

Jan. 5, 1943.

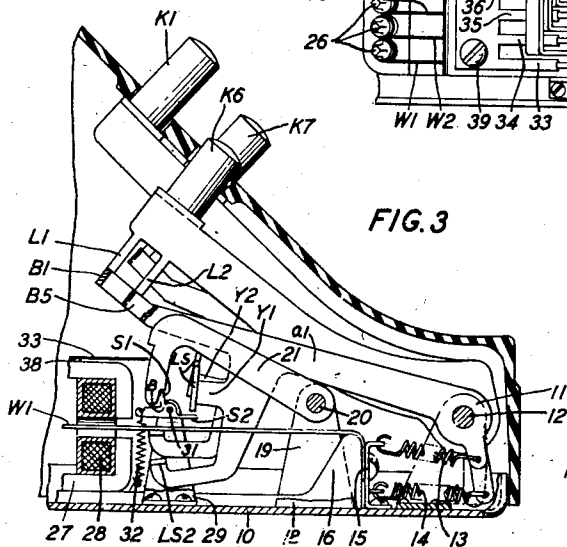
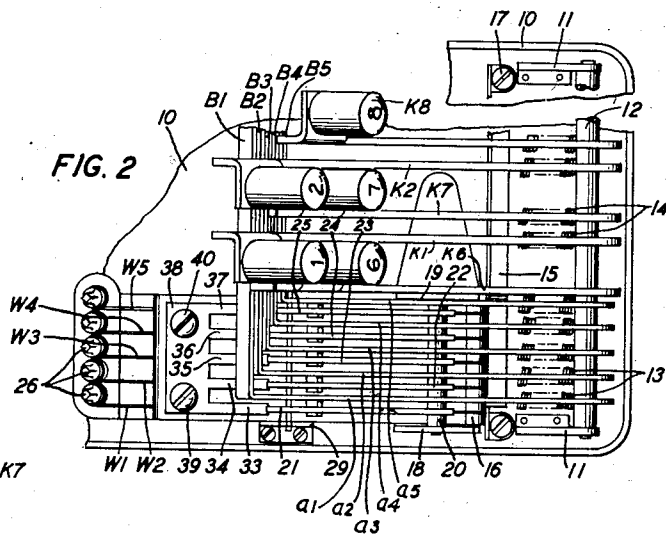
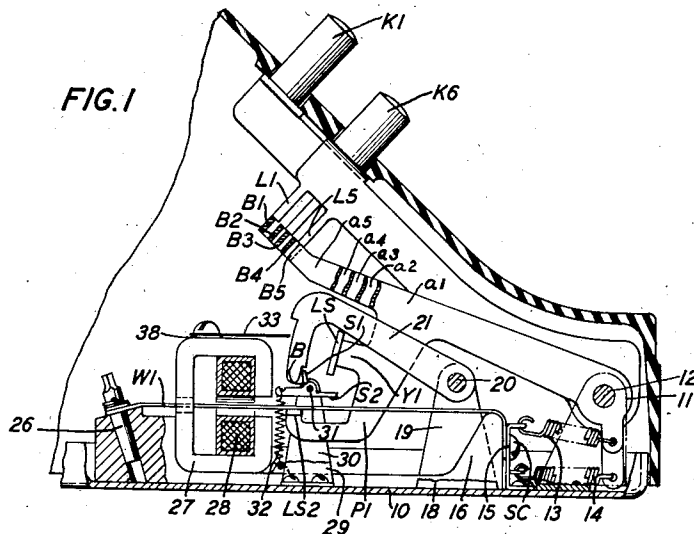
C. A. LOVELL ET AL

2,307,521

CALL TRANSMITTER

Filed July 22, 1941

2 Sheets-Sheet 1



INVENTORS: C.A. LOVELL
R.F. MALLINA
L.VIETH

BY *J. MacDonald*
ATTORNEY

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2 Sheets-Sheet 2

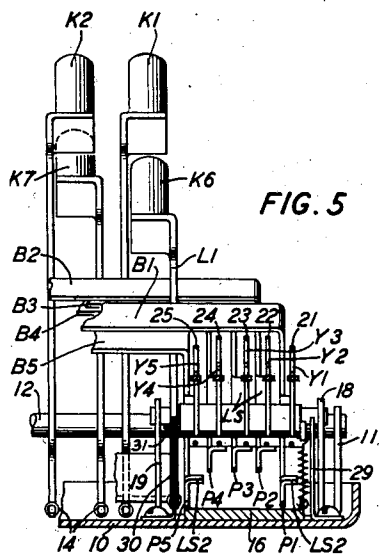


FIG. 5

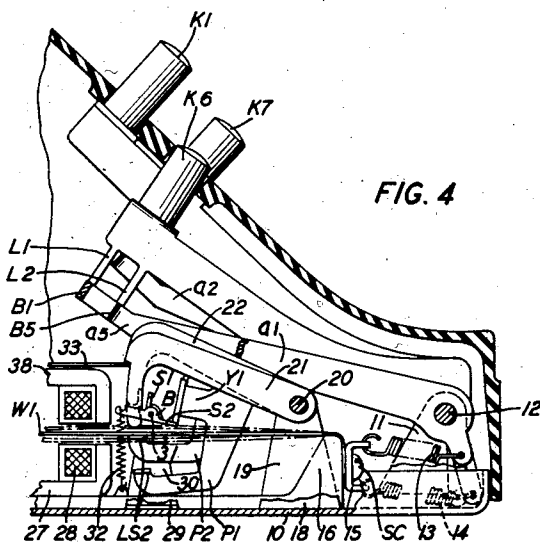


FIG. 4

FIG. 7

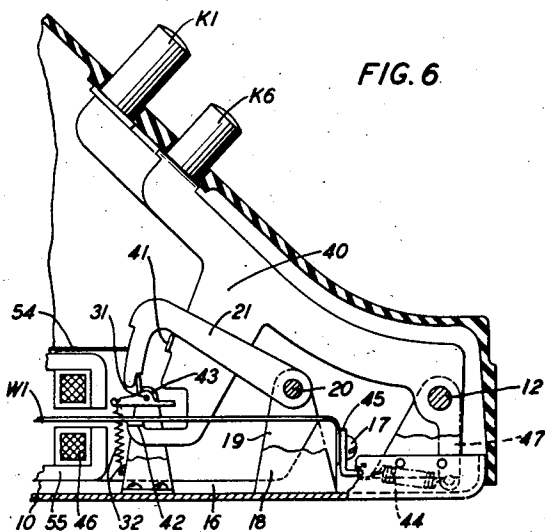
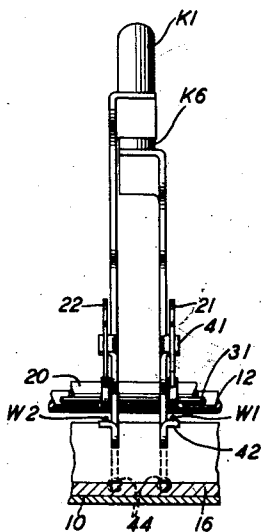


FIG. 6

C. A. LOVELL
INVENTORS: R. F. MALLINA
L. VIETH

BY *J. MacDonald*
ATTORNEY

UNITED STATES PATENT OFFICE

2,307,521

CALL TRANSMITTER

Clarence A. Lovell, Maplewood, N. J., and Rudolph F. Mallina, Hastings on Hudson, and Leonard Vieth, Jackson Heights, N. Y., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application July 22, 1941, Serial No. 403,480

3 Claims. (Cl. 179-90)

This invention relates to telephone call transmitters of the type disclosed in a copending application filed in the name of R. F. Mallina, March 22, 1940, Serial No. 325,347.

In that application a telephone call transmitter is disclosed in which the operation of manually operable key members actuates a number of pivoted bars in combinations for causing the vibration of pretensioned reeds in the field of an electromagnetic device, such vibrations being translated into alternating current signals in a telephone line for controlling the operation of so-called selector and connector switches for establishing talking connections.

The object of the invention is to improve the construction and operation of such call transmitters.

According to the invention, an actuating mechanism is provided having means by which pivoted hammer-like members are normally held in striking relation to tuned piano wires and let fall by gravity or springs through the operation of means actuated by the keys in predetermined combinations for causing vibration of the piano wires in the field of the electromagnetic device for generating alternating current signals representing the digits of the operated keys. Means is provided in the actuating mechanism for damping the vibrations of the operated wires prior to the operation of each successive key while means is provided for adjusting the tension and thereby the tuning of the piano wires to the desired signaling frequencies.

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

Fig. 1 is a side elevation view showing the hammers operating mechanism in normal position, a number of operating parts being shown partly in section;

Fig. 2 is a partial top view of Fig. 1;

Fig. 3 is a side elevation view of the hammers operating mechanism, one of the keys being shown partly operated;

Fig. 4 is a side elevation view similar to Fig. 3 but showing one of the keys in its full-operated position with the bars and hammers controlled by that key in position following their release by the operation of the common retaining pawl;

Fig. 5 is a rear view of Fig. 4;

Fig. 6 is a side elevation view of the hammers operating mechanism modified; and

Fig. 7 is a rear view of Fig. 6 shown with the

alternating current generator and a number of piano wires removed.

As shown in the drawings, the call transmitter of the invention consists of a base 10 to which is secured, as by welding, a pair of upright members 11 provided for supporting a shaft 12 at both ends, and on this shaft is pivotally mounted a set of ten manually operable numbered key members of the type shown by keys K1, K2, K6, K7, K8 arranged in two horizontal rows, each key having at its free end a pair of downwardly extending lug elements, such as L1, L2, provided for imparting movement by pairs to a set of five U-shaped bars B1, B2, B3, B4 and B5 in ten predetermined combinations representing the digits of the manually operable keys.

Bars B1, B2, B3, B4 and B5, Figs. 1, 2, 3, 4 and 5, are bent at right angles at both ends thereof to form arms pivoted on the shaft 12. These bars are yieldably held in engaged relation with the under-side of projections L1 and L2 of the keys by retractile springs 13 best seen in Figs. 1, 2, 3 and 4, while the keys K1, K2, K3, etc. are themselves yieldably held in normal non-operated position as shown in Fig. 1 by retractile springs 14, similar ends of retractile springs 13 and 14 being hooked to a common bar 15 secured at one end to an oblong-shaped mounting 16, as by screws SC, and its other end to the base 10 by a screw 17.

The adjacently disposed arms a1, a2, a3, a4 and a5 of bars B1, B2, B3, B4 and B5, respectively, are provided with downwardly extending projections P1, P2, P3, P4 and P5 best seen in Fig. 5, formed with arms y1, y2, y3, y4 and y5 provided for a purpose which will be hereinafter described in detail.

The base 10 is provided with two upright members 18 and 19 serving for supporting a shaft 20, and on this shaft is pivotally mounted a set of hammer-like elements 21, 22, 23, 24 and 25 best seen in Figs. 2 and 5 disposed in striking relation to piano wires w1, w2, w3, w4 and w5, respectively, of different sizes and tensions for vibration between the poles of an electro-magnetic device consisting of mounting 16, the coil 28 and a magnet 27 with the similar disposed ends of wires w1, w2, etc. clamped between the mountings 16 and the bar 15 while the other ends of wires w1, w2, etc. are wound similar tapered pins 26 fitted in similarly shaped holes in the opposite end of mounting 16, thus providing means for adjusting the piano wires 21, 22, etc. to their proper tensions.

The hammer elements 21, 22, etc. are normally

held in their raised positions relative to the piano wires $w1$, $w2$, etc. by similar lugs as LS bent at right angles from their respective arms $y1$, $y2$, $y3$, etc. formed as above mentioned with the projections P1, P2, etc. of bars B1, B2, etc. while the projections P1, P2, etc. are provided at their free end portions with lugs as LS2 serving for damping the operation of the wires $w1$, $w2$, etc. in a manner which will be hereinafter described in detail. The plate 10 is provided with two upright members 29 and 30 serving to support a shaft 31 used for pivotally mounting a bar B of substantially L-shaped cross section having its side S1 disposed vertically in engageable relation with shoulder portions formed at the free ends of hammers 21, 22, etc. for holding the latter in the raised position following a partial operation of the keys in their movements to full operated position, while the horizontal side S2 of bar B is disposed in engageable relation with the lugs LS of projections $y1$, $y2$, etc. to cause the pivotal movement of this bar against the tension of its retractile spring 32 for releasing the hammers corresponding to the bars B1, B2, etc. which may be operated by the depressed keys. Springs 33, 34, 35, 36 and 37 which are formed in the manner of a comb 38 and secured to the coil magnet 27 as by screws 39 and 40 are provided for holding the hammers 21, 22, etc. a small distance above the vibrative wires $w1$, $w2$, etc. following the striking of these wires to permit their vibrations between the poles of magnet 27 and thereby generating alternating current signals in the coil 28 and the telephone line (not shown) connected thereto.

In the modification of the transmitter mechanism shown in Figs. 6 and 7, the ten manually operable key members as K1, K6, etc. pivoted on shaft 12 are yieldably held in the non-operated position by individual retractile springs 44 having one of their ends hooked to a metallic strip 45 secured to the wire mountings 16 by screws 17, while the other ends of these springs are hooked to the downwardly extending lugs 47 of these keys. Each of the ten keys is provided with a downwardly extending projection 40 in turn formed with two lugs 41 and 42 extending at right angles to the plane of its body portion, the lugs 42 of the keys engaging their respective vibrative wires $w1$, $w2$, etc. when the keys are in normal non-operated position to perform functions which will be hereinafter described in detail while the lugs 41 are provided for moving their respective hammers 21 which are pivoted on shaft 20 in spaced or raised position relative to the wires $w1$, $w2$, etc. as shown in Fig. 6.

In this modification a pawl-like member 43 pivoted on shaft 31 is provided for each of the ten hammers 21 so that only the hammer associated with the depressed key is released for striking its own vibrative wire $w1$, $w2$, etc., as the case may be. Springs 54 secured to the mounting 55 of coil 46 serve for holding their respective hammers a small distance from the vibrative elements to free them, thereby permitting their vibrations between the poles of electromagnet 55 following the fall of the hammers 21 over these wires.

In a typical example of operation of the call transmitter shown in Figs. 1, 2, 3, 4 and 5, the operation of any one of the keys as key K6, for example, is effective as shown in Figs. 3 and 4 to operate the U-shaped bars B1 and B5 simultaneously in one of the combinations through the engagement of these bars with lugs L1 and

L2 formed with key 6. The movements of bars B1 and B5 and therefore the lugs LS carried by these cars from the position shown in Fig. 1 to the position shown in Fig. 3 is effective to release the hammers 21 and 25 which fall by gravity on the top edge of the vertically disposed side S1 of the pivoted L-shaped bar B, while the lug portions LS2 also formed with these bars release their respectively associated vibrative elements $w1$ and $w5$ so as to permit their vibration upon the second release of the hammers 21 and 25 as effected by the pivotal movement of the L-shaped bar B imparted by the simultaneous engagement of lugs LS of bars B1 and B5 with the horizontally disposed side S2 of the pivoted bar B.

The striking of the vibrative elements $w1$ and $w5$ by hammers 21 and 25 cause their vibration between the poles of the alternating current generator for transmitting a corresponding signal through the telephone line connected thereto representing the digit of the key depressed.

Upon the release of the operated key by the operator this key is returned to normal by the tension of its own retractile spring 14 which movement is followed by bars B1 and B5 under the tension of their respective retractile springs 13 while the pivoted L-shaped bar B is returned from the position shown in Fig. 4 to the position shown in Fig. 1 by the tension of its retractile spring 32 and the call transmitter is now ready for a successive operation.

In an example of operation of the modification shown in Figs. 6 and 7, the hammers 21, 22, etc. which are held in the raised position through their engagement with lugs 41, carried by each of these keys are released upon the partial operation of their respectively associated keys so as to fall on the vertically disposed sides of their respective pawls 43 wherein the continued operation of the depressed key is effective to impart a pivotal movement to its respective pawl against the tension of its retractile spring to cause the second release of this hammer for striking its vibrative element $w1$, $w2$, etc. the operation of which between the poles of electromagnet 55 is effective to transmit a signal of a frequency representing the digit of the depressed key to the telephone line.

It is understood that minor changes may be made in the invention without departing from the scope of the appended claims.

What is claimed is:

1. A call transmitter, comprising a set of keys, vibrative elements, a hammer for each of said elements, a retractile spring for each of said keys, means operated by said keys for engaging said hammers for holding them at a distance relative to said elements, a plurality of pawls for holding said hammers at said distance following a partial operation of said keys, means carried by the first-mentioned means for operating said pawls during the continued movement of said keys for releasing said hammers for striking said elements to cause them to vibrate, automatic operating means for moving said hammers independently of said keys following the striking of said elements for permitting the vibration of the latter, and other means carried by the first-mentioned means for damping the operation of said elements upon the return operation of said keys to normal.

2. In a call transmitter, a set of tuned piano wires, a set of key members, spring means for yieldably holding said keys in normal unoperated position, a shaft for pivoting said key members,

a set of bars pivoted on said shaft and extending in operative relation with means carried by said key members for operation in predetermined combinations, spring means for yieldably holding said bars in said relation, a second shaft, a plurality of hammer members pivoted on said second shaft, means carried by each of said bars for holding said hammer members at a predetermined distance relative to said piano wires, means for holding said hammer members at said distance following a partial operation of said key members, and means carried by said bars for operating said holding means to cause the release of said hammer members in said combinations for striking a number of said piano wires to cause their vibration, and electromagnetic means for translating said vibrations into electric signals corresponding to the operations of said key members.

3. In a call transmitter, a base, a mounting secured to said base, a set of piano wires secured at both ends to said mounting, a shaft, a set of key members pivoted on said shaft, each of said members having a pair of projections at their free end, a plurality of U-shaped bars pivoted on said shaft and extending transversely of said key

members in engageable relation with said projections to be actuated in pairs in a plurality of predetermined combinations upon the operation of said key members, a second shaft, a plurality of hammer members pivoted on said second shaft, means carried by said U-shaped bars for holding said hammer members in striking relation to said wires, a third shaft, means common to said hammer members pivoted on said third shaft for holding said hammers in said relation upon the partial operation of any one of said key members, means carried by each of said key members for actuating said common means to cause the release of two of said hammer members in said combinations for striking two of said wires to cause their vibrations, other means carried by said U-shaped bar for damping the operation of said wires following the release of the operated keys by the operator, and automatically operable means for returning said common means in engageable relation to said hammer members following the return of said operated keys to normal.

CLARENCE A. LOVELL.
RUDOLPH F. MALLINA.
LEONARD VIETH.