 of Fig. 5;

Fig. 8 is a vertical cross-sectional view taken on line 8—8 of Fig. 5;

Figs. 9 and 10 are detail views of the governor actuating mechanism;

Fig. 11 is a detail view showing one of the manually operable release mechanisms for the digit indicating wheels;

Fig. 12 is a partial front view with a number of operating parts partly in section;

Fig. 13 is a partial top view;

Figs. 14, 15 and 16 are detail views of the transfer mechanism used for the successive release of the digit wheels shown in normal unoperated position read with Fig. 15 placed over Fig. 14 and Fig. 16 placed over Fig. 15;

Fig. 17 is a schematic view of a number of digit wheels shown in settled position with the pulsing shaft actuated thereby in normal non-operated position; and

Fig. 18 is a modification of the shunting contact operating mechanism.

Referring to the drawings, a base 10 is provided for mounting a pair of upright extending plates 11 and 12 and a plurality of similarly shaped supports 13 formed with perpendicularly extending hubs or bushings *b* best seen in Figs. 4, 7 and 12, serving as spindles for rotatably mounting digit indicating wheels as W1, W2, W3, W4, W5, W6 and W7, which may be in any number desired depending upon the number of digits of the telephone exchange to which the call transmitter of this invention may be connected. In bushings *b* are mounted for free rotation therein the hub portions of ratchet wheels R1, one for each indicating wheel W1, W2, W3, etc. keyed to a common shaft 17 and on the indicating wheels W1 and W2 are mounted for rotation therewith ring gears G1 and G2 each formed interiorly with 46 ratchet teeth TH, best seen in Figs. 2, 3 and 12, while to the indicating wheels W3 to W7, inclusive are securely mounted the ring gears K3 to G7 formed interiorly with 14 ratchet teeth TH1 Figs. 4, 6, 8, 12, 15 and 16 for a purpose which will be hereinafter described in detail.

The indicating wheels W1, W2, W3, etc. are provided with similar motor springs S1 best seen

in Figs. 4, 6 and 12 the inner convolutions of which are secured to pins carried by supports 13 and their outer convolutions to studs P1, P2, P3, etc. carried by the indicating wheels W1, W2, W3, etc., these studs also serving for pivotally mounting spring-pressed pawls 20 best seen in Figs. 4, 5, 7, 8 and 12, each engaging a ratchet wheel R1 for rotating the shaft 17 and thereby a pulsing cam 21 keyed thereon upon the return movement of the indicating wheels W1, W2, W3, etc. from selected to normal unoperated position as effected by the tension of their motor springs S1, the pawls 20 having pins 55 which, when the indicating wheels are in normal non-operated position, are moved by cams 22 in disengaged relation from the ratchet wheels R1 as shown in Figs. 5, 7 and 8. The cams 22 are formed integrally with the supports 13 while normally disengaged spring-pressed pawls 23 pivoted on these supports are provided for engaging when released the ratchet teeth TH and TH1 of gears G2, G3, etc. for holding the latter in each selected position against the tension of their motor springs S1, while a pawl 35 shown in Figs. 2, 3 and 4 is provided for holding and releasing the indicating wheel W1 in a manner which will be hereinafter described in detail.

The indicating wheels W1, W2, W3, etc. are moved from normal to selected position by manually operable knobs K1, K2, K3, K4, K5, K6 and K7 (see Fig. 1) mounted for free rotation on a shaft 24 supported at both ends by upright plates 11 and 12 and to these knobs (Fig. 13) are secured as by spacer members 18 the gears 25, 26, 27, etc. meshing with respectively associated gears 25Y, 26Y, 27Y, etc. mounted for free rotation on a shaft 29 supported at both ends by arms 30 and 31 which are in turn keyed to the ends of a shaft 32 pivotally mounted in bearings in the upright plates 11 and 12 so as to permit an arcuated movement of shaft 29 for disengaging the gears 25Y, 26Y, 27Y, etc. from their respectively associated gears G1, G2, G3, etc. carried by the indicating wheels W1, W2, W3, etc. following the pivotal movement of shaft 32 in a manner which will be hereinafter described in detail, the disengagement of these gears preventing the rotation of gears 25Y, 26Y, 27Y, etc. and their associated gear knob units 25—K1, 26—K2, 27—K3, etc. upon the return movement of indicating wheels W1, W2, W3, etc. from selected to normal unoperated position as for rotating the shaft 17, the pairs of gears 25—25—Y, 26—26—Y, 27—27—Y, etc. however, are not disengaged from each other by the arcuated movement of shaft 29.

The indicating wheel W1 as above mentioned, is held in each selected position by a pawl 35, Figs. 2, 3 and 13, engaging the ratchet teeth TH of gear G1 under the tension of a spring SP. Pawl 35 is pivoted on a stud 36, also serving to pivot an angle-shaped lever *a1* having its arm 37 disposed in engageable relation with a projection formed with pawl 35 and its arm 38 extending downwardly in engaged relation with a spring-pressed pawl 39 pivotally mounted on a plate formed at the free end of an arm 40 in turn pivoted on a stud 42. The arm 40 is connected by a link or rod 46 to a lever 45 formed with arm 30 so that the pivotal movement of angle lever *a1* out of engaged relation from pawl 39 permits the pivotal movement of arm 40 and thereby the pivotal movement of shaft 32 for moving the shaft 29 bodily in a clockwise direction for disengaging the gears 25Y, 26Y, 27Y, etc. collectively from gears G1, G2, G3, etc. carried by the digit wheels W1, W2, W3, etc.

The movement of angle lever *a1* as for disengaging the pawl 39 is effected by the manual operation of a plunger member 47 against the tension of its retractile spring 48. The longitudinal movement of this plunger is effective to engage the free end of a lever 49 keyed to one end of a shaft 50 for imparting a small angular movement to this shaft and thereby to an arm 51 keyed to the opposite end of shaft 50 for moving this arm in position to cause a lug 52 carried by arm 51 to engage the arm 37 to impart a small clockwise movement to angle lever *a1* so as to disengage the pawl 39 therefrom and simultaneously imparting a pivotal movement to pawl 35 for disengaging it from the ratchet teeth TH of indicating wheel W1 so as to permit the return movement of the latter to normal unoperated position and thereby causing the rotation of shaft 17 and the impulse cam 21X through the engagement of pawl 20 carried by this wheel with its respective ratchet wheel R1 thus causing the operation of the operable spring 53 of contact 54, the pawl 35 being locked in the disengaged position due to the free end of arm 51 resting on the projection 24 of angle lever *a1*.

The return movement of indicating wheel W1 to normal unoperated position is effective to cause the engagement of a pin 55, see Figs. 5 and 7, carried by driving pawl 20 of this wheel with the stationary cam 22 for disengaging this pawl from the ratchet wheel R1 prior to the operation of a so-called transfer mechanism provided for controlling the successive starting operation of the indicating wheels W2, W3, etc. in a manner which will be hereinafter described in detail.

The indicating wheel W1 is provided with a pin 56 which when this wheel is in normal non-operated position, engages an arm 57, best seen in Figs. 5, 7, 12 and 14 with an arm 58 mounted for free rotation as a unit on a shaft 60. The arm 58 normally engages the downward extending portion of a pawl 23 mounted on support 13 of wheel W2 for holding this pawl in disengaged relation from the ratchet teeth TH of gear G2, Fig. 15.

Similarly, wheel W2 is provided with a pin 61 normally engaging the arm 62 of arm unit 62—63, Figs. 15 and 16, the arm 63 normally holding the pawl 23 of indicating wheel W3 in disengaged relation from the ratchet teeth TH1 of gear G3, while indicating wheel G3 is provided with a pin 70 normally engaging the arm 70X of duplex arm unit 70X—70Y, the arm 70Y engaging the downward extending portion of pawl 23 associated with the ratchet teeth TH1 of ring gear C_14 (not shown) carried by indicating wheel W4 shown in Fig. 1, there being similar arm units between indicating wheels W4, W5, W6 and W7. Stationary cams 22 carried by supports 13 are provided for disengaging the driving pawls 20 carried by indicating wheels W2, W3, etc. from their respective ratchet wheels R1 as above mentioned in connecting with indicating wheel W1 and pawls 23 for holding these wheels in selected positions through their engagement with the ratchet teeth of corresponding gears G2, G3, etc. carried by these wheels. The indicating wheels W1, W2, W3, etc. are held in normal or rest position against the normal tension of their motor springs S1 by pins 56, 61, 70, etc. abutting against the edges of their respective supports 13 while limiting the maximum angular selective movement of the

wheels to substantially 10/14 of a complete turn. The gears G1 and G2 of indicating wheels W1 and W2 as shown in Figs. 2, 3, 12 and diagrammatically in Fig. 17 are provided with forty-four internally formed ratchet teeth TH corresponding to the forty-four selective positions, i. e. 1 to 0 plus groups of three alphabetic letters printed on the surface of these wheels, while the indicating wheels W3, W4, etc. are each provided with ten internally disposed ratchet teeth TH1 to correspond with the ten equally spaced digits 1 to 0 printed on these wheels within an angle of 10/14 of their circumference. However, the ratchet wheels R1 keyed to shaft 17 and driven by pawls 20 are each provided with a series of fourteen teeth corresponding to the 10/14 spaced relation of the digits 1 to 0 printed at the periphery of indicating wheels W1, W2, W3, W4, etc. and the 10/14 of a turn limited by pins 58, 61, 70, etc. and the opposite edge of support 13.

The indicating wheels W1, W2, W3, etc. may be returned to normal non-operated position from any selected position ineffective relative to shaft 17 by the manual operation of respectively associated similar disc members D1 (see Figs. 4, 11 and 12) mounted for sliding movement on the hubs of supports 13 as effected by individually operable plunger members N1, N2, N3, N4, N5, N6 and N7 best seen in Figs. 1, 2 and 3 mounted for longitudinal movement in respective guiding elements M1, M2, M3, M4, M5, M6 and M7 formed with the casing 71, these plunger members being returned to normal position by their own retracting springs SP1 shown in Fig. 2.

The lower disposed ends of plungers N1, N2, N3, etc. are disposed in engageable relation with pivoted fork elements *f1*, *f2*, *f3*, *f4*, etc., Figs. 4, 5 and 12, fitted into collars or circular grooves in the discs D1, these discs being formed with double circular chamfered portions for simultaneously engaging pins 75 of pawls 23 for disengaging the latter from the ratchet teeth of indicating wheels W1, W2, W3, etc. and the pins 55 of driving pawls 20, best seen in Fig. 8, for disengaging them from ratchet wheels R1 thus permitting the return movement of these wheels to normal non-operated position by the tension of their own motor springs S1, but as above mentioned ineffective to shaft 17. The operation of disc D1 of indicating wheel W1 by plunger N1 in addition to disengaging the driving pawl 20 carried by this indicating wheel is effective as shown in Fig. 13 to engage the projection 76, formed with pawl 35 extending through the circular groove 77 in the wall of indicating wheel W1 in engageable relation with the inner formed chamfer of disc D1 for disengaging the pawl 35 from the ratchet teeth TH of ring gear G1 against the tension of its retracting spring SP simultaneously with the disengagement of the driving pawl 20 carried by this wheel from the ratchet wheel R1 on shaft 17 so that this wheel is free to return to normal non-operated position.

To the indicating wheels W1, W2, W3, W4, W5, W6 and W7 are secured for rotation therewith cams in the form of discs such as C1 shown in Figs. 4, 5, 6, 8, 12 and 13, having notches as 78 at their peripheries normally engaged by the free end portions of levers 80 mounted for free rotation on the shaft 32 to which the arms 30 and 31 are securely mounted, while similar coiled springs 84, best seen in Fig. 5, having one of their ends secured to pins 85 and their other ends hooked to levers 80 serve to yieldably hold these levers on the periphery of their associated cam C1, while tending to rotate their supporting shaft 32 following the operation of any or a plurality of the digit wheels W1, W2, etc. in selected position, the rotation of shaft 32 as above mentioned causing the disengagement of gears 25Y, 26Y, 27Y, etc. from the gears G1, G2, G3, etc. upon the manual operation of plunger 47 to cause the operation of angle lever *a1* under the tension of spring 2Y and the consequent disengagement of pawl 35 from the ratchet teeth TH of gear G1.

The rotation of shaft 17 and impulse cam 21Y carried thereby as imparted by the successive operation of indicating wheels W1, W2, W3, etc. timed by the transfer mechanism above described is controlled by a centrifugal governor CG, Figs. 4, 8, 9, 10, 12 and 13 operatively connected to the shaft 17 by a gear 87, keyed to this shaft and meshing with a gear 88 mounted for free rotation on a countershaft 95 and engaging a pinion 89 mounted for free rotation on the governor shaft 90 and on the hub of this pinion is mounted a disc member 96 carrying a spring-pressed pawl 97 for engagement with the ratchet wheel 98, keyed to governor shaft 90, thus actuating this shaft and the governor CG adjusted to operate the pulsing cam for transmitting pulses at the usual rate of ten per second.

The gear G1 of digit indicating wheel W1 operatively engages with gear 100 mounted for free rotation on shaft 95 with gear 100 meshing with a pinion 102 mounted for free rotation on shaft 90 and on the hub of this pinion is securely mounted a disc 103 carrying a spring pressed pawl 104 engaging a ratchet wheel 105 keyed to the shaft 90. Similarly, the gear G2 of digit indicating wheel W2, meshes with gear 101 mounted for free rotation on shaft 95, while gear 101 meshes with a pinion 106 mounted for free rotation on shaft 90 and on the hub of this pinion is mounted a disc 107 carrying a spring-pressed pawl 108 for engaging a ratchet wheel 109 keyed to the shaft 90. According to this mechanism the movement of any one gear 87, G1, G2, as for actuating the governor shaft 90 is ineffective to affect the operation of the other two gear wheels.

The operation of angle lever *a1* as effected by the manual operation of plunger 47 and arm 51 actuated thereby, is effective to impart a small angular movement to a lever member 110 shown in Figs. 2, 3, 4 and 13 keyed to one end of a shaft 111 journaled at both ends in plates 11 and 12, and along its middle portion in projections formed with support 13 of digit wheel W3 and to the opposite end of shaft 111 as shown in Figs. 4 and 13 is mounted an arm 112 having an insulating piece 113 disposed in operative relation with the so-called off-normal contact spring 114 to effect the operation of this contact simultaneously with the starting operation of digit indicating wheel W1. A pin 116 carried by the digit indicating wheel W1 as shown in Fig. 4 actuates a lever member 115 at the completion of the digit transmitting operation to cause a small angular movement of shaft 111 and to lever 110 keyed on the opposite end of this shaft to return the angle lever *a1* to normal non-operated position, that is, from the position shown in Fig. 3 to the position shown in Fig. 2 to cause the pawl 35 to reengage with the ratchet teeth TH of gear wheel G1 while the gears 25Y are moved by the tension of springs SP1 into engagement with their associated gears G1, G2, G3, etc. due to the ends of levers 80 to reengage the notches of cams C1, the spring 53 of pulsing

contact 54 holding the impulse wheel 21X and thereby the shaft 17 with ratchet wheels R1 keyed on this shaft in adjusted position relative to their driving pawls 20 following each set of pulses transmitted.

In the modification of the shunting contact actuating mechanisms shown in Fig. 18, the operation of plunger member 47 and the consequent pivotal movement of shaft 50 as above described following the setting of a number of a digit wheels as for transmitting a two, three or four digit call designation is effective to cause the pivotal movement of shaft 32 through the release of pawl 39 thus closing the shunting contact 114 under the action of springs 84 tensioned by the setting operation of these digit wheels. The contact 114 is held closed until the last digit wheel in any particular call designation has returned to normal non-operated position when the arm 80 associated with that wheel reengages the notch in its cooperating disc C_1, thus causing the pivotal movement of shaft 32 and thereby that of the arm 45 for reopening the contact 114, while the return of the digit wheel W1 to normal non-operated position through a pin PX carried thereby is effective to move the angle lever *a1* in position wherein the pawl 76 reengages its ratchet teeth TH in gear wheel G1 and the pawl 39 the arm 38 of this angle lever for holding the arm 45 and therefor the contact 114 in its open position, thus preparing this mechanism for a successive operation.

In a typical example of operation, supposing that it is desired to transmit the telephone call designation AT–17426 shown in Fig. 1. In the setting operation of such a number the knob K1 and gear wheel 25 are rotated manually as a unit on shaft 24 for imparting movement to the gear wheels 25Y and G1 and thereby to digit indicating wheel W1 in the direction indicated by the arrow in Fig. 2, against the tension of its motor spring S1 for placing the latter A, the first digit of the call designation AT–17426 above mentioned, in registry with a glass-covered opening OP in the casing 71. This digit indicating wheel is held in selected position by the pawl 35 under the normal tension of its retractile spring SP engaging the ninth tooth of teeth TH thus moving the driving pawl 20 carried thereby past two teeth of its operatively associated ratchet wheel R1 plus a quarter of a tooth of this ratchet wheel which, as above mentioned, are provided with fourteen teeth, each tooth corresponding to four ratchet teeth TH of gear wheel G1, the shaft 17 being held from rotation by the tension of contact spring 53 engaging the pulsing cam 21X.

The setting of digit wheel W1 and the movement of pin 56 (see Fig. 14) carried thereby is effective to release the pair of arms 57—57, the arm 58 in turn releasing the retaining pawl 23 of indicating wheel W2 which thus moves automatically in engaged relation with the teeth TH of gear wheel G2 of this indicating wheel, gear wheel G2 being also divided into 47 teeth to the circumference or four teeth for each of ratchet wheels R1 associated with indicating wheel W2. The operation of knob K2 is effective to rotate the gears 26 and 26Y, the gear G2, and thereby the digit indicating wheel W2 against the tension of its own motor spring S1 to a position for placing the letter T the second digit of the call designating in registry with the glass opening OP1 in the casing 71, the driving pawl 20 of this digit passing over eight teeth of its associated ratchet wheel R2 plus one tooth TH where the digit wheel W2 is held in its adjusted position as shown in Figs. 1, 13 and 17 by its retaining pawl 23.

The movement of the indicating wheel W2 and that of pin 61 carried thereby from normal to selected position is effective to release the pair of arms 62—63, the arm 63 releasing the pawl 23 of indicating wheel W3 which thus moves automatically in engageable relation with the ratchet teeth TH1 of gear wheel G3 for holding this indicating wheel to the position placing the digit 1 in registry with the glass-covered opening OP2 in casing 71 in a horizontal row with the digits represented by letters A and T above mentioned, the number of ratchet teeth in gear G3 being fourteen to the circumference, ten of which are used to correspond to the ten digits printed at the periphery of wheel W3, the driving pawl 20 of this wheel thus passing over a single tooth of teeth TH1 where the wheel is held against the tension of its motor spring S1 by its associated pawl 23. Similarly the selective movement of indicating wheel W3 and the pin 70 carried thereby causes the arm 70Y of this unit to release the pawl 23 associated with indicating wheel W4 shown in Fig. 1 for holding the latter in selected positions and this operation is continued in a similar manner for the remaining indicating wheels W5, W6 and W7.

It is to be noted that in the selected position of digit wheels W1 and W2 as shown in Fig. 17, the driving pawls 20 carried to these wheels are now positions one-quarter the length of a tooth of the ratchet wheels R1 on shaft 17 with the result that this shaft is not operated until the digit 2 of wheel W1 and digit 8 of wheel W2 pass under the glass-covered openings OP and OP1 of casing 71 during the return movement of these wheels to normal non-operated position. The ineffective movement of these wheels prior to the engagement of the driving pawls 20 with their associated ratchet wheels R1 keyed to shaft 17 is controlled by the governor CG actuated by the movement of digit indicating wheel W1, the gear G1, the gear 100, the pawl 104, the ratchet wheel 105 keyed to the governor shaft 90. Similarly the movement of the indicating wheel W2 is controlled by this governor through the rotation of gear G2 carried by this wheel, the gear 101, the pinion 106 and the pawl 108 engaging the ratchet wheel 109 keyed to shaft 90 so that the driving pawls 20 of digit indicating wheels W1 and W2 do not come in operative engagement with the ratchet wheels R1 with a jerking action, while in the release operation of digit wheels W1 and W2 from any numeral selected position the operation of the governor mechanism is effected through the shaft 17, the gears 87, 88, 89 and ratchet wheel 98 engaged by pawl 97 but without interference from gears G1 and G2.

The release of the indicating wheels W3 to W7, inclusive, is effected in a manner similar to that described in connection with wheels W2 and W3. In the return operation of digit indicating wheels W1, W2, W3, etc. the driving pawls 20 are moved out of engagement with their associated ratchet wheels R1 due to their pins 55, see Figs. 7 and 8, engaging their respective cams 22 carried by supports 13 to provide a lapse of time or interdigit space between each train of pulses to permit the automatic switches at the exchange to distinguish between the different series of pulses.

Upon the return of digit indicating wheel W7 to normal, the cam 116, see Fig. 4, engages the lever 115 to impart a small angular movement to shaft 111 and thereby to arm 110 for moving

the angle lever *a1* from the position shown in Fig. 3 to the position shown in Fig. 2 thus reengaging the pawl 35 with ratchet teeth TH of gear wheel W1, while permitting the return movement of arm 51 to normal position shown in Fig. 2.

The return of digit indicating wheels W1, W2 to W7, inclusive, and the cams C1 carried thereby is effective as above mentioned to remove the tension of springs 84 from their supporting shaft 32 which thus rotates a small angular movement under the tension of the coiled spring SP1 for collectively reengaging the gears 25Y with their respectively associated gears G1, G2, G3, etc. while causing the pivotal movement of arm 45 and link 46 to cause the reengagement of pawl 39 with the arm 38 of angle lever *a1* and the transmitter is now ready for a successive call setting and transmitting operation.

In the setting of the telephone call designation AT–17426 above mentioned, supposing now that due to a wrong setting operation of one or a plurality of the digit wheels W1, W2, W3, etc. it is desired to return these wheels to normal position for correction but without causing the operation of the pulsing shaft 17. Under this condition the operation of any one of the knobs K1, K2, K3, etc. corresponding to the wheels, the setting of which is to be corrected, is effective to impart a small angular movement to their operatively associated fork members F1, F2, etc. as the case may be, which movement is effective to impart sliding movements to the corresponding discs D1 for engaging the pin 55 of driving pawls 20 and the pins 75 of their retaining pawls 23 for moving the pawls 20 out of engagement from ratchet wheels R1 and the corresponding pawls 23 out of engagement from the ratchet teeth TH of gear wheels W1 and W2 or from the ratchet teeth TH1 of gear wheels G3, G4, etc. thus permitting the rotation of the wheels to be corrected by the rotation of the manually actuated knobs K1, K2, etc. in the manner above described followed by the release of the plungers *n1*, *n2*, *n3*, etc. to permit the re-engagement of these pawls with their respective ratchet wheels R1 on shaft 17 and the pawls 23 with their operatively associated digit wheels thus corrected.

What is claimed is:

1. In a call transmitter, a plurality of indicating elements, normally engaged manually operable gearing mechanisms for moving said elements in position for setting a call, a pulsing cam successively operated by the movement of said indicating elements for transmitting the call, and manually operable means to cause the disengagement of said gearing mechanisms from said indicating elements prior to their return operation for transmitting the call.

2. In a call transmitter, a plurality of indicating elements, gear trains for moving said elements from normal to selected positions for setting a call, ratchet wheels movable with said indicating elements, pawl members cooperating with said ratchet wheels for holding said elements in said selected position, manually operable means for operating one of said pawls to cause the release of one of said elements, means actuated by the return movement of said element to cause the successive return movement of the other of said elements, a movable shaft actuated by the operation of each of said indicating elements, and a unidirectional movable pulsing cam actuated by said shaft for transmitting the call, the operation of the first-mentioned means causing the collective disengagement of said gear trains from said elements.

3. In a call transmitter, a plurality of indicating wheels, manually operable gear mechanisms for moving said wheels from normal to selected position for setting a call, motor springs tensioned by the movement of said wheels, means for holding said wheels in said position against the tension of said motor springs, a rotatable shaft disposed concentric to said indicating wheels for operation by the movement thereof, an impulse mechanism actuated by said shaft, a plurality of means automatically operable for operating said holding means for successively releasing said wheels to actuate said shaft, and manually operable means to cause the disengagement of said gear mechanisms from said indicating wheels prior to the return operation of the first operated wheel.

4. In a call transmitter, a plurality of digit indicating wheels, normally engaged gear trains for moving said indicating wheels in selected position for setting a call, motor springs tensioned by the operation of said wheels, ratchet mechanisms for holding said wheels in said position an individual support for each of said wheels, a shaft journaled in said supports, an impulse cam carried by said shaft, a pulsing contact disposed for operation by the movement of said cam, a ratchet wheel for each of said digit indicating wheels keyed on said shaft, driving pawls carried by said wheels engaging said ratchet wheels for actuating said shaft to cause the operation of said contact, and spring means tensioned by the setting operation of said indicating wheels to cause the collective disengagement of a number of gears in said gear trains following the operation of one of said mechanisms for transmitting of the call.

5. In a call transmitter, an impulse contact, a plurality of digit indicating wheels, a plurality of supports having hollow spindles for rotatably supporting said indicating wheels, a motor spring for each of said wheels tensioned by the movement thereof, a shaft journaled in said spindles, an impulse cam for actuating said contact keyed to said shaft at one end thereof, a ratchet wheel for each of said indicating wheels keyed to said shaft, a pawl carried by each of said indicating wheels, means carried by said indicating wheels for normally holding said pawls disengaged from said ratchet wheels, said means normally engaging said supports for holding said indicating wheels in normal non-operated position against the normal tension of said motor springs, normally engaged operable gearing mechanisms for rotating said wheels from normal to selected position for setting a call and causing said pawls to engage with said ratchet wheels, and a manually operable pawl mechanism for collectively disengaging said gear mechanism and causing the operation of one of said indicating wheels from selected to normal position by the tension of its motor spring for rotating said shaft, the operation of the last-mentioned wheel actuating means to cause the successive operation of the other of said indicating wheels for operating said shaft for transmitting the call.

6. In a call transmitter, a plurality of digit indicating elements, normally engaged manually operable gearing mechanisms for moving said elements in selected position for setting a call, a plurality of means for holding said indicating elements in said selected position, a manually operable mechanism to cause the operation of

one of said means for releasing one of said indicating elements, a transfer mechanism, means carried by said released element for operating said transfer mechanism to cause the successive release of the other of said elements, an impulse mechanism operated by said elements successively for transmitting sets of pulses corresponding to the setting thereof, other means actuated through the operation of said manually operable mechanism for collectively disengaging a number of gears in said gearing mechanisms prior to the return operation of said indicating elements to normal and a governor mechanism for controlling the operation of each of said elements.

7. In a call transmitter, a movable element having groups of digits and letters, means for moving said element from normal to selected position, a motor spring tensioned by the movement of said element, a ratchet mechanism for holding said element in said position against the tension of said spring, a pulsing shaft having a ratchet wheel keyed thereon, a pawl carried by said movable element engaging said ratchet wheel for actuating said shaft upon the return movement of said element from selected to normal position by the tension of said spring, and manually operable means for disconnecting said ratchet mechanism and simultaneously disengaging the pawl from said ratchet wheel keyed to said pulsing shaft to cause the return movement of said element to normal ineffective relative to said pulsing shaft as for correcting the setting thereof.

8. In a call transmitter, a plurality of symbol-indicating elements, individually operable gearing mechanisms for moving said elements in any of a plurality of selected positions for setting a call, manually rotatable knobs for actuating said gearing mechanisms, motor springs tensioned by the operation of said elements, successively automatically operable ratchet mechanisms for normally holding said indicating elements in each of said selected positions, and a plurality of means for disengaging said ratchet mechanisms for releasing said elements individually for permitting their return movement under the tension of said springs as for correcting the positions of said elements.

9. In a call transmitter, an impulse contact, a plurality of indicating wheels, a motor spring for each of said wheels tensioned by the movement of the latter from normal for setting a call, a plurality of supports having hollow spindles for rotatably mounting said indicating wheels, a shaft journaled in said hollow spindles for free rotation therein, a ratchet wheel for each of said indicating wheels keyed to said shaft, driving pawls carried by said indicating wheels for successively engaging said ratchet wheels when moved to said selected position to rotate said shaft in their return movement to normal, a ring carried by each of said indicating wheels having internally formed ratchet teeth and peripherally formed gear teeth, a pawl for holding one of said digit wheels in selected position against the tension of its motor spring, means manually operable for actuating said holding pawl to cause the operation of its associated indicating wheel, other pawls for holding the other of said wheels in selected position, means carried by the last-mentioned digit wheel to cause the successive disengagement of the last-mentioned pawls to release the other of said indicating wheels, and camming means carried by said supports cooperating with means carried by said driving pawls for successively disconnecting the latter from said ratchet wheels upon their return to normal non-operated position following the transmitting of pulses corresponding to the setting of said indicating wheels.

10. In a call transmitter, a plurality of symbol-indicating elements, manually operable gearing mechanisms for moving said elements in a plurality of selected positions for setting a call, motor springs tensioned by the operation of said elements, ratchet wheels carried by said elements, retaining pawls automatically movable in engaged relation with said ratchet wheels for holding said elements in each selective position, a rotatable shaft, a pulsing mechanism actuated by said shaft, clutch members mounted on said shaft one for each of said elements, clutch members carried by said elements engaging the clutch members on said shaft, a plurality of manually operable spring retracted keys, and a plurality of discs actuated by the operation of said keys, said discs having means for engaging means carried by the first-mentioned clutch members and the means carried by said retaining pawls for simultaneously disengaging said ratchet wheels and said clutch members for permitting the resetting of said indicating elements independently of said pulsing mechanisms..

11. In a call transmitter, a digit indicating wheel, a support having a hollow hub portion extending perpendicularly therefrom for rotatably supporting said indicating wheel, a motor spring for said wheel, a ring carried by said indicating wheel having gear teeth at its periphery and ratchet teeth interiorly thereof, a unidirectional rotatable shaft journaled in said hub portion, an impulse cam keyed to said shaft, a pulsing contact having its operable member engaged with said cam, a pair of supporting plates, a shaft pivoted on said plates, a lever member keyed at each end of said shaft for movement therewith, a shaft mounted at the free end of said lever members for arcuated movement upon the operation of said pivoted shaft, a gear wheel mounted on the arcuated movable shaft normally engaging the gear teeth of said ring, another shaft mounted on said supporting plates, a manually operable knob and a gear movable as a unit on the last-mentioned shaft and engaging the gear wheel on said arcuated movable shaft for rotating said indicating wheel upon the operation of said knob for moving it in selected position, a retaining pawl engaging the ratchet teeth of said ring for holding said indicating wheel in said selected position against the tension of said motor spring, one of said lever members having an arm formed therewith, an arm pivoted to one of said supporting plates, a link member operatively connecting said pivoted arm to the arm of said lever member, a latching mechanism manually operable for causing the operation of said retaining pawl to permit the movement of said indicating wheel simultaneously with the movement of said arcuated movable shaft for disengaging the gear carried thereby from the gear teeth of said ring prior to the rotation of said indicating wheel for actuating said contact, and a shunting contact actuated by the operation of the second mentioned shaft.

12. In a call transmitter, a plurality of wheels having symbols printed at their peripheries, a plurality of manually operable knobs, normally engaged gear trains actuated by said knobs for moving said wheels from normal to selected position for setting a call, an operable support for

a number of said gears, said support having a pivoted shaft, spring means acting on said support to operatively hold said gears in said engaged relation, cams carried by said wheels, arm members actuated by the movement of said cams, springs tensioned by the movement of said arms tending to impart a pivotal movement to said shaft for moving said support in position for disengaging said gears, a latching mechanism for normally holding said gears in engaged relation against the tension of each of said spring means, manually operable means for operating said latching mechanism to cause the operation of one of said wheels and the movement of said support for disengaging said gears collectively, a transfer mechanism, means actuated by the return movement of said wheel to cause the release of the other of said wheels successively, a pulsing mechanism comprising a contact, a shaft and a cam keyed to said shaft actuated by the movement of each of said wheels, and a speed governor geared to said shaft for controlling the operation of said shaft for operating the contact according to the setting of said wheels.

13. In a call transmitter a plurality of indicating elements, gear trains for moving said elements in pre-selected positions for setting a call, means for holding said elements in said selected positions, a pulsing shaft, means carried by each of said elements engaging means carried by said shaft for actuating the latter, a common speed governor geared to said shaft and to said elements and a plurality of means operable for effecting a corrective selective movement to one of said elements independently of the operation of said shaft and the other of said elements.

CHARLES EARNEST NEWELL.