Dec. 13, 1932. F. LOWITZ 1,890,619

RECORDING DEVICE

Filed Jan. 7, 1930 3 Sheets-Sheet 1

Fig. 1.

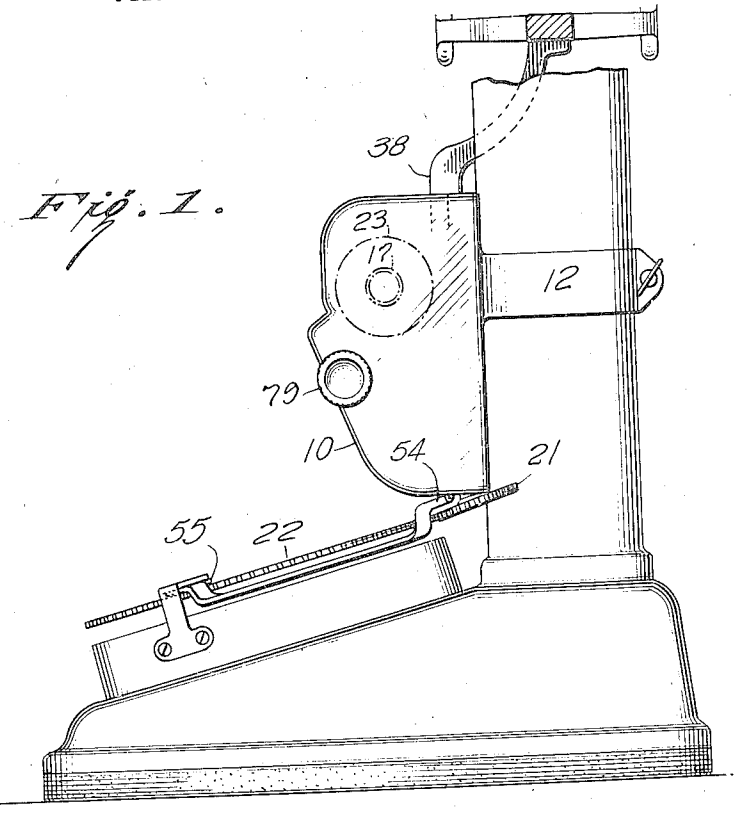
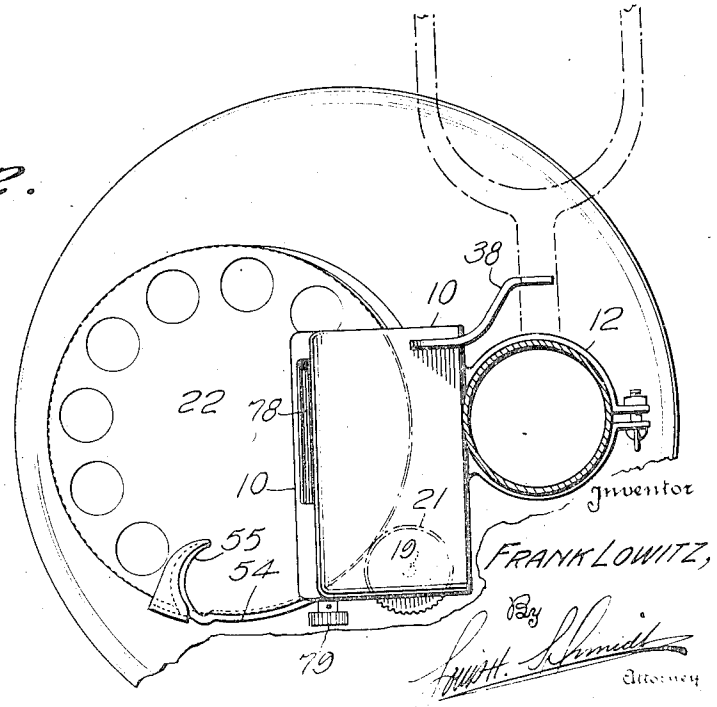


Fig. 2.



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Fig. 3.

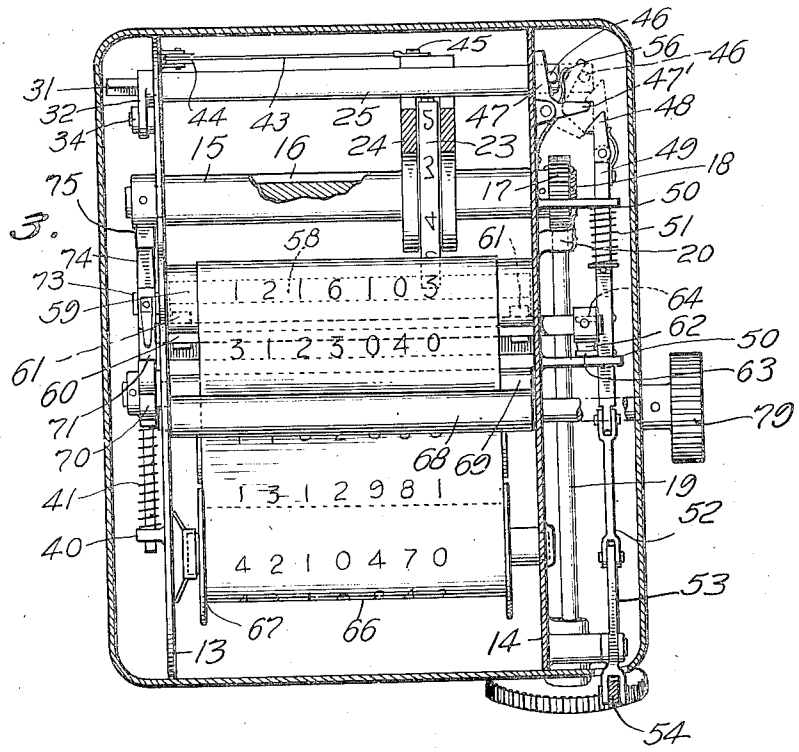
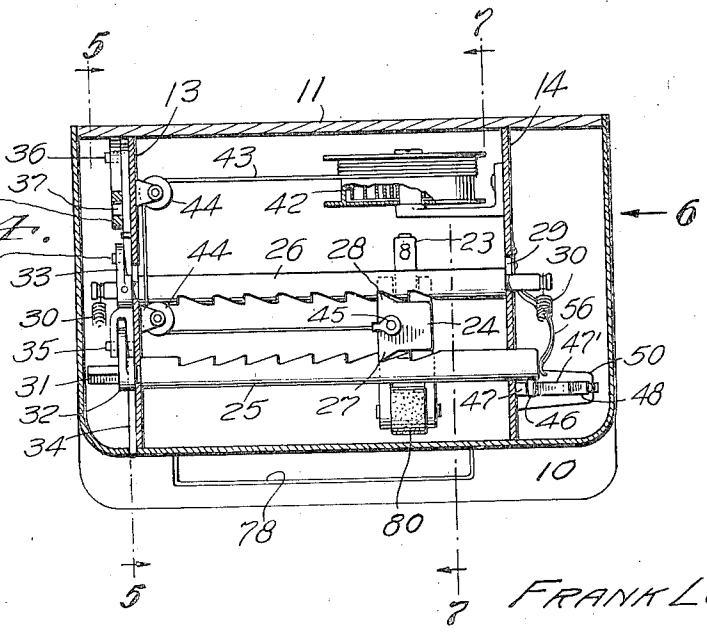


Fig. 4.



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Dec. 13, 1932. F. LOWITZ 1,890,619

RECORDING DEVICE

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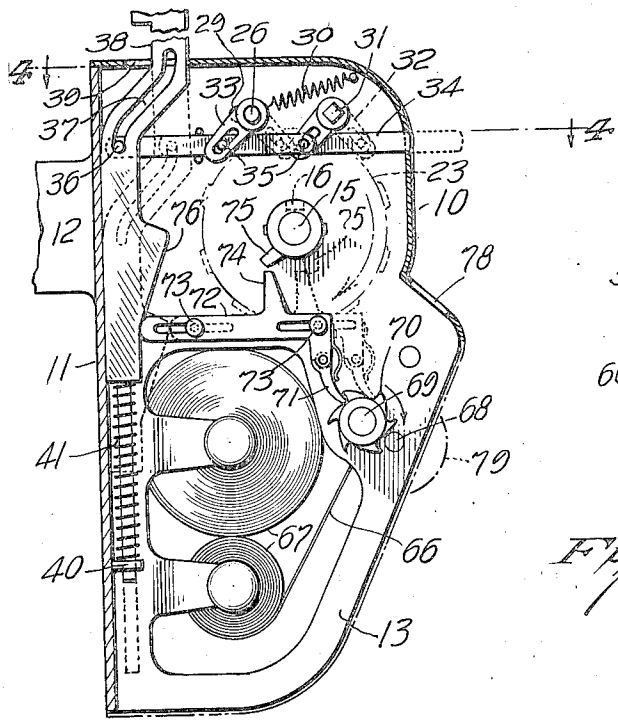


Fig. 5.

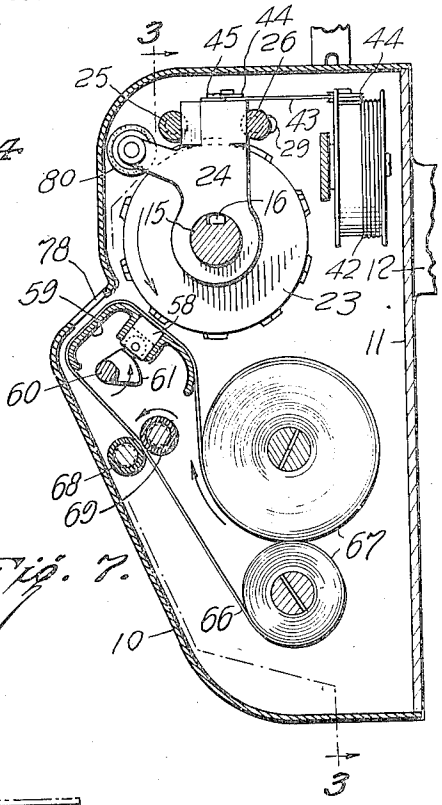


Fig. 7.

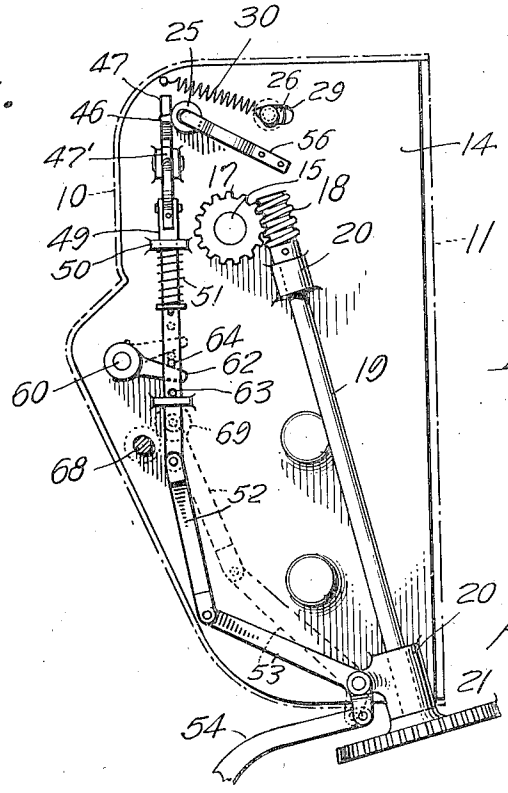


Fig. 6.

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Patented Dec. 13, 1932 1,890,619

UNITED STATES PATENT OFFICE

FRANK LOWITZ, OF NEW YORK, N. Y.

RECORDING DEVICE

Application filed January 7, 1930. Serial No. 419,159.

My invention relates to recorders for telephones and is particularly adapted for use as an attachment in connection with dial telephones, to which it may be readily attached and automatically operated therefrom.

Briefly stated, my invention is as follows: When a call number is dialed in the usual manner the receiver is removed from the hook and the desired call is made by rotating the dial accordingly. My invention, therefore, is associated with the dial telephone instrument in such a novel manner that with the removal of the telephone receiver from its respective hook, certain indicia recording mechanism is unlocked and at the same time properly set so that a permanent record may be had of the numbers as they are selectively and individually dialed. As the dial is rotated to each predetermined stop, depending upon the call desired by the operator, the number wheel is simultaneously caused to register on a paper strip or tape so that upon reaching the extreme limit of successive movement of the dial, a printed record is made upon the paper strip.

The subscriber now has a record of the complete set of numbers which made up that particular call. If the subscriber completes the telephone call, no further attention need be given; otherwise, upon replacing the receiver upon the hook, the paper strip will automatically be caused to feed into a position which is clearly visible to the subscriber. At this time he may indicate with a pencil, if desired, any comment he wishes to make, as, for example, "line busy", or "no answer". Notations may also be made of unusual calls, as when long distance calls are made.

When the receiver is replaced upon its hook, the paper strip is moved over into a position, ready for its next successive printing operation simultaneously with the resetting of the number wheel to its initial position together with the locking of the number wheel to prevent the movement thereof. These positions are, of course, automatically retained as long as the receiver is in its position upon its respective receiver hook.

My invention is not to be limited to the details as shown and described, but extends to whatever constructions may be included within the terms or language of the appended claims.

In the drawings:

Figure 1 is a side elevation of the lower portion of a dial telephone illustrating my invention in its attached relationship;

Figure 2 is a top plan view thereof, partly broken away and the receiver hook indicated in dotted lines;

Figure 3 is a vertical sectional view taken on the line 3—3 of Figure 7 looking in the direction of the arrows and illustrating my invention in front elevation;

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 5;

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 4;

Figure 6 is a side view of the opposite end thereof illustrating the casing removed and shown in dotted lines, or as indicated by the arrow 6 in Figure 4, and

Figure 7 is a cross sectional view taken on the line 7—7 through Figure 4.

My invention, in the form or embodiment shown in the drawings and briefly described, comprises a casing, 10, which is preferably constructed of relatively thin sheet metal and of any desirable configuration to effectively cover the structural details of my invention. This casing, 10, may be provided with a rear plate, 11, to which is secured a clamp, 12, for fastening to the usual standard of the telephone in any desired manner. A pair of vertically extending frame sections or plates, 13 and 14, are utilized within the casing, 10, and are held in their spaced relationship by any suitable means, not shown.

A revoluble shaft, 15, is mounted between the side plates, 13 and 14, and is provided with a keyway, 16, for a purpose to be hereinafter described. A worm gear, 17, is keyed or otherwise fastened to one end of this shaft, 15, and is adapted to be engaged by a worm, 18, which is pinned to the upper end of the shaft, 19. The shaft, 19, preferably located on the outer side of the plate, 14, is journalled in the bearings, 20, and has fastened upon its lowered extreme end a gear, 21, and is adapted

to mesh with and be engaged by the roughened edges or teeth on the outer periphery of the dialing disc, 22, as is clearly indicated in Figures 1 and 2. It is obvious, therefore, that as the dialing plate, 22, is rotated, the mating gear, 21, will simultaneously cause the rotation of the shaft, 15.

The number wheel, 23, is keyed to the shaft, 15, adapted for lengthwise movement thereon and is provided on its outer periphery with indicia corresponding in character and number with the dial of the particular telephone to which it is adapted. It may be here stated that the gears, 17, 18, and 21, are of a size and pitch and so properly timed corresponding with the intervals between the openings in the dialing plate, 22, and the several numbers on the number wheel, 23. A substantially inverted U-shaped member or carriage, 24, is arranged to extend on either side of the number wheel, 23, for the purpose of moving it sidewise. The carriage member, 24, is slidable along the shaft, 15, and guided at its upper end between a pair of parallel rods, 25 and 26. One side of the upper end of this carriage member, 24, is provided with a pair of outwardly extending toothed portions, 27 and 28, for the purpose of engaging similarly formed notched portions in the rods, 25 and 26.

The rod, 25, is mounted for rotative and lengthwise movement within the plates, 13 and 14, whereas the rod, 26, is mounted to rotate and to slide transversely within the slots, 29, in the plates, 13 and 14, with respect to its mating rod, 25, as is clearly shown in Figures 4, 5, 6 and 7. In order that both sets of oppositely disposed teeth on the rods, 25 and 26, shall engage the toothed portions, 27 and 28, of the carriage member, 24, I utilize a pair of coil springs, 30, which are connected to each outer end of the transversely slidable rod, 26.

One end of the rod, 25, is provided with a reduced polygonal portion, 31, on which is mounted a link, 32. A similarly formed link, 33, is pinned or fastened to the reduced end of the rod, 26. Each of these links is connected to the transversely mounted and slidable strip, 34, through the medium of pins and slots, 35, for the purpose of oscillating the rods, 25 and 26, about one-fourth of a turn. The reason for rotating these rods is to cause the disengagement between the teeth in the rods and the coacting teeth, 27 and 28, of the carriage, for a reason to be later described. The front end of the strip, 34, passes through the front end of the casing, 10, by which means it is guided, whereas the rear end of this strip is provided with a laterally extending pin, 36, which is adapted for engagement within the angular slot, 37, formed in the bar, 38, as is clearly shown in Figure 5. This bar, 38, is disposed for vertical movement within the casing, 10, and is supported against displacement within the slot, 39, provided in the upper end of the casing, 10, and is further supported at its lower end by means of the lug, 40, carried by the rear plate, 11. A coil spring, 41, is mounted upon the reduced lower portion of the bar, 38, for the purpose of normally holding the bar in its raised position. From the dotted position of the bar, 38, illustrated in Figure 5, it will be noted that the strip, 34, is moved in a horizontal position sufficiently to oscillate the links, 32 and 33, about ninety degrees for the purpose of moving the toothed portion of the rods, 25 and 26, out of their opposite alignment thereby permitting the return of the carriage member, 24, to its initial position. The return movement of the carriage is affected by means of the spring drum, 42, and the flexible connection, 43. Referring particularly to Figure 4 and 7, it will be seen that the flexible cord, 43, is passed about the spring drum, 42, and thence around the pulleys, 44, from which it is directed and fastened to the upper end of the carriage member, 24, as indicated at 45.

The means for returning the carriage member, 24, to its initial position as for beginning the next operation may be described as follows: A transversely extending pin, 46, is secured to one of the outer ends of the rod, 25, and is adapted to rest against and be actuated by the arm, 47, of the bell crank lever, which is suitably pivoted to the partition plate, 14, as shown. The other arm, 47', of this bell crank lever is adapted to be engaged by the pivotally mounted pawl, 48, which is carried at the upper end of the slidable rod, 49. A comparatively light leaf spring may be employed to hold the pawl in its upright position. This slidable rod, 49, is preferably held in its proper position by means of the bearing arms or lugs, 50. A coil spring, 51, may be used for normally holding the slidable rod, 49, in its uppermost position. In order to actuate the raising and lowering of the rod, 49, I employ a link, 52, which is pivoted to the lower end of the slidable rod, 49, and a bell crank lever, 53, whose lower end is connected to the operating lever, 54, which is provided with a finger operating end, 55. In order to normally hold the pin, 46, against the arm, 47, of the bell crank lever, I may provide a leaf spring, 56, as is clearly shown in Figures 3, 4 and 6.

A bar, 58, is slidably mounted between guide flanges of the apron, 59, as is clearly indicated in Figures 3 and 7, and is adapted at the proper time to force the paper strip toward the predeterminedly set number on the number wheel, 23. This is accomplished in the following manner: A rotatably mounted shaft, 60, is located between the partition plates, 13 and 14, and is provided with a pair of cams, 61, located adjacent to the bar, 58. On the outer side of the partition plate, 14,

and pinned to the protruding end of the shaft, 60, is a relatively short arm, 62, as is obvious from the disclosures in Figure 6. This arm, 62, is actuated by means of lower and upper pins, 63 and 64, which are carried by the slidable rod, 49. These pins are so relatively spaced as to cause the oscillation of the shaft, 60, to move the cams, 61, against the adjacent bar, 58, to affect the desired contact between the bar and the number wheel, 23.

The paper strip, 66, may be mounted upon suitable spools, 67, in any desired manner, so that while one is unwinding and becoming smaller in diameter, its mating spool or roll will enlarge, proportionately. A pair of friction rollers, 68 and 69, are suitably mounted in the partition plates, 13 and 14, so that they may effectually feed the paper strip predetermined amounts at a time. This is accomplished by means of a ratchet wheel, 70, pinned to the friction roll, 69, and which is engaged by a spring actuated pawl, 71, carried by the slidable arm, 72. Slots may be formed in the arm, 72, for the purpose of receiving the headed pins, 73, which are secured to the partition plate, 13, whereby the arm, 72, may be guided with respect thereto. A lug, 74, is upwardly extended and integrally formed with the arm, 72, and is so proportioned as to act as a stop and be contacted by the lug, 75, formed on a collar which is pinned to one end of the shaft, 15, as is clearly shown in Figures 4 and 5.

Should it be found desirable to feed the paper strip manually, this may be readily accomplished by actuating the knurled knob, 79, which is pinned to the outer end of the roller shaft, 68. An opening, 78, is formed in the casing, 10, adjacent to a portion of the apron, 59, which, it will be noted, supports the paper strip, 66, so that the subscriber may indicate notes upon the paper strip.

The several raised figures of the number wheel, 23, may be inked in any desired manner, as for example, by the roller, 80, which is pivotally supported by means of a pair of arms integrally formed with the carriage member, 24.

Having thus described the various details of my invention, the operation thereof will be very apparent. Before beginning the dialing operation, the receiver must, of course, be removed from its respective hook, which operation raises the spring actuated bar, 38. The lifting of this bar oscillates the toothed shafts, 25 and 26, through the medium of the arm, 34, thereby placing these toothed shafts in an operative position. This action of the bar, 38, also permits the sliding arm, 72, to return to a new paper feeding position, by reason of the lug 75, pushing the upwardly extending lug 74 of the sliding arm 72, upon beginning the dialing operations.

The usual dialing operation which now follows the lifting of the receiver from the hook, takes place. While dialing, it will, of course, be obvious that the rotation of the gear, 21, will cause the rotation of the number wheel, 23, the desired distance to turn it the desired amount. Just before finally completing each individual dialing operation the finger which has been inserted in the desired opening of the dial, 22, actuates the operating end, 55, of the lever, 54, thereby lifting the rod, 49, to affect the camming action against the bar, 58, for printing the dialed number upon the paper strip, 66. The pawl, 48, which is now in its raised position or as shown in dotted lines in Figure 3, contacts with the arm, 47′, of the bell crank lever so that the downward movement thereof will cause the toothed shaft, 25, to slide sufficiently against the tension of the spring, 56, the distance of one tooth, thereby advancing the carriage member, 24, one step. The device is now ready for printing each successive number, the operations thereof being identical.

When the receiver, however, is replaced upon its hook, as when the call is completed, the toothed shafts, 25 and 26, are turned at right angles, which will cause the toothed portions to be disengaged from the pointed ends, 27 and 28, of the carriage member, 24, thereby permitting the return of this carriage to its initial position by means of the spring drum, 42. Simultaneously with this action the forward movement of the arm, 72, by reason of the cam surface, 76, will cause the paper to feed the desired amount or as is clearly indicated by the several rolls of numbers on the paper, 66, in Figure 3. The raising of the arm 38, as when answering a call, does not feed the paper; this action being only affected after beginning dialing.

When my invention is used in connection with dial telephones of the "switch-board" type, it is obvious that the arm 38, may be manually depressed at the completion of each dialing operation.

What I claim is:

1. A recording device for use with dial telephones, a single numbering wheel bearing characters corresponding to dial characters, a receiving strip on which the wheel characters may be successively printed, means for setting the numbering wheel in accordance with each dial movement, and means for automatically shifting the numbering wheel axially to a new printing position relative to the strip at the completion of each dial movement.

2. A recording device for use with dial telephones, a single numbering wheel mounted for rotation and axial movement, means for compelling rotative movement of the numbering wheel in each rotative movement of the dial, and means for compelling axial shifting movement of the wheel immediately

following the completion of each dial movement.

3. A recording device for use with dial telephones, including a single numbering wheel, a receiving strip on which the numbers of the wheel may be printed, means for supporting the wheel for rotative and axial movement, an element responsive to each dial movement for actuating the wheel supporting means to rotate the wheel to predetermined printing position relative to said strip, means cooperating with said wheel for compelling axial movement of said wheel, and means automatically responsive to and following the completion of each dial movement to actuate the means for compelling axial movement of the wheel.

4. A recording device for use with dial telephones, including a single numbering wheel mounted for rotative and axial movement, a carriage for compelling axial movement of the wheel, shafts formed with longitudinally-ranging notches, projections on the carriage to engage in said notches to hold the numbering wheel in predetermined axial position, and means incident to dial operation for longitudinally moving one of said shafts to move the carriage and thereby the wheel into cooperation with the next succeeding notch in the other shaft.

5. A construction as defined in claim 4 with the addition of means for simultaneously rotating both shafts to displace their notches relative to the carriage and free the latter, and means for returning the freed carriage and thereby the numbering wheel to a predetermined normal position.

6. A recording device for use with dial telephones, including a single wheel having characters corresponding to dial characters, means for mounting the wheel for rotative and axial movement, a strip on which the characters of the wheel may be printed, a printing element for forcing the strip and wheel into printing cooperation, means responsive to each dial movement to compel rotative setting movement of the wheel, means responsive to the completion of each dial movement for actuating the printing element, and means automatically following each complete dial movement for compelling axial movement of the wheel.

7. A recording device for use with dial telephones of the type including a hook for the receiver, including a shaft mounted for rotation, a numbering wheel keyed on the shaft for independent axial movement, a carriage for moving the wheel axially, notched shafts normally positioned to cause their opposed notches to engage and hold the carriage, a receiving strip on which the characters on the wheel may be printed, means responsive to dial movement to turn the shaft on which the wheel is mounted to thereby position the wheel characters in relation to said strip, means responsive to the completion of each dial movement for insuring printing cooperation of said strip and said wheel, and means automatically following the completion of each dial movement for operating said notched shafts for compelling axial movement of the carriage and thereby the wheel, means for feeding the strip, and means to the release of the receiver hook of the telephone for operating the notched shafts to release the carriage and simultaneously feeding the receiving strip to a new printing position.

8. A construction as described in claim 7, with the addition of means for returning the carriage and thereby the wheel to a predetermined normal position following operation of the notched shafts to release position.

9. A recording device for use with dial telephones of the type involving a movable receiver hook, including a single wheel having characters corresponding to the characters on the dial, means for shifting the wheel in correspondence with dial movement, means following each dial operation for shifting the wheel axially, said means including a carriage cooperating with the wheel and formed with opposed projections, spaced shafts having their normally adjacent peripheral portions formed with teeth to engage said projections, mechanism for shifting one of the shafts longitudinally to thereby similarly move the carriage wheel, an arm projecting from each shaft for rotating the shaft to disalign the notches therein with respect to the carriage, a bar connecting the arms for compelling simultaneous movement thereof, and a member connected to the bar and responsive to the movements of the receiver hook of the telephone, said member in one position maintaining the shafts with their notches in automatic alignment to engage the projections of the carriage and in the other position to move the shafts to disalign the notches to free the carriage.

10. A recording device for use with dial telephones of the type involving a movable receiver hook, including a single wheel having characters corresponding to the characters on the dial, means for shifting the wheel in correspondence with dial movement, means following each dial operation for shifting the wheel axially, said means including a carriage cooperating with the wheel and formed with opposed projections, spaced shafts having their normally adjacent peripheral portions formed with teeth to engage said projections, mechanism for shifting one of the shafts longitudinally to thereby similarly move the carriage wheel, an arm projecting from each shaft for rotating the shaft to disalign the notches therein with respect to the carriage, a bar connecting the arms for compelling simultaneous movement thereof, a member connected to the bar and responsive to the

movements of the receiver hook of the telephone, said member in one position maintaining the shafts with their notches in automatic alignment to engage the projections of the carriage and in the other position to move the shafts to disalign the notches to free the carriage, and means connected to the carriage to move the carriage and thereby the wheel to a predetermined normal position when the shafts have been moved to a position to free the carriage.

11. A recording device for use with dial telephones of the type including a receiver hook including a single member mounted for rotative and axial movements, a strip on which the characters of the wheel may be printed, a printing element for forcing the strip into printing contact with the wheel, a carriage to compel axial movement of the wheel, spaced shafts between which the carriage is mounted, the peripheries of the shafts being formed with notches to co-operate with projections on the carriage, said shafts being mounted for rotative movement, with one of the shafts capable of independent axial movement, means responsive to each dial movement to actuate the printing element, means automatically responsive to and immediately following each dial movement for moving the axially movable shaft a distance of one notch to thereby move the carriage and wheel a predetermined operative distance, means for advancing the strip, and an element cooperating with the receiver hook and operative on the release of said hook to rotate said shafts to move the notches therein out of cooperation with the carriage and simultaneously actuate the strip-feeding means for advancing the strip.

12. In a recorder for use with dial telephones of the type including a movable receiver hook, a single numbering wheel for printing dial indications, means for mounting the wheel for rotative and axial movement, a strip on which the wheel characters may be printed, a printing element for forcing the strip into printing contact with the wheel, a carriage cooperating with the wheel to compel axial movement of the wheel in correspondence with the movement of the carriage, spaced shafts between which the carriage is supported, peripheral notches on the shafts cooperating with the projections on the carriage to hold the carriage in predetermined relation to the shafts, means responsive to dial movement for setting the numbering wheel, means responsive to the completion of a dial movement for operating the printing element, means automatically set in the operation of the printing element for compelling relative movement of said spaced shafts to advance the carriage and thereby the numbering wheel a predetermined distance, said means being automatically actuated following the cessation of one dial operation and the beginning of the next, and means responsive to the telephone cut off movement of the receiver hook for simultaneously moving said shafts to withdraw the peripheral notches thereon from cooperation with the projections on the carriage.

13. A recorder for use with dial telephones of the type including a receiver hook including a single numbering wheel, a strip on which the numbering wheel characters may be printed, means responsive to dial actuation for rotating the numbering wheel, a printing element for forcing the strip into cooperation with the numbering wheel, a carriage for moving the wheel axially, elements cooperating with the carriage to impart a step by step feeding movement to the carriage and thereby to the numbering wheel, a rod operated in one direction at the completion of each dial movement, means for operating the rod automatically in the opposite direction following release of the dial at the completion of the movement, means actuated by the rod in that movement responsive to dial completion to actuate the printing element, means responsive to the automatic operation of the rod for imparting a step by step movement to the carriage, and an element actuated in the telephone cut off movement of the receiver hook to disconnect the carriage from the step by step feeding movements.

14. A recorder for use with dial telephones of the type including a receiver hook including a single numbering wheel, a strip on which the numbering wheel characters may be printed, means responsive to dial actuation for rotating the numbering wheel, a printing element for forcing the strip into cooperation with the numbering wheel, a carriage for moving the wheel axially, elements cooperating with the carriage to impart a step by step feeding movement to the carriage and thereby to the numbering wheel, a rod operated in one direction at the completion of each dial movement, means for operating the rod automatically in the opposite direction following release of the dial at the completion of the movement, means actuated by the rod in that movement responsive to dial completion to actuate the printing element, means responsive to the automatic operation of the rod for imparting a step by step movement to the carriage, an element actuated in the telephone cut off movement of the receiver hook to disconnect the carriage from the step by step feeding movements, and means for automatically moving the element to a position to compel cooperation of the step by step feeding means and the carriage in that movement of the receiver hook serving to cut in the telephone.

15. A recorder for use with dial telephones of the type including a receiver hook includ-

ing a single numbering wheel, a strip on which the numbering wheel characters may be printed, means responsive to dial actuation for rotating the numbering wheel, a printing element for forcing the strip into cooperation with the numbering wheel, a carriage for moving the wheel axially, elements cooperating with the carriage to impart a step by step feeding movement to the carriage and thereby to the numbering wheel, a rod operated in one direction at the completion of each dial movement, means for operating the rod automatically in the opposite direction following release of the dial at the completion of the movement, means actuated by the rod in that movement responsive to dial completion to actuate the printing element, means responsive to the automatic operation of the rod for imparting a step by step movement to the carriage, an element actuated in the telephone cut off movement of the receiver hook to disconnect the carriage from the step by step feeding movements, and printing strip feeding means actuated by said element.

In testimony whereof I affix my signature.

FRANK LOWITZ.