

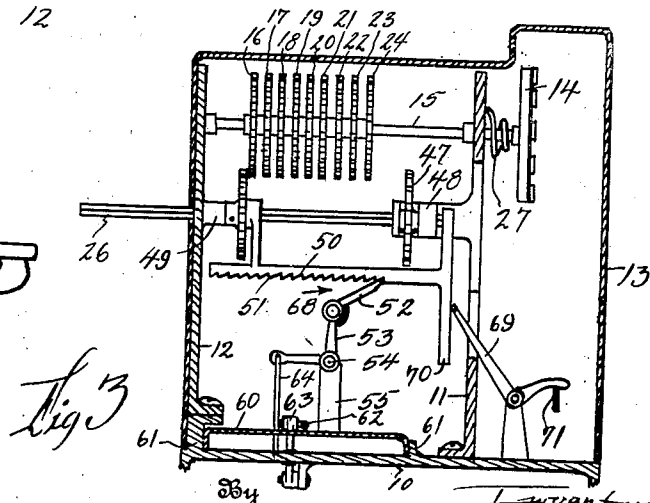
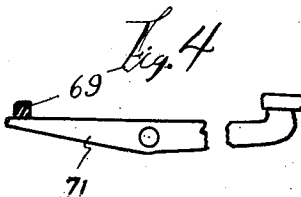
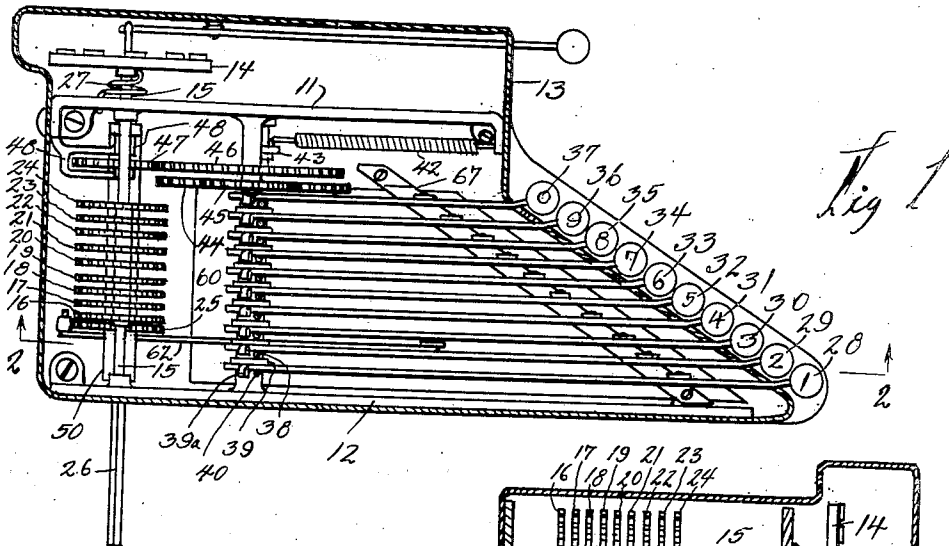
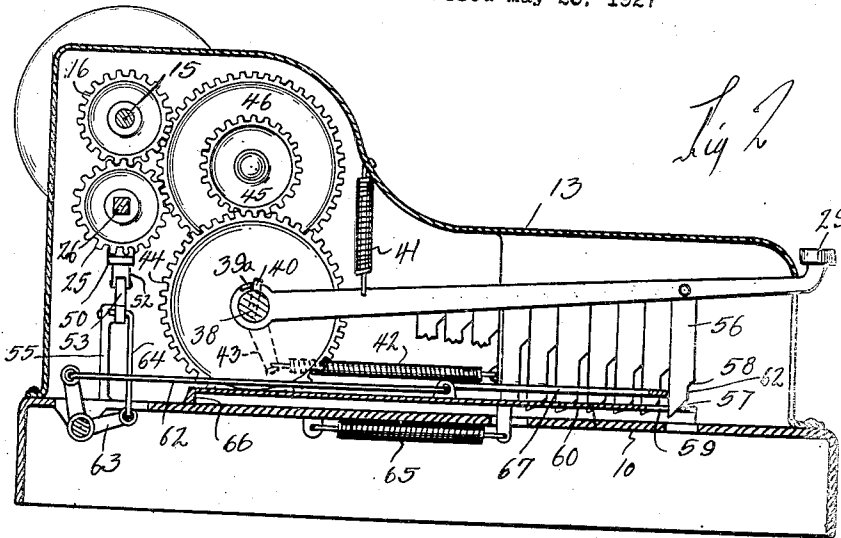
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DIALING DEVICE FOR TELEPHONES

Filed May 23, 1927



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UNITED STATES PATENT OFFICE.

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DIALING DEVICE FOR TELEPHONES.

Application filed May 23, 1927. Serial No. 193,564.

My invention relates to a dialing device for telephones and it is my object to provide a dialing device in which a number may be called on an automatic phone by pressing in succession a plurality of keys, each adapted to rotate the dial switch a distance corresponding to a certain digit which that key represents.

With this and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a plan view of the device, the casing being shown in section.

Fig. 2 is a longitudinal, sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse, sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a detail view illustrating the rack-returning mechanism.

My device comprises generally a supporting base 10, to which is secured the frame members 11 and 12 carrying the mechanism inclosed within a casing 13. The ordinary dial switch is diagrammatically indicated at 14, mounted on the shaft 15, journaled in the members 11 and 12. Secured to the shaft 15 in spaced relation are a plurality of gear elements 16, 17, 18, 19, 20, 21, 22, 23, 24, which are adapted to be successively engaged to rotate the dial switch 14 through successive arcs of rotation for producing the series of interrupting impulses used in the automatic system for operating the selecting mechanism in the central station.

I have shown nine of the gear elements 16—24 inclusive, so that a number of nine digits may be called by my device, but it will be understood that for use in an average telephone system where only five digits are used, only five gear elements will be necessary.

I provide a shifting pinion 25, secured to a squared shaft 26 and adapted to be carried longitudinally by said shaft to first engage the gear element 16, thence to be rotated by a shaft 26 to rotate the shaft 15, thence to be again shifted to a position between a gear element 16 and 17 to allow the dialing switch 14 to return to its original position as by means of the coil spring 27

and thence to be again moved longitudinally to engage the gear element 17 etc.

Both longitudinal and rotating movement are coincidentally produced by any one of a series of keys 28, 29, 30, 31, 32, 33, 34, 35, 36 or 37. The keys may be numbered, as shown in Fig. 1, from 1—9 and 0, consecutively. The keys are mounted on a shaft 38, being loosely mounted and spaced by washers 39 and each key is adapted to be connected to the shaft for transmitting rotating movement to it in the direction wherein the key is depressed by means of a laterally extending lug 39, which engages a pin 40 secured in the shaft. Each key is returned to its normal position, as shown in Fig. 2, by a spring 41 and the shaft is returned to its normal position, limited by the contact of the pins 40 against the lugs 39, by a spring 42, which is stretched between the casing 13 and a lever arm 43 secured to the shaft.

Thus when any one of the keys is depressed, it will rotate the shaft without affecting any of the other keys.

Rotation is transmitted from the shaft 38 to the shaft 26 through a train of gears 44, 45, 46 and 47, the latter being shown in Fig. 3 and comprising a pinion slidably mounted upon the shaft 26 and held against longitudinal movement by a bracket 48 extending from the frame element 11. Thus as the shaft 26 moves longitudinally, the pinion 47 will continue to impart rotating movement to it and to remain in mesh with the gear 46.

The shaft 26 is slidably mounted in the bracket 48 and a bearing 49 on the member 12 and is carried longitudinally by a rack 50 in which it is rotatably mounted. The rack 50 has a number of ratchet teeth 51, engaged by a pawl 52, carried on the end of a bell crank lever 53, pivoted at 54 to a post 55, projecting from the base 10. In order to impart the oscillating movement to the bell crank lever 53, I provide for each key a cam plunger 56 having the cam surfaces 57 and 58 engaging one edge of a slot 59 in a sliding plate 60. The plate 60 rests upon the base 10 between guides 61, the inclined portions 57 and 58 are separated by a vertical portion 62, which varies in length for each key, being short for the number 1 key and maximum in length for the zero key. Movement of the plate 60 is transmitted to the bell crank lever 53 through the medium of

a link 62, a bell crank lever 63, and a link 64. The plate is returned to its normal position, shown in Fig. 2, by a spring 65 and rests against a stop 66 on the base 10. The plungers 56 are pivoted to the keys and are retained against swinging movement by means of a guide plate 67.

It may now be noted that when a key is depressed, the plate 60 will first be moved rearwardly by the cam face 57, thus moving the pawl 52 in the direction indicated by the arrow 68, a distance sufficient to engage the moving pinion 25 with the face gear element 16. During the time that the vertical portion 62 is passing through the slot 59 of the plate 60, the key will transmit rotation to the shaft 15 through the medium of the train of gears already described and thus will move the switch element 14 a distance corresponding to the particular key and determined by the length of the vertical portion 62 of the plunger 56.

When the cam face 58 engages the plate 60, the pinion 25 will be drawn away from engagement with the gear element 16 to a position between the gear elements 16 and 17. As the key is released, the various springs described will return the operating elements to their original positions with the exception of the rack 50, which will remain in the position in which it was left. The pawl 52 will then be drawn rearwardly, jumping two of the teeth 51, to position, for again moving the rack forwardly. When another key is depressed, the operation will be repeated, the driving pinion first being moved into engagement with the gear element 17, the depression of the key then serving to rotate the gear element 17 a distance corresponding to the particular key depressed and finally moving the driving pinion to the space between the gear element 17 and the next element 18.

Since those keys, which must transmit a greater amount of rotation to the shaft 15, must move through a greater arc of rotation around the shaft 38, they are made shorter as shown in Fig. 1, and allowed to move the same distance vertically as the longer keys. After all of the digits have been dialed, the rack 50 must be returned to its original position. For this purpose I provide the bell crank lever 69, the long arm of which engages a projecting lug 70 on the rack 50 and the short arm of which is engaged by the end of a key 71, shown in Fig. 4. The movement of the rack 50 in the direction 68 will raise the key 71 against its own weight and when the last digit has been dialed, the key 71 is depressed, thereby moving the rack to its original position. The key will then remain depressed, due to its own weight, until the rack has again been moved during the dialing of a number.

Some changes may be made in the con-

struction and arrangement of the parts of my invention without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a device of the class described, a dial switch shaft, a plurality of spaced gear elements thereon, a driving pinion, a plurality of pivoted keys, each key corresponding to a digit to be dialed, means operative by swinging movement of any key for rotating the driving pinion through an arc commensurate with the digit represented by that key, and means operative by any key for first moving the driving pinion into engagement with a gear element and thence moving said driving pinion to a neutral position between the gear element just engaged and the next gear element.

2. In a device of the class described, a dial switch shaft, a plurality of spaced gear elements thereon, a driving pinion, a plurality of pivoted keys, each key corresponding to a digit to be dialed and being limited to an arc of movement corresponding in length to said digit, means operative by any key for rotating the driving pinion and means operative by any key for first moving the driving pinion into engagement with a gear element and thence moving said driving pinion to a neutral position between the gear element just engaged and the next gear element.

3. In a device of the class described, a dial switch shaft, a plurality of spaced gear elements thereon, a driving pinion, a plurality of pivoted keys, each key corresponding to a digit to be dialed, means operative by any key for rotating the driving pinion through an arc commensurate with the digit represented by that key, and means operative by any key for first moving the driving pinion into engagement with a gear element and thence moving said driving pinion to a neutral position between the gear element just engaged and the next gear element, a resetting key and means actuated by resetting key for returning the driving pinion to a starting position.

4. In a device of the class described, a dial switch shaft, a plurality of spaced gear elements thereon, a driving pinion shaft slidably mounted for longitudinal movement, a rack supporting said driving pinion shaft, a plurality of keys, each corresponding to a digit to be dialed, means operative by any key for transmitting rotative movement to the driving pinion shaft through an arc commensurate with the digit represented by that key and means operative by any key for engaging said rack and thereby moving the driving pinion first into engagement with a

gear element and thence moving said driving pinion to a neutral position between the gear element just engaged and the next gear element.

5 5. In a device of the class described, a dial switch shaft, a plurality of spaced gear elements thereon, a driving pinion shaft slidably mounted for longitudinal movement, a rack supporting said driving pinion shaft,
10 a plurality of keys, each corresponding to a digit to be dialed, means operative by any key for transmitting rotative movement to the driving pinion shaft through an arc

commensurate with the digit represented by that key and means operative by any key for 15 engaging said rack and thereby moving the driving pinion first into engagement with a gear element and thence moving said driving pinion to a neutral position between the gear element just engaged and the next gear 20 element, a resetting key and means operative by said key engaging one end of the rack to return said rack to a starting position.

Signed this 21 day of May, 1927, in the county of Woodbury and State of Iowa.

FREDERICK HEIZER.