Feb. 12, 1946. R. F. MALLINA 2,394,927

TELEPHONE CALL TRANSMITTER

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FIG. 1

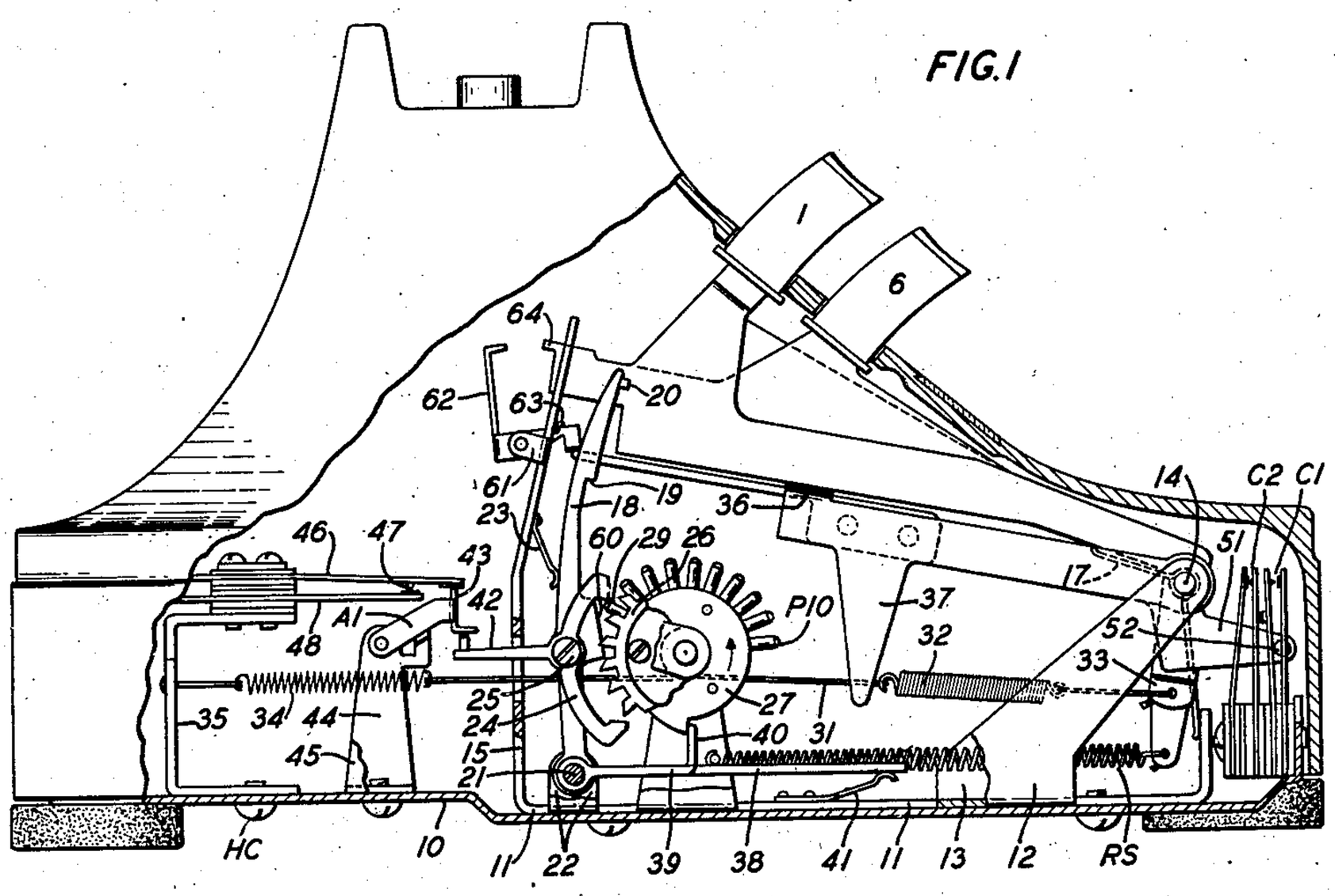

FIG. 2

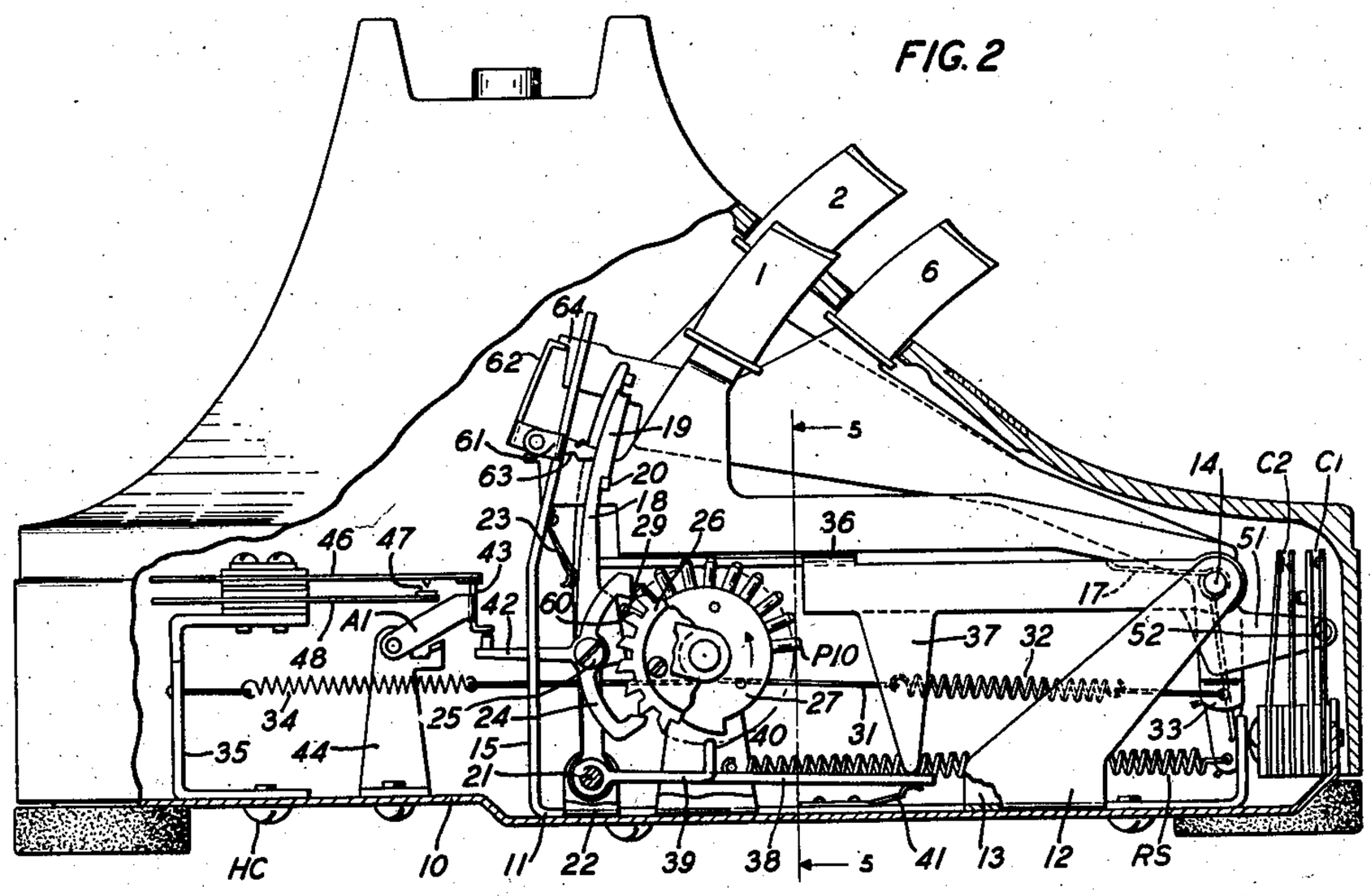

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FIG. 3

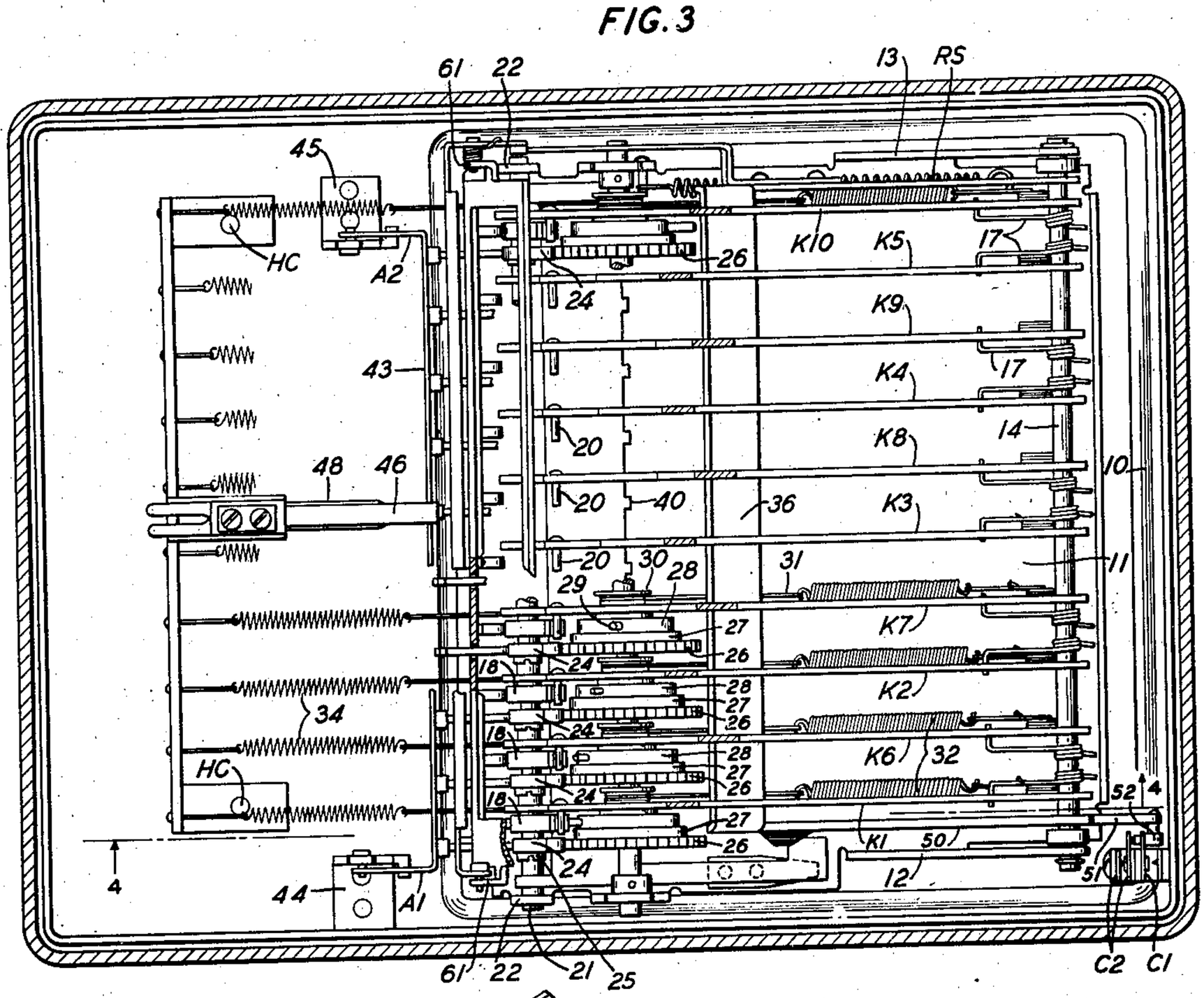

FIG. 4

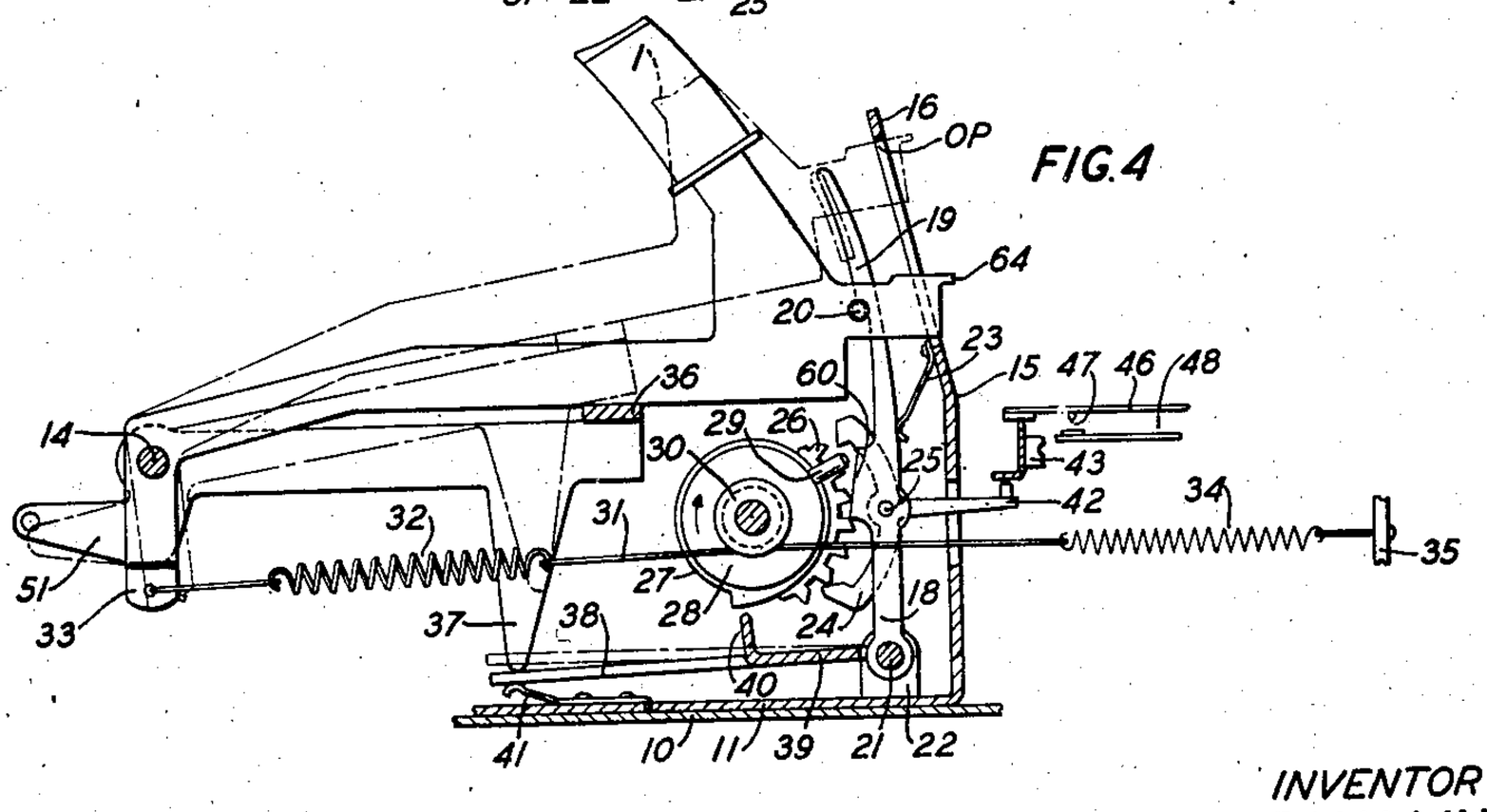

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FIG. 7

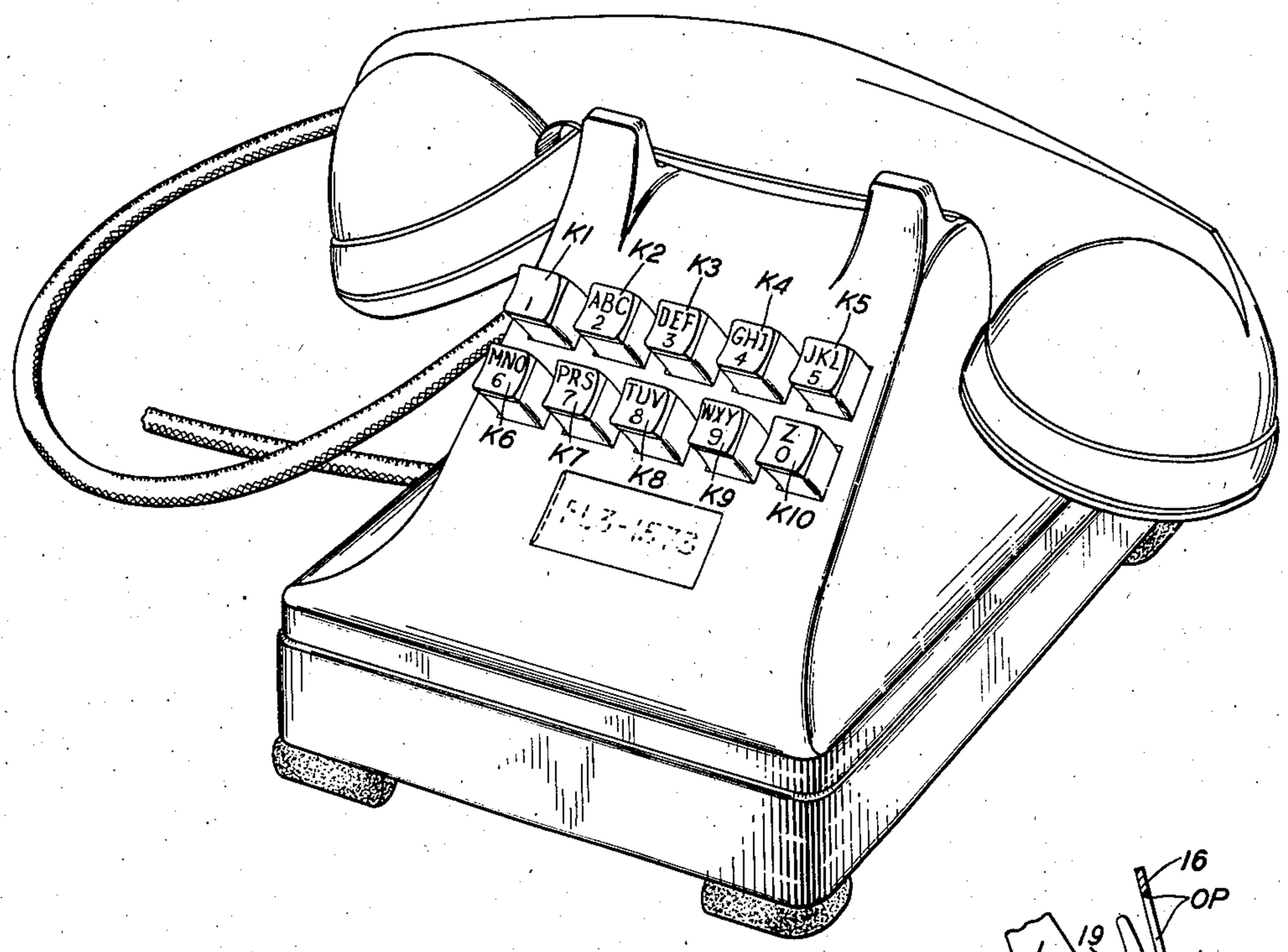
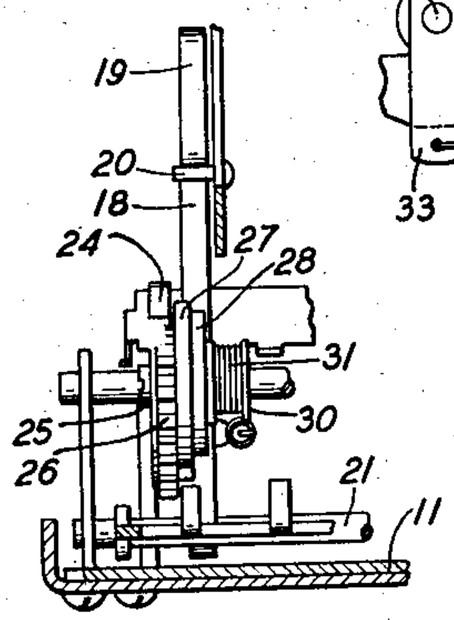


FIG. 5



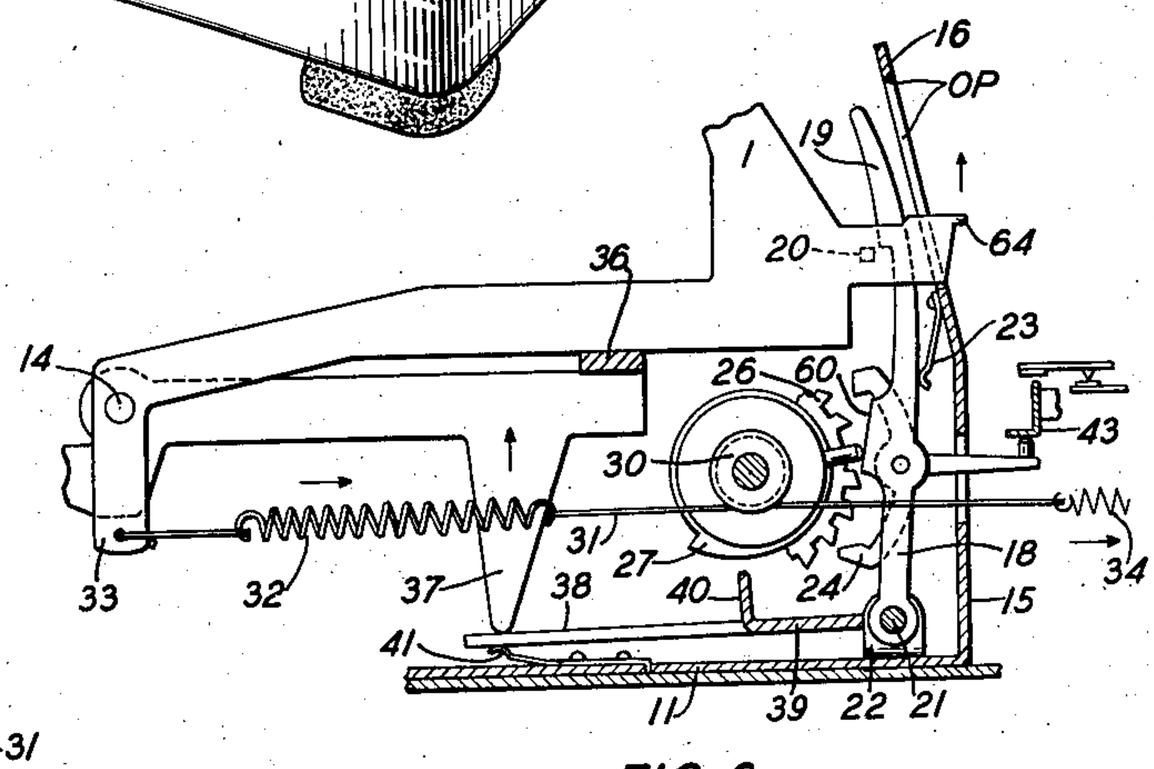


FIG. 6

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UNITED STATES PATENT OFFICE

2,394,927

TELEPHONE CALL TRANSMITTER

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Application November 30, 1944, Serial No. 565,905

6 Claims. (Cl. 179—90)

This invention relates to call transmitter devices of the type used in automatic telephone systems for establishing talking connections.

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

In the call transmitter device of this invention, a set of pivoted key members, representing digits, is provided for tensioning respectively associated motor springs having one of their ends attached to means carried by the keys, and their opposite ends to cords or wires coiled on drums, for rotating these drums and clock escapement wheels secured thereto upon the release of these wheels as effected by means in the form of a common pawl bar actuated by a U-shaped bar, itself under control of the operated key member.

Spring actuated means is provided for engaging means carried by the depressed key for locking this key in the operated position while positioning an anchor member pivoted thereon in operative relation with the escapement wheel associated with that key for operating a bar common to all the clock escapement mechanisms for actuating a pulsing contact, while a second pawl bar operates upon the movement of the U-bar under control of the operated key for locking the other keys in the non-operated position for preventing the operation of the latter during the operation of the pulsing mechanism. A disc movable with each drum and its associated escapement wheel is provided with a cam element engaging means carried by the spring actuating means for moving the latter in position for releasing the operated key and moving the anchor member carried thereby out of engaged relation from its associated escapement wheel for controlling the operation of the pulsing contact, the operated key returning to normal non-operated position by the tension of its own retractile spring.

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:

Fig. 1 is a left side elevation view, the casing housing the transmitter mechanism being shown partly in vertical longitudinal section and the keys in normal position;

Fig. 2 is a view similar to Fig. 1 but showing one of the keys and a number of operating parts controlled thereby in the operated position;

Fig. 3 is a partial plan view shown with a number of operating parts in horizontal section;

Fig. 4 is a partial view shown with a number of operating parts in section taken on line 4—4 of Fig. 3;

Fig. 5 is a partial view of an escapement mechanism showing its operated key and the mounting base for the transmitter mechanism in vertical section taken on line 5—5 of Fig. 2;

Fig. 6 is a view similar to Fig. 4 but showing one of the keys and the latch associated therewith in position following the operation of the pulsing mechanism and the release of the operated key by its cam actuating mechanism; and

Fig. 7 is an elevation view of the completed device shown in perspective.

Referring to the drawings, a base 10 is provided for mounting a plate 11 having upright extending arm portions 12 and 13 serving for supporting a shaft 14 and on this shaft is mounted a set of key members K1, K2, K3, K4, K5, K6, K7, K8, K9 and K10 having their free end portions extending through an opening OP best seen in Figs. 4 and 6, in an upright extending portion 15 formed with the plate 11, the key members K1, K2, K3, etc., being normally held in normal position against the bar 16 formed at the top end of the upright portion 15 by the tension of similar retractile springs 17 shown in Figs. 1, 2 and 3.

The key members K1, K2, K3, etc., are locked individually in their operated position as shown by key K1 in Figs. 2 and 4 by similar respective arms 18 having ratchet toothed portions 19 at their upper ends engaging pins 20 carried by their respectively associated keys. The arms 18 as best seen in Figs. 1, 2, 4 and 6, are pivoted on a common shaft 21 supported at both ends in bearing portions 22 formed with the plate 11 and are moved in engagement with their respective pins 20 by the normal tension of similar springs 23 secured to the upright extending portion 15 of plate 11 following the individual movement of their respectively associated keys to operated position.

The upright extending portion 15 of plate 11 is formed with two similar bearing portions 61 provided for pivotally mounting a pawl bar 62 disposed transverse of the keys and movable under the tension of a coiled spring 63 in the path or engagement with lugs 64 carried by the key members K1, K2, K3, etc., for locking the non-operated keys in normal position, the movement of the pivoted bar 62 being effected under control of a pivoted U-shaped bar 36, itself actuated by

the operation of the depressed key member as will be hereinafter described in detail.

On each arm 18 is pivoted as on a shoulder screw 25 an anchor member 24, each operatively associated with an escapement wheel 26 mounted for rotation as a unit with a one toothed ratchet wheel 27 and a disc 28, the discs having projections 29 disposed in spaced angular relation relative to the one toothed ratchet wheels 27, while the disc 28 of each unit thus formed is provided with a drum element 30 on which is coiled a cord or piano wire 31 having one of its ends hooked to a motor spring 32, the latter having its opposite end connected to the downward extending arm 33 of its respectively associated key while the opposite end of cord 31 is hooked to the end of a retractile spring 34 having its opposite end hooked to a support 35 secured to the base 10 as by a number of screws HC shown in Figs. 1, 2 and 3.

The operation of any one of the key members K1, K2, K3, etc., is effective to impart a corresponding angular movement to the U-shaped bar 36 against the tension of a retractile spring RS. The movement of this bar in turn causes the pivotal movement of pawl bar 62 from the position shown in Fig. 1 to the position shown in Fig. 2 for locking the non-operated key in that position while the movement of U-shaped bar 36 is effective to engage a downwardly extending projection 37 carried thereby with an arm 38 formed with a bar 39 pivoted on shaft 21. The bar 39 is formed with a ridge 40 extending transverse of the one toothed ratchet wheels 27 to serve for individually holding these wheels in normal position during the tensioning of their respective motor springs 32 by the operation of their respectively associated keys, the bar 39 being returned to the engaged position with ratchet wheels 27 following the return of the operated key and the bar 36 to normal position by the normal tension of a spring 41.

Each anchor member 24 is provided with an arm 42 disposed in operative relation with a bar 43 having arms as A1 and A2 pivoted on supports 44 and 45 best seen in Figs. 1 and 2. Bar 43 is disposed in engageable relation with a spring 46 which cooperates with a spring 48 to form a normally closed pulsing contact 47, these springs being securely mounted in a pile-up arrangement on the U-shaped support 35.

One arm of U-shaped bar 36 is provided with a projection 51, best seen in Figs. 1, 2, 3 and 4, carrying a stud 52 of insulating material disposed in operable relation with a set of contacts C1 and C2 provided to perform switching operations well known in the automatic telephone art but which form no part of the present invention.

In the operation of the cell transmitter of this invention, the operation of any key member as key K1, for example, from the position shown in Fig. 1 to the position shown in Fig. 2 is effective to impart a corresponding movement to the U-shaped bar 36 against the tension of its retractile spring RS while tensioning the motor spring 32 hooked thereto due to the one toothed ratchet wheel 27 of the unit associated with that key, being prevented from rotation by the ridge 40 of bar 39. The operation of bar 36 to its full operated position causes the automatic pivotal movement of arm 18 under the tension of its spring 23 for engaging the pin 20 carried by that key and thereby holding the latter in the operated position as shown in Fig. 2, while the pivotal movement of arm 18 is effective to position the anchor member 24 mounted thereon in operative relation with its respective escapement wheel 26 which occurs in timed relation with the engagement of projection 37 formed with bar 36 with the arm 38 of the pivoted bar 39 for releasing the one toothed ratchet wheel 27 and thereby permitting the rotation of escapement wheel 26 of that unit and the consequent movement of its anchor member 24 for operating the bar 43 and thereby opening the pulsing contact 47 once followed by the engagement of projection 29 of wheel 28 of that unit with the cam portion 60 formed with arm 18 for disengaging the latter from pin 20 of key K1 and thereby moving the anchor member 24 as shown in Fig. 6 out of operable relation from its respectively associated escapement wheel 26, the disengagement of pin 20 by arm 18 permitting the return of this key to normal position under the tension of its own retractile spring 17.

Rotation of escapement wheel 26 under the tension of motor spring 32 and the consequent winding of the cord 31 on drum 30 during the pulsing operation is effective to tension the retractile spring 34 which in turn causes the reverse movement of this unit to normal non-operated position simultaneously with the return of the operated key to normal position when the ridge 40 of bar 39 under the tension of its retractile spring 41 reengages the one toothed ratchet wheel 27 of all units and the transmitter mechanism is now in condition for the operation of a succeeding key.

The operation of key K10 for transmitting ten pulses as another example is effected in a manner similar to that described in connection with key K1. The rotation of the unit associated with key K10 is effective through the engagement of its pin P10 shown in Figs. 1 and 2 to move its associated arm 18 against the tension of its spring 23 and thereby the anchor member 24 carried thereby out of engagement from its escapement wheel 26 following ten complete oscillations of the anchor member 24 and that of contact 47, the operation of arm 18 releasing key K10 which is returned to normal position under the tension of its own retractile spring 17 in the manner as above described in connection with key K1 to again prepare the transmitter mechanism for the operation of the succeeding key.

What is claimed is:

1. In a call transmitter, a set of key members, clock escapement mechanisms, each of said mechanisms having an escapement wheel and an anchor member one for each of said key members, each of said mechanisms having a motor spring tensioned by the operation of its respectively associated key member, movable supports for said anchor members of said mechanisms normally in position wherein said anchor members are out of engagement from their respectively associated escapement wheels, normally tensioned spring elements for moving said supports under control of said key members in position for rendering the operation of said escapement wheels effective relative to said anchor members, said movable supports having means for locking their respective keys in the operated position, a pulsing contact actuated by the operation of any one of said clock escapement mechanisms, and means actuated by said escapement mechanisms for releasing their operated keys following the operation of said pulsing contact.

2. In a call transmitter, a set of pivoted key

members, clock escapement mechanisms, one for each of said key members, each of said mechanisms comprising an escapement wheel and an anchor member normally disengaged from said escapement wheel, a disc secured to said escapement wheels for movement therewith, pivoted arms operatively associated with said key members for pivotally mounting said anchor members, means carried by each of said arms for engaging means carried by their associated key members for locking the latter individually in the operated position, the movement of each of said arms positioning its anchor member in operative relation with its associated escapement wheel, motors for actuating said escapement wheels to cause the operation of their anchor members, a contact actuated by the anchor member of each of said clock mechanisms upon the operation of their respectively associated key members, each of said discs having means for actuating its respectively associated arm for moving the anchor member carried by this arm in non-operated position relative to its associated escapement wheel for controlling the operation of said contact.

3. In a call transmitter mechanism, a set of key members, motor springs attached at one of their ends to means carried by said key members, a shaft, escapement wheels mounted for rotation on said shaft, a drum and a disc secured to each of said escapement wheels forming independent units therewith, one of said units for each of said key members, cords attached to the opposite ends of said motor springs and winding on the drums of said units for rotating them upon the operation of their respectively associated key members, an anchor member operatively associated with each of said escapement wheels, but normally out of operative relation therefrom, spring actuated supporting means operatively associated with each of said key members for positioning said anchor members in operative relation with their respectively associated escapement wheels, and a pulsing contact actuated by the individual operation of said anchor members upon the rotation of the operated unit by its respective motor spring, each of said discs having means for actuating its respectively associated spring actuated supporting means for moving its anchor member out of operable relation from its associated escapement wheel for controlling the operation of said pulsing contact.

4. In a call transmitter, a key member, a pulsing contact, a shaft, a clock escapement wheel, a ratchet wheel, a disc and a drum secured to said escapement wheel for rotation as a unit on said shaft, a motor spring, a cord coiled on said drum and having one of its ends connected to one end of said motor spring and its other end to said key member, a pivoted pawl bar normally engaging said ratchet wheel for holding said unit against movement upon the tensioning of said motor spring by said key member, means actuated by the movement of said key for operating said pivoted pawl bar for releasing said unit to cause the operation of the latter by the tension of said motor spring, spring actuated means operable for locking said key in the operated position, an anchor member carried by said spring actuated means positioned for engaging said escapement wheel upon the locking of said key, a pulsing contact actuated by the operation of said anchor member, and means carried by said key member engaging means carried by said spring actuated means for moving said anchor member in position ineffective relative to said escapement wheel and releasing said key, spring means for returning said key to normal position and a retractile spring tensioned by the operation of said motor spring for returning said unit to normal.

5. In a call transmitter a set of key members, a pulsing contact, a supporting shaft for said key members, another shaft, a plurality of escapement wheels mounted for free rotation on said other shaft, one of said escapement wheels for each of said key members, a drum secured to each of said escapement wheels, an anchor member for each of said escapement wheels normally out of engagement therewith, movable supports for pivotally mounting said anchor members, means carried by said supports for individually locking said keys in the operated position and engaging said anchor members with their respectively associated escapement wheels, a cord coiled on each of said drums, a motor spring operatively connecting each of said key members to one end of each of said cords coiled on said drums for individually rotating said escapement wheels upon the operation of their respectively associated key members for actuating said anchor members, means movable with each of said escapement wheels for actuating one of said pivoted arms for moving its respective anchor member away from its associated escapement wheel for controlling the operation of said contact and simultaneously releasing the operated key member.

6. In a call transmitter, a base, a pulsing contact a set of key members, a shaft for pivotally supporting said key members, a U-shaped bar pivoted on said shaft and disposed for operation by the movement of any one of said key members, a retractile spring for said U-shaped bar, another shaft, a clock escapement wheel for each of said key members, a ratchet wheel, a disc and a drum secured to said escapement wheels for movement as units therewith on the second-mentioned shaft, a cord wound around each of said drums, a motor spring for each of said units having one of its ends attached to one of the ends of said cords and their other ends to their respective key members, retractile springs secured to the other ends of said cords, and their other ends to supporting means mounted on said base, a pivoted pawl bar normally engaging the ratchet wheels of said units for preventing the operation thereof during the tensioning of their respective motor springs by the operation of their associated members, an anchor element for each of said escapement wheels normally positioned out of operative relation therewith, means carried by each of said key members cooperating with means supporting said anchor elements for controlling the engagement of their respective anchor elements with their associated escapement wheels, means carried by said U-bar engaging means carried by said pawl bar upon the operation of any one of said key members for operating said pawl bar for permitting the operation of the escapement wheel in the unit associated by the operated key by the tension of its motor spring for actuating said contact, means carried by the disc of the operated unit for moving its operated anchor member out of engaged relation with its associated escapement wheel for controlling the operation of said contact and releasing the operated key member.

RUDOLPH F. MALLINA.