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R. F. MALLINA

2,352,723

CALL TRANSMITTER

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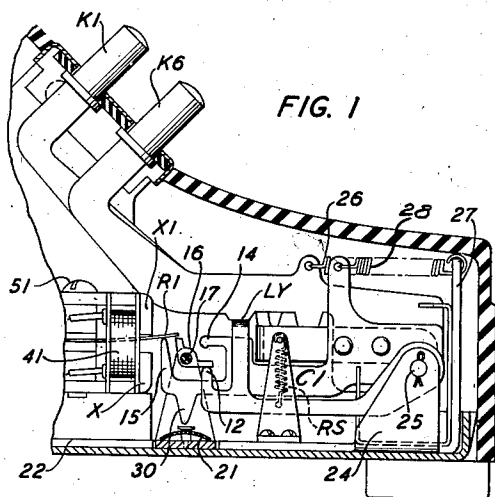


FIG. 1

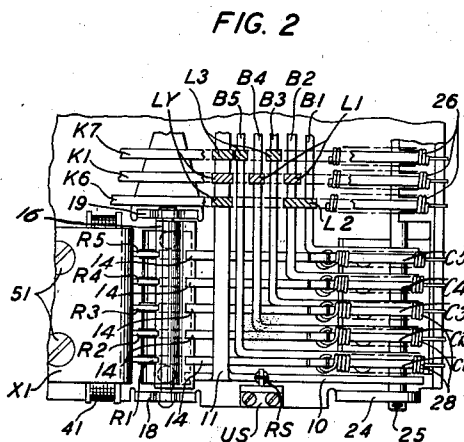


FIG. 2

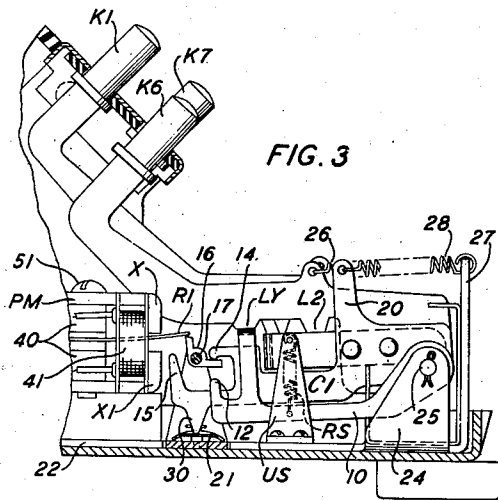


FIG. 3

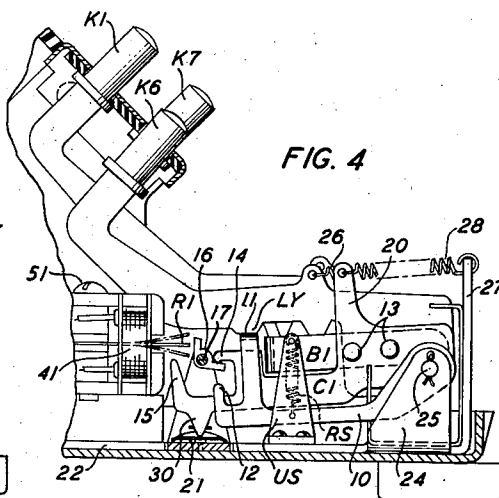


FIG. 4

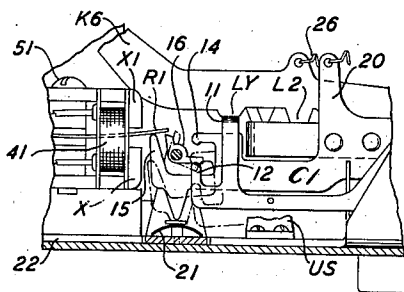


FIG. 5

INVENTOR
R. F. MALLINA
BY *J. Mac Donald*
ATTORNEY

UNITED STATES PATENT OFFICE

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CALL TRANSMITTER

Rudolph F. Mallina, Hastings on Hudson, N. Y.,
 assignor to Bell Telephone Laboratories, In-
 corporated, New York, N. Y., a corporation of
 New York

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3 Claims. (Cl. 179-90)

This invention relates to telephone call transmitters of the type in which the release of manually pretensioned reeds by the operation of manually operable digit key members and their consequent vibration between the pole-pieces of an alternating current generator is effective to transmit signals in a telephone line connected thereto corresponding to the digits of the keys depressed for controlling the operation of selector and connector switches at the telephone exchange for establishing talking connection.

It is an improvement over the call transmitter disclosed in a copending application Serial No. 225,347, filed in the name of R. F. Millina, March 22, 1940, now Patent No. 2,315,344, granted March 30, 1943.

In the above-mentioned application, a call transmitter is disclosed having an operative mechanism for the vibrative elements of an alternating current generator in which pivoted pawl-like members are moved upon the return movement of the keys to normal in juxtaposition of the underside of the vibrative elements by ribbon shaped retractile springs secured to arms carried by so-called U-shaped bars, which are operated in predetermined combination by the operation of the keys. In the use of this mechanism, it was found that upon the return movement of the keys and the U-shaped bars to normal followed by the movement of the pawl-like members as effected by the tension of the respective retractile ribbon springs movable with the U-shaped bars, caused these pawls to be pressed against the free ends of the vibrative elements prior to their coming to rest and during the movement of these elements toward their pretensioned positions, with the consequent shortening of the operating period of time of the elements and causing undue wear between the elements and their releasing pawls.

The object of this invention is the provision of an operating mechanism in which a pawl-like member which is common to all the vibrative elements is moved by the movement of the keys in position relative to the elements in a sequence of simple and positively controlled operations, thus avoiding interference between the pawl-like members and the vibrative elements resulting in a greater number of positive operations of the transmitter mechanism.

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 drawing in which:

Fig. 1 is a side elevation view of the transmitter mechanism shown with the keys and operating parts actuated thereby in normal non-operated position, the casing for housing the transmitter mechanism and the base plate being shown in vertical section and with portions broken away;

Fig. 2 is a partial top view of Fig. 1 showing the operative relation of the U-bars and the key members, the keys being shown with portions broken away;

Fig. 3 is a view similar to Fig. 1 but showing one of the keys and a number of operating parts controlled thereby partly operated;

Fig. 4 is a view similar to Fig. 3 but showing such key and operating parts controlled thereby in their full operated position; and

Fig. 5 is a view similar to that of Figs. 1, 3 and 4 but showing the operating parts in position following the return of the operated key to normal position.

According to the invention a set of ten key members representing digits from 1 to 9 plus a zero of the type as shown by keys K1, K6 and K7 is provided for actuating five U-shaped bars B1, B2, B3, B4 and B5 as described in the above-mentioned application in ten predetermined combinations through the engagement of lugs, as L1, carried by key K1, for example, engaging as shown in Fig. 2 the bars B2 and B4. The common lug L2 carried by key K6 engaging the U-shaped bars B1 and B2 and the pair of lugs L3 carried by key K7 engaging the U-shaped bars B3 and B5, the remaining keys (not shown) as mentioned in connection with keys K1, K6 and K7 actuating the bars B1, B2, B3, etc., in combinations so as to produce a different signal for each of the keys, all the keys being yieldably held in normal non-operated position by retractile springs as 26 having one of their ends hooked to lugs formed with the body portion of the keys and their other ends hooked to a common plate 27 formed with and extending perpendicularly from a supporting plate 22.

The set of key members K1, K2, K3, etc., and the U-shaped bars B1, B2, B3, etc., actuated thereby are pivoted on a common shaft 25 journaled at both ends in upright supporting members as 24 formed with the supporting plate 22. On shaft 25 is pivoted the arms 10 of a bar 11 extending in direction transverse of the keys and held in operative relation with lugs as LY carried by the keys by the tension of a retractile spring RS having one of its ends hooked to an upright support US secured to the supporting

plate 22 and its other end to the arm 10 of bar 11. The free end of one of the arms 10 as shown in the drawing is provided with an upwardly projecting lug 12 disposed in engageable relation with the horizontally disposed side of a pivoted bar 16 of angular cross section, the vertically disposed side of this bar extending in juxtaposition to the underside and free ends of a plurality of vibrative elements in the form of tuned reeds R1, R2, R3, R4 and R5, the angle bar 16 having a stud, as 17, at each end freely engaging bearings in upright supporting members 18 and 19 formed with the mounting plate 22.

To the U-shaped bars B1, B2, B3, etc., are secured as by rivet 13, the arms C5, C4, C3, C2 and C1 respectively. These arms are formed at their free ends with similar projections 14 and 15, projections 14 being disposed in operative relation with the horizontally disposed side of angle bar 16, while the projections 15 are disposed in engageable relation with the free ends of reeds R1, R2, R3, R4 and R5 for tensioning them through the tension of retractile springs 28 when the keys and the U-bars B1, B2, B3, etc., are in normal non-operated position, the springs 28 having one of their ends hooked to the upright extending plate 27 and their other ends to upward extending lug portions 20 formed with the arms C1, C2, C3, etc.

A spring 21 of arcuate cross section and common to all the arms C1, C2, C3, etc., is disposed with its parallel edges bearing on the plate 22 and its apex in engageable relation with downwardly projecting lugs 30 formed with the arms C1, C2, C3, etc., so as to control the manual operation of the set of key members K1, K2, K3, etc., in a manner which will be hereinafter described in detail.

The vibrative elements R1, R2, R3, etc., are clamped between the blocks 40 by a number of screws 51 and extend into an opening in a coil 41 for vibration between the poles X and X1 of a permanent magnet PM and in engageable relation with the lugs 15 of arms C1, C2, C3, etc., and with the vertically disposed side of pivoted angle bar 16 as above mentioned.

In a typical example of operation of the transmitter mechanism above described, considering the operating parts in the position shown in Fig. 1, i. e., wherein the reeds R1, R2, R3, etc., are held in flexed position by the engagement of lugs 15 of arms C1, C2, C3, etc., with reeds R5, R4, R3, etc., under the tension of springs 28, the operation of key member K6, for example, from the position shown in Fig. 1 to the position shown in Fig. 3 is effective to impart a pivotal movement to the U-shaped bars B1 and B2 through the engagement of lug L2 of that key and a pivotal movement to the transverse bar 11 through the engagement of lug LY of key K6 with that bar. The simultaneous downward movement of U-shaped bars B1 and B2 and the arms C5 and C4 carried by these bars is effective to release the reeds R5 and R4 while the projections 14 of these arms are now positioned in engagement with the top surface of the horizontally disposed side of bar 16 preparatory to the rotation of this angle bar for moving its vertically disposed side out of engageable relation from the reeds R1, R2, R3, R4 and R5 so as to permit the release and vibration of reeds R4 and R5 upon the continued operation of key K6 from the position shown in Fig. 3 to the position shown in Fig. 4, the pivotal movement of angle bar 16 being timed to occur following the

movement of transverse bar 11 as effected by the lug LY carried by key K6 for moving the projection 12 of arm 10 of that bar a predetermined distance from the angle bar 16, thus permitting the pivotal movement of the latter through its engagement with the lugs 14 of arms C4 and C5 operating in combination with the manual operation of key K6 while the reeds R1, R2 and R3 remain tensioned due to their engagement with the lugs 15 of their unoperated arms C1, C2, and C3 held by the tension of their retractile springs 28. The pivotal movement of angle bar 16 and the consequent release of reeds R4 and R5 permit the vibration of these reeds between the poles X and X1 of the alternating current generator for transmitting a signal in the telephone line connected to the coil 41 of frequencies corresponding to the depressed key K6 and the operating parts of the transmitter are now in the position shown in Fig. 4.

Upon the return movement of the depressed key K6 from its full operated position shown in Fig. 4 to the position shown in Fig. 5 followed by the return movement of the U-shaped bars B1 and B2 and therefore that of the arms C5 and C4, the lugs 15 of these arms move the reeds R4 and R5 to their tensioned position which is reached prior to the pivotal movement of angle bar 16 toward normal position as affected by the engagement of lug 12 of bar 11 itself operated by the tension of its retractile spring RS but under the control of the key K6 so that the vertical side of angle bar 16 does not come into contact with the ends of these reeds during their tensioning operation, thus avoiding the consequent wear and interference between these parts resulting in a greater number of positive operations of the transmitter mechanism, the function of the arcuated spring 21 being to offer maximum resistance to a pressure applied on any one of the keys during their operation as from the position shown by key K6 in Fig. 1 to the position of that key in Fig. 3 where the resistance of this spring decreases to a negligible value tending to induce the operator to depress the keys to their maximum limit of movement.

What is claimed is:

1. In a call transmitter, a set of keys, vibrative elements, operable means controlled by the operation of said keys and having retractile springs for normally tensioning said elements, an operable common latching member for said elements, another operable means movable independently of the first-mentioned operable means by the operation of any one of the key members and having a retractile spring for moving said common latching member in position for retaining said elements tensioned upon a predetermined manual movement of said keys and means carried by the first mentioned operable means for actuating said latching member upon the continued operation of said keys and the disengagement of the second-mentioned operable means from said latching member for releasing said elements to cause their vibration.

2. In a call transmitter, a set of key members, a plurality of U-shaped bars disposed for operation in predetermined combinations by the movement of said key members, a plurality of vibrative elements, a pivoted angle bar, a bar disposed for operation by any one of said key members and having means for normally positioning said angle bar to hold said elements in pretensioned position following the operation of said bars by said key members, an arm carried by each of

said U-shaped bars, each of said arms having means for engaging one of said elements for moving them in said pretensioned position, other means carried by said arms disposed in engageable relation with one side of said angle bar for rotating it upon the operation of any one of the key members for releasing the elements corresponding to the U-shaped bars actuated by that key, the third-mentioned bar restoring said angle bar in the vibrating path of said vibrating elements following the tensioning of the latter by the first-mentioned means carried by said arms.

3. A call transmitter having vibrative elements, a mechanism for controlling the operation of said elements, said mechanism comprising a set of key members, a set of movable bars disposed for operation by the movement of said key members,

a retractile spring for each of said movable bars for holding them in operative relation with said key members, means carried by each of said bars for tensioning said vibrative elements under the tension of said retractile springs, a pivoted latching element of angular cross section, a pivoted bar disposed in operative relation with each of said keys, a retractile spring for said pivoted bar for yieldably holding the latter in operative relation with said key members and said latching element in engageable relation with said vibrative elements under the tension of said retractile spring when said elements are in their tensioned position, other means carried by each of said movable bars for rotating said latching element following the operation of the pivoted bar for disengaging it from said elements for permitting their vibration.

RUDOLPH F. MALLINA.