

Feb. 27, 1945.

O. A. SHANN

2,370,264

TELEPHONE CALL TRANSMITTER

Filed May 29, 1943

2 Sheets-Sheet 1

FIG. 1

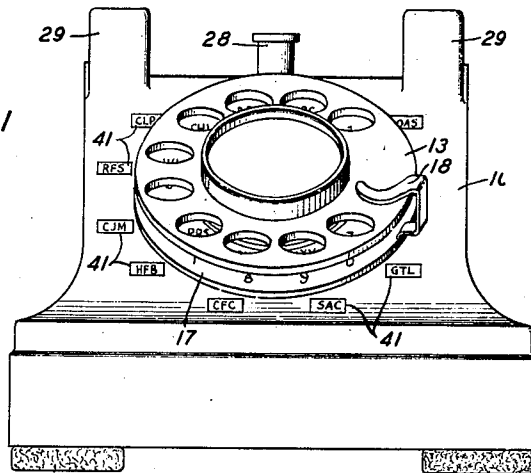
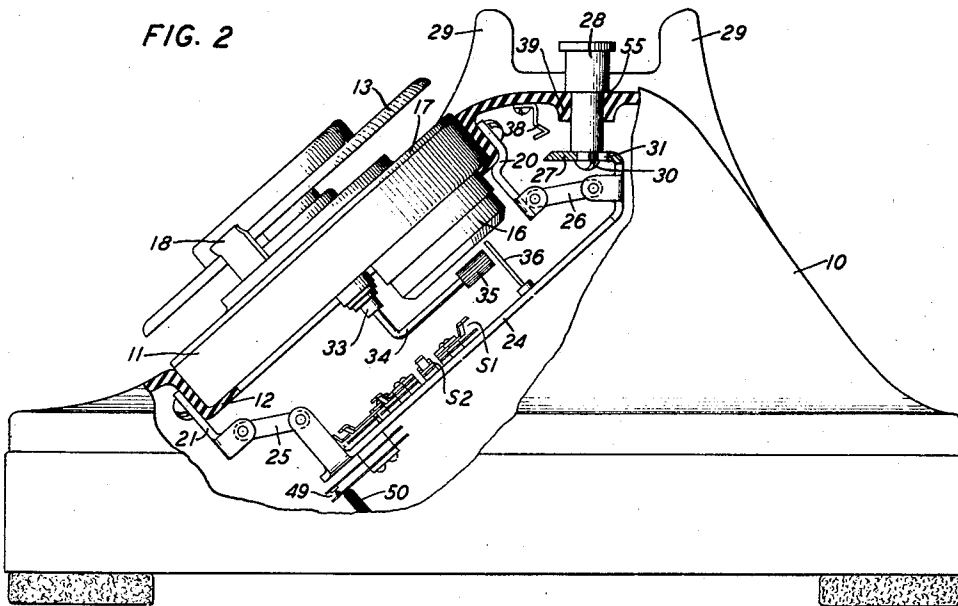


FIG. 2



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FIG. 3

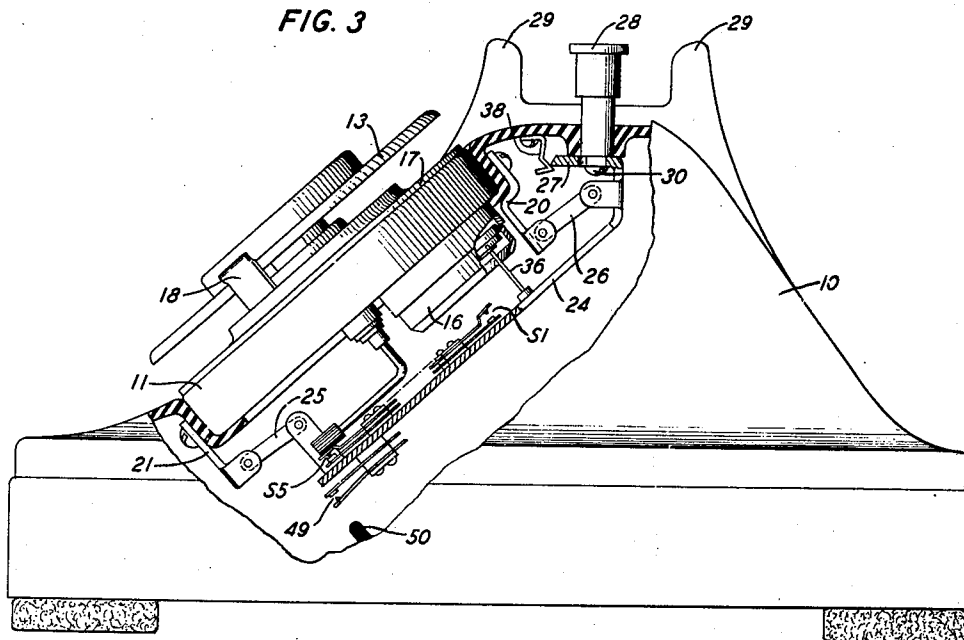


FIG. 4

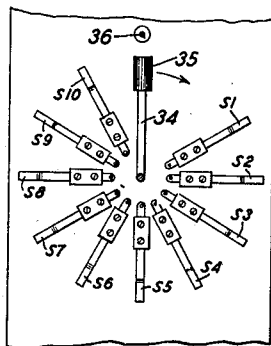
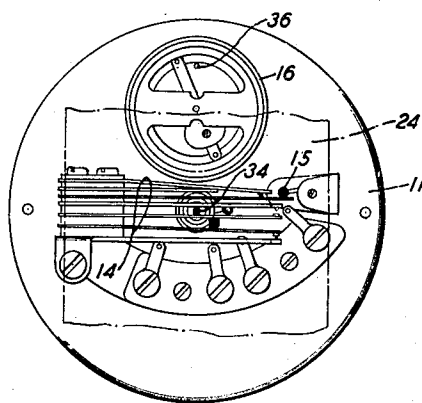


FIG. 5



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TELEPHONE CALL TRANSMITTER

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16 Claims. (Cl. 179-90)

This invention relates to telephone calling devices and particularly to a combined impulse sender and line selector for use at a subscriber's station of the so-called key-calling type.

Key-calling telephone systems have been devised for the purpose of providing facilities whereby a calling subscriber who has regular dial service may also effect the completion of direct station connections expeditiously, with a minimum of effort, and without resorting to the use of the telephone dial. The telephone set at such a subscriber's station has been characterized heretofore by a plurality of manually operable keys usually arranged in one or more rows and occupying a location on the set immediately below the dial. The number of keys correspond to the number of lines to which the key calling subscriber has direct access and the operation of any one key serves to extend the calling subscriber's line directly to one of a group of frequently called lines. Such facilities enable a subscriber to initiate calls to any of a selected group of lines, normally accessible through the medium of the dial, by the simple operation of a key, and preclude the necessity for operating the dial to originate such calls, thereby expediting their completion.

It is the object of this invention to simplify and otherwise improve the substation facilities at a subscriber's station of a so-called key calling telephone system which enable the subscriber to complete direct connections to any of a group of frequently called lines.

This object is attained in accordance with a feature of the invention by housing the line terminals of a group of frequently called lines in the subscriber's telephone set and by the provision of means for rendering the said terminals selectively operable under the control of the finger wheel of the dial which is normally employed in controlling the completion of automatic telephone connections originated at the subscriber's station.

A particular feature of the invention resides in associating a line terminal actuator with the rotatable shaft of the dial and so normally locating the line terminals relative thereto that when the dial is employed in its capacity as a telephone designation transmitter the said actuator is ineffective to actuate the line terminals.

Another feature of the invention provides manually operable means for moving the line terminals relative to the said actuator so as to render the actuator effective to operate the line ter-

minals when the dial finger wheel is employed in effecting a direct station connection.

A further feature of the invention resides in the use of means for locking the dial finger wheel in an operated position when used to control the operation of the line terminals.

A still further feature of the invention contemplates the release of the locked finger wheel incident to the replacement of the telephone handset on its support at the termination of a direct line call.

Another feature of the invention provides an auxiliary set of line designations on the telephone set, each of which identifies a line to which the calling subscriber has direct access, and each of which is disposed adjacent to a particular finger-hole in the dial finger-wheel.

These and other features of the invention will be better understood from the following detailed description made with reference to the accompanying drawings, in which:

Fig. 1 is a front view of a subscriber's telephone set (the telephone handset being omitted) which illustrates a conventional dial housed in the telephone set casing and shows the auxiliary set of designations fixed to the telephone set and disposed thereon in such a manner that each designation corresponds to a different one of the ten finger-holes in the dial finger-wheel;

Fig. 2 is a side view of the telephone set shown in Fig. 1, with part of the casing broken away to expose the line terminals, or line selector, its location relative to the dial, and the control mechanism therefor. In this view the dual-purpose call transmitter is illustrated in its normal condition, that is, the condition in which it is found when the telephone handset is removed from its cradle support preparatory to initiating a call;

Fig. 3 is a view similar to that of Fig. 2 and in which the call transmitter has been conditioned for use as a direct line selector and the finger-wheel has been rotated to a position in which a particular set of line terminals corresponding to the setting of the finger-wheel is actuated;

Fig. 4 is a partial detail view of the line terminals and shows the control arm or actuator therefor in its normal position; and

Fig. 5 is a bottom view of the dial structure showing the spring pile-up usually mounted thereon and the operating device for the pulsing springs.

In Figs. 2 and 3 the dial springs have been omitted in order to simplify the showing and to avoid unnecessary complexities. Fig. 5, however,

includes a showing of the springs omitted from Figs. 2 and 3.

On the drawings the numeral 10 identifies the subscriber's telephone set (handset omitted) of conventional contour. The front sloping face of the telephone set casing is provided with the usual centrally located orifice into which a dial of any well-known design fits. The circular orifice is defined by the peripheral wall formed integrally with the casing and having a substantially circular flange 12 to which the dial cup 11 is fixed by means of screws, not shown. The dial, per se, may be of any well-known design, such as is shown for example in U. S. Patent 1,161,854, issued November 30, 1915, to O. F. Forsberg. It consists primarily of a finger-wheel 13, the cup-shaped casing 11 which houses the dial operating mechanism fully disclosed in the above identified patent, a contact spring pile-up 14, a pulsing lobe 15 which functions under the control of the operating mechanism housed in the casing 11 to operate the pulsing springs of the spring pile-up 14, a governor indicated by the numeral 16 which regulates the return speed of the dial, a number plate 17 which bears the telephone designation characters, and a finger stop 18. These elements are all combined in a unitary structure in a well-known manner and serve well-known purposes. A complete description of the operation of a dial generally similar to that shown in the drawings is contained in the above identified patent. Briefly, when the dial is to be operated, the finger of the subscriber is inserted in a finger-hole of the finger-wheel 13 through which the digit or character to be dialed is visible to the subscriber and the finger-wheel is rotated in a clockwise direction until the finger contacts the finger stop 18. The finger is then withdrawn and the finger-wheel restores to normal, rotating in a counter-clockwise direction under the action of a restoring spring, not shown in the drawings but clearly illustrated in the drawings of the above identified patent, its speed of rotation being governed by the governor 16. During the return of the dial to normal the pulsing lobe 15 is actuated to interrupt the pulsing spring contacts of the pile-up 14 a number of times determined by the length of arc through which the finger-wheel rotates. The pulsing springs function in a well-known manner to interrupt the pulsing circuit over which the telephone automatic switches are controlled.

Brackets 20 and 21 are fixed by screws to diagonally opposite sides of the annular wall of the dial cup receptacle whole flange is indicated at 12. These brackets support a carriage 24 through the medium of a link mechanism comprising links 25 and 26 each of which is pivotally connected to ear-like projections of the brackets 20 and 21 and of the carriage 24.

The carriage 24 supports a bank of ten sets of contact springs or line terminals mounted radially thereon as clearly shown in Fig. 4. Each set of line terminals consists of two contact springs normally in disengaged relation. Each set of springs is insulated from the carriage 24 and from one another. The line terminals are identified by the designations S1, S2 . . . S10 on Fig. 4.

The upper end of carriage 24 is provided with a horizontal offset portion 27 which supports a button 28 which protrudes through a centrally located orifice 55 in the cradle portion of the telephone set casing 10 and which is positioned midway of the two pairs of cradle tines 29 which support the telephone handset. This button is se-

cured to the portion 27 of the carriage 24 by means of a screw bolt 30 which passes through the aperture 31 in the carriage portion 27. The aperture 31 is slightly larger in diameter than the shank portion of screw 30 which permits the carriage portion 27 to move slightly to the left, viewing Fig. 2, when the button 28 is raised as will appear from a later description. The button 28 is essentially a cylindrical element having a lower portion of smaller diameter than the upper portion. This construction provides a shoulder which normally rests upon the edge of the portion of casing 10 which defines the orifice 55 by virtue of which the carriage 24 is maintained in its normal position shown in Fig. 2.

The lower end of the dial shaft 33, which extends below the base of the dial casing 11 has fixed thereto an L-shaped arm or line terminal actuator 34 which, at its free end, carries an insulating wiper 35. By virtue of the fixed relation of the actuator 34 to the dial shaft 33 any rotational movement of the dial shaft to which the finger-wheel 13 is secured, is communicated to the arm 34.

An elongated pin 36 is fixed to the carriage 24 and projects upwardly therefrom at right angles, its free end normally lying just below the governor 16.

When the dual-purpose call transmitter is to be employed to selectively actuate the line terminals the button 28 is withdrawn from the orifice 55, or pulled upwardly until the upper face of the carriage portion 27 abuts the lower edge of the casing shoulder 39. In this position the carriage is locked by means of spring 38 which is sufficiently flexible to allow the beveled edge of the carriage portion 27 to pass and to then snap into a locking position.

When the button 28 has been operated in the manner described and the spring 38 functions to lock it in its operated position the carriage 24 and its associated equipment will occupy the positions illustrated in Fig. 3. Following the actuation of the button 28 in the manner indicated, the subscriber rotates the finger-wheel in accordance with the particular line desired. The finger-wheel is thus rotated clockwise until the subscriber's finger engages the stop 18. The finger is then withdrawn. When the button 28 was actuated, the carriage 24, by virtue of the links 25 and 26, swings in such a manner as to move bodily towards the actuator 34. The locking pin 36 is, accordingly, moved within the housing of the governor 16 so as to be inserted between the rotatable element thereof and to thereby preclude the return of the dial finger-wheel to normal under the action of its restoring spring. The rotation of the finger-wheel in a clockwise direction is not interfered with by the pin 36 so that as the finger-wheel 13 is rotated the shaft 33 is correspondingly rotated and the wiper 35 wipes over the terminal sets S1, S2, etc., until it stops on the set selected in accordance with the particular finger-hole utilized by the subscriber in actuating the finger-wheel. By virtue of the action of pin 36, the arm 34 and its wiper 35 are locked in their operated position and in engagement with the selected set of line terminals. The telephone line corresponding to the selected line terminals is thus effectively seized when the transmitter finger-wheel is rotated subsequent to the operation of the button 28.

When the connection involving the calling subscriber's line and the line corresponding to the line terminals actuated by the actuator 34, in-

cident to the operation of the dial finger-wheel, is to be terminated the calling subscriber replaces the handset on its cradle support causing it to depress the button 28 with sufficient force to cause the carriage portion 27 to be released from the spring latch 38. The line selector mechanism thus assumes the normal position illustrated in Fig. 2. When the carriage 24 resumes its normal position, the locking pin 35 is simultaneously withdrawn from the dial governor mechanism and the finger-wheel returns to normal under the influence of its restoring spring (not shown, but fully illustrated in the above identified patent).

When the dual-purpose call transmitter is used to effect a direct station connection, it is necessary that the dial shunt springs be opened to prevent the shorting of the handset transmitter. This is accomplished by means of spring 49 carried on the underside of the carriage 24 and the stud 50 which is rigidly fixed to the base of the telephone set in any suitable manner. As shown in Fig. 2, the springs 49 are normally closed by virtue of the engagement thereof with the stud 50 whereas, when the carriage 24 is moved, incident to the operation of button 28, the springs are separated as shown in Fig. 3. The springs 49 are connected in series with the shunt springs of the spring pile-up 14.

When the call transmitter is used as a regular dial, the finger-wheel is actuated in the manner previously described and, though the arm 34 follows the rotational movements of the dial, its wiper 35 sweeps over the line terminals with sufficient clearance to preclude their operation by the wiper. It is only due to the operation of the button 28 that the line terminals are displaced in a direction towards the actuator 34 sufficiently to render the latter effective to operate the line terminals.

Applicant's invention provides a simple, compact and highly effective arrangement for incorporating in a dial equipped telephone set the facilities heretofore obtained by use of a plurality of individually operable keys, and utilizes the finger-wheel of a dial for controlling the actuation of both the regular dial pulsing contacts and the individual line terminals. The telephone set is thus materially simplified and rendered less costly.

What is claimed is:

1. In combination, a rotatable telephone dial, a plurality of line terminals normally inoperative by said dial when rotated, and means operable independently of the rotation of said dial for rendering said line terminals operative by said dial when rotated.

2. In combination, a telephone dial having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft, a plurality of line terminals, means carried by said shaft for engaging said terminals, said means being normally ineffective to engage said terminals when said shaft is rotated, and means for rendering said actuating means effective to engage said terminals when said shaft is rotated.

3. In combination, a telephone dial having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft, a plurality of line terminals, a terminal actuator carried by said shaft and normally displaced from said terminals whereby said actuator is ineffective to actuate said terminals when said shaft is rotated, and manually operable means

for positioning said terminals relative to said actuator so as to be actuated thereby when said shaft is rotated.

4. In combination, a telephone dial having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft, pulsing contacts, means controlled by said shaft when rotated in one direction for actuating said pulsing contacts, a plurality of line terminals, an actuator for said line terminals carried by said shaft and normally inoperative to actuate said terminals when said shaft is rotated, and means for rendering said terminals operable by said actuator when said shaft is rotated.

5. In combination, a telephone dial having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft in one direction, means operable to rotate said shaft in a reverse direction, pulsing contacts, means controlled by said shaft when rotated in said reverse direction for actuating said pulsing contacts, a plurality of line terminals, means carried by said shaft for actuating said terminals, said terminal actuating means being normally inoperative to actuate said terminals when said shaft is rotated, and means for rendering said line terminals operable by said terminal actuating means when said shaft is rotated in said one direction.

6. In combination, a telephone dial having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft in one direction, means effective when said shaft is rotated in said one direction and then released for rotating said shaft in the opposite direction, pulsing contacts, means controlled by said shaft when rotated in the said opposite direction for actuating said pulsing contacts, means operable to lock said shaft operated when rotated in the said one direction, line selecting terminals, and means carried by said shaft for actuating said line selecting terminals when said shaft is locked operated.

7. In combination, a telephone dial, having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft, a plurality of line terminals, an actuator for said line terminals carried by said shaft and normally displaced from said terminals so as to be ineffective to actuate said terminals when said shaft is rotated, and manually operable means for moving said terminals to a position in which they are actuated by said actuator when said shaft is rotated.

8. In combination, a telephone dial having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft through arcs of various lengths, a plurality of line terminals, an actuator for said line terminals carried by said shaft, and means for locking said shaft when rotated through any arc of predetermined length whereby line terminals corresponding to the length of arc through which said shaft is rotated are held operated.

9. In combination, a telephone dial having a rotatable shaft, a finger-wheel fixed to said shaft and manually operable to rotate said shaft through arcs of various lengths, a plurality of radially disposed line terminals, an actuator for said line terminals carried by said shaft and normally displaced from said line terminals so as to be ineffective to actuate said line terminals when said shaft is rotated, means for locking said shaft when rotated through any arc of predetermined length, and manually operable means for ren-

dering said locking means effective and for simultaneously moving said terminals to a position in which said actuator becomes effective to actuate them, whereby line terminals corresponding to the length of arc through which said shaft is rotated are actuated and said shaft is held locked in the position to which it has been rotated.

10. In a telephone set the combination of a telephone dial having pulsing contacts, a line selector comprising a plurality of line terminals, a rotatable finger-wheel operable to effect the actuation of said pulsing contacts and also operable to effect the selective actuation of said line terminals, and manually operable means for selectively rendering said finger-wheel operable to effect the actuation of either said line terminals or said pulsing contacts.

11. In a telephone set the combination of a telephone dial having pulsing contacts, a line selector comprising a plurality of line terminals, a rotatable finger-wheel normally operable to control the operation of said pulsing contacts, and means for rendering said finger-wheel operable to control the operation of said line terminals.

12. In a telephone set the combination of a casing, a telephone dial mounted on said casing, a handset support formed integrally with said casing, a plurality of line terminals, an actuator for said line terminals controlled by said dial, said line terminals being normally displaced from said actuator so as to be inoperable thereby when said dial is actuated and a button located in the handset support-portion of said casing and manually operable to move said terminals so as to render them operable by said actuator when said dial is actuated, said button being operable by the handset when placed on its support to restore said terminals to normal position.

13. In combination, a pair of pulsing springs, a plurality of circuit closing springs, an operating device for said pulsing springs, an operating device for said circuit closing springs, a rotatable finger-wheel controlling both said operating devices, and manually operable means for selectively rendering one or the other of said operating devices effective to operate its respective springs when said finger-wheel is rotated.

14. In combination, a telephone call transmitter comprising a plurality of line terminals, a support for said terminals, a shaft, a rotatable finger-wheel fixed to one end of said shaft, means comprising an actuator for said terminals fixed to the other end of said shaft, said support being normally so disposed relative to said actuator that said actuator clears said terminals when said finger-wheel is rotated, and manually operable means for moving said support relative to said actuator so that said actuator engages and actuates said terminals when said finger-wheel is rotated.

15. In combination, a telephone dial normally operative to control the operation of pulsing contacts, a plurality of line terminals, means controlled by said dial for actuating said line terminals, a two-position button, and means controlled by said button when in one of its positions for rendering said dial ineffective to operate said pulsing contacts and for rendering said line terminal actuating means effective to operate said line terminals.

16. A telephone call transmitter comprising a plurality of line terminals, an actuator for said terminals, said terminals being movable relative to said actuator, and manually operable means for moving said terminals relative to said actuator.

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