Sept. 2, 1947. M. DEMEULENAERE ET AL 2,426,600

AUTOMATIC DIAL OPERATOR

Filed May 19, 1942 2 Sheets-Sheet 1

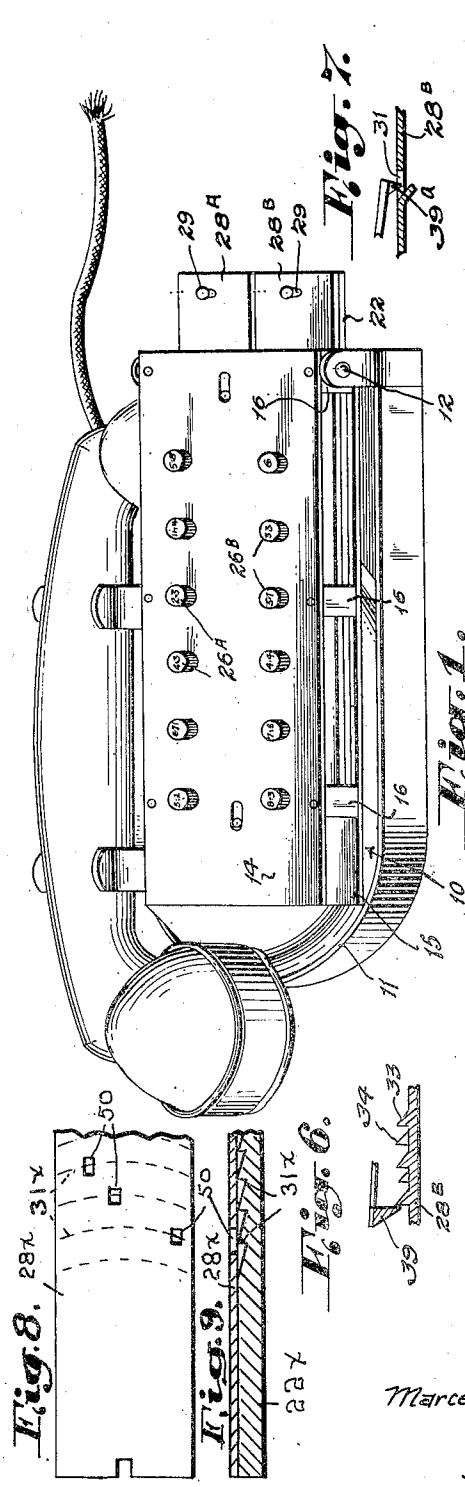


Fig. 1.

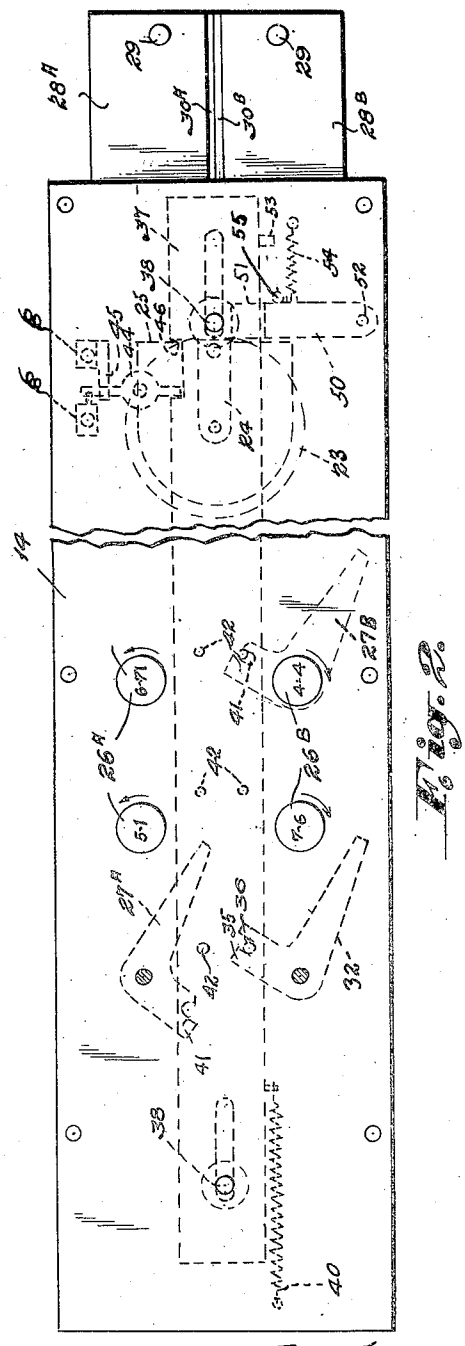


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 6.

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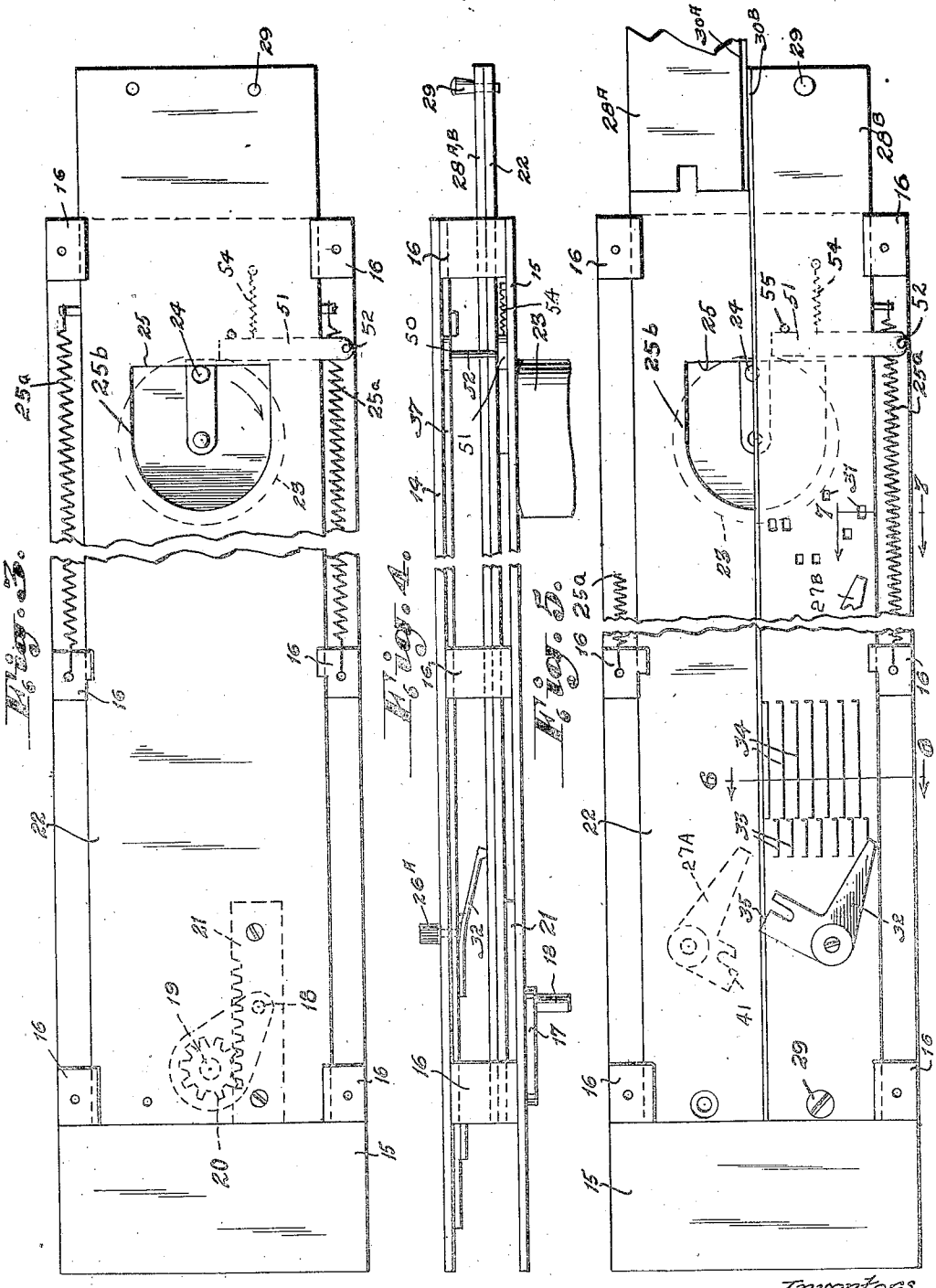


Fig. 3.

Fig. 4.

Fig. 5.

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AUTOMATIC DIAL OPERATOR

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20 Claims. (Cl. 179—90)

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This invention relates to a device designed for application to a conventional dial telephone by which any one of a group of telephone numbers may be automatically dialed by the simple manipulation of a control member.

The invention has for its object to reduce the number of parts as well as the structural detail and to otherwise simplify and render devices of this character more serviceable, economical and practical.

In the accompanying drawing:

Fig. 1 is a perspective view of the automatic dial operator applied to a conventional dial telephone.

Fig. 2 is a top plan view of the casing of the dial operator and related parts detached from the supporting base.

Fig. 3 is a plan view of the interior of the dial operator, the top plate of the casing and the record strips being removed.

Fig. 4 is an edge view of the mechanism of the dial operator removed from the telephone.

Fig. 5 is a view similar to Fig. 3 and shows one of the record strips in operative position and the other partially removed.

Fig. 6 is a detail section of the terminal of the escapement lever and related stop members, and,

Fig. 7 is a detail sectional view showing the form of the stops in the record strips and the arms coacting therewith.

Fig. 8 is a fragmentary top plan view, and Fig. 9 is a sectional view through a modification of the invention.

Referring to the drawing in detail the numeral 10 indicates a casing forming an enclosure and housing for the parts of the dial operator which is arranged above a rim 11 conforming in shape and size to the base of a conventional dial telephone whereby the device may be properly positioned with respect thereto. For convenience in tilting the dial operator to a position in which the telephone dial is freely accessible for manual operation, the casing 10 is pivotally mounted in a bracket 12 to which the rim 11 is attached.

The casing 10 consists of top and bottom walls 14 and 15 retained in spaced relation by connecting strips 16. A dial operating crank 17 is rotatably mounted in the bottom wall 15 adjacent to one end thereof and the crank pin 18 thereof is positioned to enter the aperture in the impulse wheel overlying the 0 designation, when the parts of the dial operator are in the position of rest. The crank arm 17 is attached to a shaft 19 journaled in the bottom wall of the casing and provided above the latter with a pinion 20 meshing with a rack 21 rigidly attached to the underside of the shiftable member 22. As will be understood, the number of teeth on the pinion 20 and rack 21 are so selected that for each full stroke of the longitudinally movable member 22 the impulse disc of the telephone is turned through the

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maximum angle required for dialing operations.

A drive motor 23 is secured below the bottom plate 15 adjacent the end of the shiftable member 22 opposite the crank 17 and is provided with a crank pin 24 co-acting with an abutment 25 provided in the shiftable member 22. The abutment 25 is constituted by the straight edge of an opening 25b in the member 22 through which the crank pin 24 projects. The radius of the crank pin 24 is so chosen with respect to the gear ratio of the pinion 20 and rack 21 that, when said pin 24 co-acting with the abutment 25 has displaced the member 22 to its furtherest right hand position, the crank pin 18 occupies a position which corresponds with the normal rest position of the impulse disc of the telephone. The displacement member 22 is yieldably urged in the opposite direction to transmit dialing movement to the impulse disc by a pair of springs 25a secured, on one hand, to the member 22 and, on the other hand, to the spacing member 16.

Thus, by a succession of movements of the displaceable member 22 of variable magnitude depending upon the items of a particular telephone number to be dialed, the crank pin 18 imparts a series of impulses to the impulse disc, thereby automatically dialing the selected telephone number. The means for controlling the motion of the shiftable member 22 consists of two or more rows of manually operable knobs 26A and 26B rotatably mounted in the top wall 14 of the casing. The two sets of knobs are provided with manually settable arms which turn with the related knobs in the act of conditioning the device for operation. The arms 27A of one row of manually settable knobs cooperate with groups of motion limiting members on a record strip 28A and the arms 27B of the other row cooperate with limiting members on a strip 28B, both strips being removably and interchangeably secured to the shiftable member 22 by suitable fastening devices 29.

In the normal or rest position of the manipulating knobs 26A—B the reduced outer ends of the arms 27A—B occupy positions in grooves 30A and 30B in the strips 28A—B. When any one of the arms 27A—B is turned into operative position the tooth-like terminal 39a thereof is sprung out of the related groove 30A—B and swings across the corresponding strip 28A—B into position to successively engage each of a group of stops 31 provided in said strips. Thus, when the shiftable member 22 is released by rotation of the crank pin 24 and is permitted to move under the influence of the springs 25, the movement of the displaceable member continues until it is arrested by engagement of the arm 27A—B with the first of the group of stops 31. For this purpose the stops of each group are arranged in positions corresponding with the items of the pre-selected telephone

numbers to be dialed. After the first operative stroke of the shiftable member 22 which is limited by engagement of the arm 27A—B with the first stop 31, the crank pin 24 which continues to revolve during a complete dialing operation, re-engages the abutment 25 and shifts the displaceable member to its initial or rest position. During the following revolution of the crank pin 24, the arm 27A—B is positioned to engage or sense the second stop 31 in the group.

The step by step movement of the arm 27A—B which is set into operative position, is effected by an escapement mechanism including a lever 32 and guides 33 and 34 cooperating therewith and forming part of one of the strips 28A—B. The lever 32 is in the form of a bell crank and is provided at one end with a slot 35 of sufficient length to permanently engage a pin 36 secured to a universal bar 37 slidably mounted on the underside of the top wall 14 of the casing and held in position and guided by pins 38. The other arm of the escapement lever 32 is provided with a laterally beveled tooth 39 which, in the initial position of the device, is engaged in one of the grooves 30A—B. The lever 32 is normally held in the position in which the tooth 39 engages the retaining groove 30A—B by the tension of a spring 40 normally tending to shift the universal bar 37 toward the left (Fig. 2) and swing the lever 32 in a counter-clockwise direction.

When the escapement lever 32 is swung across the two sets of guides 33—34 to condition the device for operation as shown in Fig. 2, the beveled tooth 39 is deflected and rides across the correspondingly shaped guides 33 but due to the shape of these parts as shown in Fig. 6, the escapement lever is held in the position to which it is swung and prevented from returning to initial position under the influence of the spring 40 by the lowermost guide 33. The guides 33 are arranged in spaced relation in a row extending transversely of one of the strips 28A—B and the guides 34 are similarly arranged in a position in which the ends thereof enter the spaces between the guides 33. Thus, during successive strokes of the displaceable member 22 the tooth 39, moves off of the lowermost guide 33 and engages the lowermost guide 34. Upon reversal of the motion of the shiftable member 22, the tooth 39 moves in the opposite direction against the lowermost guide 34 and swings into engagement with the next successive guide 33. During successive movements of the shiftable member 22, the escapement lever 32 moves step by step from one to the other of the two groups of guides 33—34 and at the end of the dialing operation the tooth 39 comes to rest in the groove 38A—B of one of the strips 28A—28B.

The escapement lever 32 is swung in the clockwise direction to condition the device for operation and for the purpose of effecting such movement through the universal bar 37 each of the sensing arms 27A—B is provided with a slot 41 engaging a pin 42 carried by the universal bar 37. The wall of each slot 41 which engages the related pin 42 when any one of the knobs 26A—B is turned to initiate operation of the device, is of greater length than the other wall. Consequently, when that knob which corresponds with the telephone number to be dialed is actuated, the wall of the slot 41 engages the related pin 42 and shifts the universal bar 37 longitudinally against the tension of the spring 40. Coincident with this longitudinal movement of the bar 37 the escapement lever 32 is swung clockwise and by cooperation of the beveled tooth 39 with the guides 33, the escapement lever together with the universal bar 37 and actuated knob 26A—B are held until the motor 23 is set in operation and the shifting movement of the displaceable member 22 is initiated. Due to the form of the slots 41 in the sensing arms 27A—B, the pins 42 cooperating with all except the actuated knob 26A—B move freely out of the slots 41 so as to prevent actuation of any of the sensing arms 27A—B except the one which has been manually set.

The operation of the electrical motor 23 is controlled by a switch 44 preferably of the pivoted snap type which controls contacts 45 interposed in the motor circuit. An arm of the switch 44 is located in a notch 46 provided in one edge of the universal bar 37 so that when said bar is shifted end-wise to condition the device for operation the switch 44 is closed. During the step by step movement of the universal bar incident to the sensing of the stops 31 by the arm 27A—B, the switch remains in the on position but is turned to the off position at the end of the step by step movement of the universal bar 37 when the switch arm encounters the opposite end of the notch 46.

As will be understood, the stops 31 of each group are arranged in accordance with the items of a telephone number to be automatically dialed and due to the comparatively small space which is required to accommodate the stops of the individual groups, each dialing device may be constructed so as to permit the automatic dialing of a comparatively large number of telephone numbers.

In operation, the knob 26A—B associated with the desired telephone number is merely turned a distance sufficient to displace the terminal of the sensing lever 27A—B out of the slot 30A—B and into alignment with the outermost stop 31. In Fig. 2 the lower knob 26B second from the lever 32 is shown as so adjusted. This motion is transmitted through the slot 41, pin 42, the universal bar 37, pin 36, and slot 35 to the escapement lever 32. Owing to the flexibility of said lever and the inclination of the beveled tooth 39 it is cammed across the guides 33 and comes to rest behind the outermost guide. The spring 40 tends to displace the universal bar and swing the lever 32 counter-clock-wise, but due to the cooperation between the guide 33 and tooth 39 the lever is held in set position. During displacement of the universal bar 37 the switch 34 is closed and the motor 23 is set in operation. As the motor-driven crank pin 24 revolves and swings away from the abutment 25 the springs 25*a* move the displaceable member 22 toward the left and the rack 21 through engagement with the pinion 20 rotates the crank pin 18 and the impulse disc engaged therewith. The movement of the shiftable member 22 continues until arrested by engagement of the sensing lever 27A—B with the first of the related group of stops 31 which, as will be understood, is arranged in dependence upon the first item of the telephone number to be dialed. The crank pin 24 disengages the abutment 25 when the shiftable member 22 is arrested by the sensing lever 27A—B but during continued rotation thereof it re-engages the abutment and restores the shiftable member to its extreme right hand position. During this reciprocation of the shiftable member the tooth 39 moving back and forth across the two sets of guides 33 and 34 affects an escap-

ing movement of the escapement lever **32** and a step-wise movement is imparted to the universal bar **37** and the operative sensing lever **27A—B** so as to position the latter for engagement with the next succeeding stop in the related group. These operations are repeated until the device has performed a plurality of dialing operations corresponding with the items of the selected telephone number and when the universal bar **37** is restored to its rest position the switch **44** is opened and operation of the motor **23** is interrupted.

To arrest the movement of the crank pin **24** at the termination of a dialing operation in the position in which the shiftable member **22** is disposed in its extreme right hand position, a two-armed lever **50—51** is provided. The lever is fulcrumed at **52**, the short arm **50** thereof being engaged and operated by a pin **53** carried by the universal bar **37** and the long arm **51** being movable into the path of the arm of the crank pin **24** to arrest rotary movement thereof. When any one of the knobs **26A—B** is actuated and the switch **44** is conditioned for operation, the lever **50—51** is disengaged by the pin **53** and withdrawn by a spring **54** against a stop **55** and in this position permits free rotary movement of the crank arm and pin **24**, the motion of the latter being arrested at the completion of a dialing operation when the pin **53** swings the lever **50—51** to operative position.

In the modification of the invention shown in Figs. 8 and 9, a group of stops **31***x*, one for each arm **27A—B**, is formed directly in the shiftable member **22***x* and is curved concentrically with the axis of the related arm **27A—B**. A record strip **28***x* is arranged above the shiftable member **22***x* and is formed with perforations **50** arranged in dependence upon the items of the telephone number to be dialed and permitting the tooth **39***a* of the spring arm **27A—B** to pass therethrough and engage the proper stop **31***x* and thereby periodically limit the shifting movement of the member **22***x* at varying points depending upon the items of the telephone number to be dialed.

What we claim is:

1. In an automatic dial operator, a rotatable dial operating member, drive means, a shiftable motion transmitting member between the drive means and the operating member for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members carried by said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, and manually settable means co-acting with said limiting members for determining the extent of each of a series of shifting movements of the shiftable member.

2. In an automatic dial operator, a rotatable dial operating member, a member shiftable in opposite directions for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members carried by said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, and a manually settable member co-acting with and common to the several limiting members for determining the extent of each of a series of shifting movements of the shiftable member.

3. In an automatic dial operator, a rotatable dial operating member, drive means, a shiftable motion transmitting member between the drive means and the operating member for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members carried by said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, a manually settable member co-acting with and common to the several limiting members for determining the extent of each of a series of shifting movements of the shiftable member, drive means for the said shiftable member, and means controlled by said manually settable means for initiating and interrupting operation of said drive means.

4. In an automatic dial operator, a rotatable operating member, a member shiftable in opposite directions for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members movable with said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, and means including a pivoted manually settable member co-acting with said limiting members for determining the extent of each of a series of shifting movements of said shiftable member.

5. In an automatic dial operator, a rotatable dial operating member, a member shiftable in opposite directions for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members carried by said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, a manually settable member, and means for moving said settable member stepwise into position to successively engage said limiting members and thereby determine the extent of each of a series of shifting movements of the shiftable member.

6. In an automatic dial operator, a rotatable dial operating member, a member shiftable in opposite directions for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members carried by said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, a manually settable member, an escapement member conditioned for operation by said settable member, and means co-acting with said escapement member to move said settable member step-wise to successively engage said limiting members and thereby determine the extent of each of a series of shifting movements of said shiftable member.

7. In an automatic dial operator, a rotatable dial operating member, a member shiftable in opposite directions for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members carried by said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, a pivoted manually settable member, a pivoted escapement lever conditioned for operation by said settable member, and means carried by the shiftable member and co-acting with said escapement member to move said settable member step-wise to successively engage said limiting members and thereby determine the extent of each of a series of shifting movements of said shiftable member.

8. In an automatic dial operator, a rotatable dial operating member, a member shiftable in opposite directions for imparting a succession of dialing movements to said operating member, a plurality of groups of motion limiting members carried by said shiftable member, the limiting

members of each group being arranged in positions corresponding with the items of the telephone numbers to be dialed, a manually settable member associated with each group of limiting members, and means common to the several settable members and conditioned for operation by the setting of any one of said settable members to cause that settable member to move step-wise for successive engagement with the limiting members.

9. In an automatic dial operator, a rotatable dial operating member, drive means, shiftable means for transmitting a succession of movements from said drive means to said operating member by a series of shifting movements, and manually controlled means coacting directly with said shiftable means for determining the extent of each of said series of shifting movements of said shiftable means.

10. In an automatic dial operator, a rotatable dial operating member, drive means, shiftable means for transmitting a succession of movements from said drive means to said operating member by a series of shifting movements, and manually controlled means partly carried by and movable with said shiftable means for determining the extent of each of said series of shifting movements of said shifting means.

11. In an automatic dial operator, a rotatable dial operating member, drive means, means shiftable by said drive means, a permanent drive connection between said shiftable means and said rotatable member for transmitting a succession of movements to said rotatable member by a series of shifting movements of said shiftable member, and manually controlled means co-acting directly with said shiftable means for determining the extent of each of said series of shifting movements of said shifting means.

12. In an automatic dial operator, a rotatable dial operating member, a shiftable member for imparting rotary movements of variable magnitude to said rotatable member, yieldable drive means for shifting the shiftable member, and manually controlled means for determining the extent of each of a series of shifting movements of said shiftable member under the influence of said yieldable drive means.

13. In an automatic dial operator, a rotatable dial operating member, a shiftable drive member for said operating member, yieldable means tending to shift said shiftable member in one direction, drive means for positively and periodically shifting the shiftable member in the opposite direction, and manually settable means co-acting with said shiftable member for determining the extent of each of a series of shifting movements of said shiftable member under the influence of said yieldable means.

14. In an automatic dial operator, a rotatable dial operating member, a member shiftable in opposite directions for driving said operating member, an abutment on said shiftable member, a motor-driven crank pin engaging said abutment, yieldable means normally tending to draw said abutment against said crank pin, and manually settable means co-acting with said shiftable member for determining the extent of each of a series of shifting movements of said shiftable member under the influence of said yieldable means.

15. In an automatic dial operator, a shiftable dial operating member, a plurality of groups of motion limiting members on said operating member, a universal member, a manually settable member associated with each group of limiting members and normally independent of said universal member, means rendered operative upon setting of any one of the settable members to displace said universal member, the other settable members remaining independent of said universal member, and escapement means rendered effective upon displacement of the universal member to move the latter and impart a step-wise movement to said settable member.

16. In an automatic dial operator, a shiftable dial operating member, a plurality of groups of motion limiting members on said operating member, a universal member, a manually settable member associated with each group of limiting members and normally independent of said universal member, means rendered operative upon setting of any one of the settable members to displace said universal member, the other settable members remaining independent of said universal member, escapement means rendered effective upon displacement of the universal member to move the latter and impart a step-wise movement to said settable member, and a motor drive control actuated by said universal member.

17. In an automatic dial operator, a rotatable dial operating member, a member shiftable in opposite directions for imparting a succession of dialing movements to said operating member, a plurality of motion limiting members carried by said shiftable member and arranged in positions corresponding with the items of the telephone number to be dialed, a plurality of guide members carried by said shiftable member, an escapement lever freely movable in one direction across said guide members and advanced step by step in the opposite direction by cooperation with said guide members during shifting movement of the shiftable member, and a manually settable member moved step by step with said lever to successively engage said limiting members.

18. In an automatic dial operator, a member shiftable in opposite directions for imparting a succession of dialing movements to a telephone dial, strips removably secured to said shiftable member, a plurality of groups of motion limiting members carried by said shiftable member, said strips having openings arranged in positions corresponding with the items of the telephone number to be dialed and exposing portions of said limiting members, and a manually settable member co-acting with the exposed portions of each group of limiting members for determining the extent of each of a series of shifting movements of the shiftable member.

19. In an automatic dial operator, a casing, a rotatable dial operating member mounted in said casing, a member mounted for shifting movement in opposite directions in said casing, a plurality of groups of motion limiting members carried by said shiftable member, the limiting members of each group being arranged across said shiftable member in a direction perpendicular to the shifting movement of said shiftable member, and a manually settable member pivoted above said shiftable member and co-acting with the limiting members of each group.

20. In an automatic dial operator, a member shiftable in opposite directions for imparting a succession of dialing movements to a telephone dial, a manually settable member, motion limiting members carried by said shiftable member

and cooperating with said manually settable member, and a strip having perforations therein overlying said motion limiting members and arranged in dependence upon the items of the telephone number to be dialed.

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