

Oct. 28, 1958

F. STYNER ETAL

2,858,067

VISUAL INDICATING DEVICE FOR CASH REGISTERS

Filed March 1, 1955

2 Sheets-Sheet 1

Fig. 1

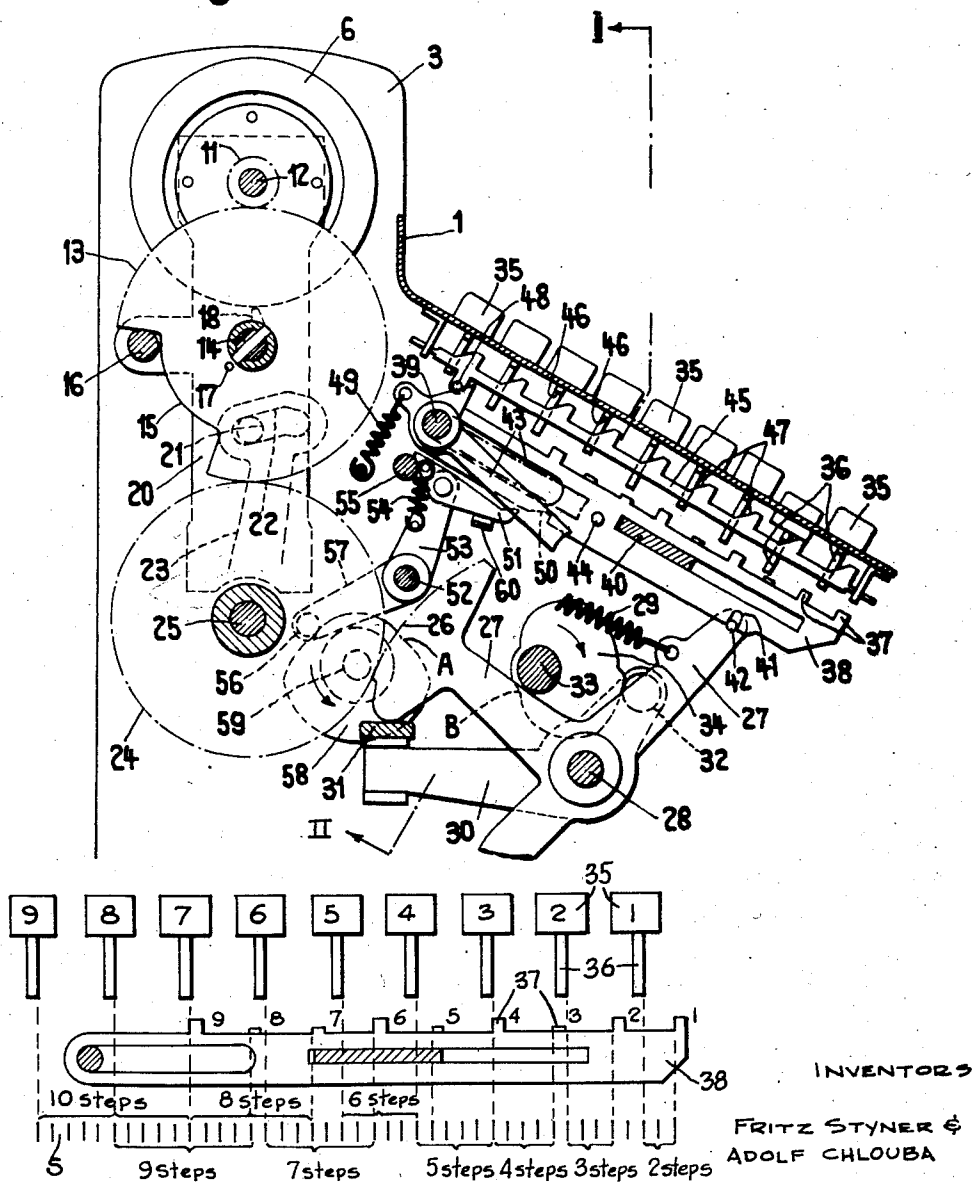


Fig. 3

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VISUAL INDICATING DEVICE FOR CASH REGISTERS

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Application March 1, 1955, Serial No. 491,415

Claim priority, application Switzerland March 13, 1954

8 Claims. (Cl. 235—23)

This invention relates to a visual indicating device for cash registers, having a number of adjustable cipher carriers, such as cipher rolls, equal to the number of digits to be indicated, wherein each cipher carrier has a blank indicating position in which no cipher appears and into which the carriers are brought in the first part of each cycle, and wherein at least some of the cipher carriers may remain in this blank position during the indication.

Known visual indicating devices of this type were equipped with cipher carriers, for instance cipher rolls, on which a blank area and the ciphers 0 to 9 were arranged in continuous regular order of succession. For every indicating cycle of the visual indicating device such cipher carriers were brought into a zero position in which all the nulls were visible. For indication, the cipher carriers were either turned in such a way that a cipher higher than null appeared or they continued to indicate null or they were turned back into the blank position in the decimal orders where there was nothing to be indicated. The adjusting members associated with the cipher carriers of such prior art indicating devices were reset into an initial position corresponding to zero indication on the cipher carriers. Specific zero eliminating means, displaceable on the said adjusting members, had to be inserted between the said adjusting members and the cipher carriers associated therewith, the said zero eliminating means allowing resetting of the cipher carriers into their blank position where no cipher was to be indicated.

Such specific zero eliminating means displaceable between the cipher carriers and their adjusting members may be dispensed with, and one single adjusting member may be brought into any position corresponding to blank or indicating position of the cipher carrier. In accordance with this invention, the visual indicating device has an adjusting member for each cipher carrier which is in an initial position corresponding to the said blank position of the cipher carrier at the commencement of each indicating cycle. The said adjusting member is adjusted from this initial position by first advancing it and subsequently resetting it into its initial position in decimal orders where the cipher carrier is to take its blank position.

One embodiment of the visual indicating device according to this invention is shown, by way of example, in the accompanying drawings of which:

Fig. 1 is a section of the adjusting and indicating mechanism of the visual indicating device on the line I—I in Fig. 2,

Fig. 2 is a section of the adjusting mechanism on the line II—II in Fig. 1, whereby the upper portion of the cash register with the casing wall partially removed is shown from the side of the registering keys, and

Fig. 3 is a schematic illustration of the operation of the adjusting mechanism.

The mechanism of the visual indicating device is mounted between two plates 2 and 3 fixed in the casing 1 of the cash register. The indicating device has cipher

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carriers having the form of cipher rolls 4 to 9 each carrying the ciphers 0 to 9 in continuous regular order of succession. The distance between the ciphers 0 and 9 is double the distance between any two other ciphers and by this increased distance a free area 10 is formed on each cipher roll 4 to 9 which appears in the indicating window (not shown) of the cash register, when the cipher rolls are in the zero position as shown for the cipher rolls 4 to 7 (Fig. 2). On cipher roll 7, the area 10 is provided with the sign (—).

Each of the cipher rolls 4 to 9 is rigidly connected to a toothed wheel 11 and is mounted for free rotation on a shaft 12. The toothed wheels 11 gear each with one of several toothed wheels 13 mounted for free rotation on a shaft 14. Each of the toothed wheels 13 has a recess 15 limiting the turning movement of the toothed wheel 13 by abutment against a stop rod 16. All the toothed wheels 13 are further equipped with a pin 17 each adapted for cooperation in a manner described below with one of several stops 18 fixed on shaft 14.

Shafts 12 and 14 are mounted in two vertically displaceable lateral plates 19 and 20. Pins 21 fixed on the plates 19 and 20 engage cam slots 22 of turnable cam levers 23, the plates 19 and 20 and the shafts 12 and 14 being vertically displaced when the cam levers 23 are turned. This vertical displacement has the effect to engage and disengage respectively the toothed wheels 13 with toothed wheels 24 provided below the wheels 13. The toothed wheels 24 are mounted for free rotation on a shaft 25. Each of the wheels 24 gears with a toothed sector 26 of one of several differential actuators 27 mounted for free rotation on a shaft 28. Each of the differential actuators 27 is loaded by a pulling spring 29 tending to turn the differential actuator 27 in anticlockwise direction. A resetting lever 30 having a resetting rod 31 engaging the differential actuators 27 from below is rotatably mounted on shaft 28. This resetting lever 30 is controlled from a cam disc 34 fixed on the main shaft 33 of the cash register by means of a control roller 32. In Fig. 2 the resetting rod 31 is shown in side elevation for simplicity.

The registering keys 35 of the cash register are held in the inclined back face of the cash register in a well known manner not shown. Control pins 36 of the registering keys 35 cooperate with lugs 37 of adjusting slides 38 slidably mounted on a shaft 39 and a rod 40. The adjusting slides 38 are displaced by a pin 42 of the corresponding differential actuator 27, engaging a notch 41 of the adjusting slide, when the differential actuator 27 is turned.

The lugs 37 of the adjusting slides 38 extend upwards or are bent sidewise as shown and cooperate in suitable order of succession with the control pins 36 of the keys 35, whereby the distance between successively operating lugs 37 with respect to the distance between successively operating control pins 36 is such that the amount of displacement of the adjusting slides 38 to the abutment of the operating lug 37 with the corresponding control pin 36 is of 2, 3, 4, 5 . . . 10 unit steps when the ciphers 1, 2, 3 . . . 9 are registered by depression of the corresponding key. This is clearly illustrated in Fig. 3 in which the numbers of unit steps are indicated on a linear scale S associated with the keys 35 and the lugs 37 of the adjusting slide 38 respectively. In other terms, the adjusting slide 38 is allowed to advance by a number of unit steps exceeding the number indicated by the key depressed in the corresponding decimal by one.

At the side of each adjusting slide 38 a stop latch 43 is turnably mounted on the shaft 39, which is adapted for cooperation with a stop pin 44 of the adjusting slide 38. Above the adjusting slides 38 and parallel thereto, toothed control slides 45 are provided for each decimal,

such control slides being mounted for lengthwise movement in the casing of the cash register. The control pins 36 have lateral shoulders 46 cooperating with the inclined tooth faces 47 of the control slides 45 in such a way that the control slide is displaced to the right (Fig. 1) when a key of the corresponding decimal order 35 of the register is depressed. In this position, shown in Fig. 1, the stop latch 43 is turned downwards by a control pin 48 of the control slide 45 so that the stop pin 44 of the corresponding adjusting slide 38 does not abut against the stop latch 43 and therefore the adjusting slide 38 is allowed to move any desired distance determined by the control pin 36 of the depressed key 35. When, however, no key 35 is depressed in the corresponding decimal order the stop latch 43 is maintained by the spring 49 in its rest position indicated in dash-dotted lines in Fig. 1, the control slide 45 remaining in its left position. The stop latch 43 is so designed that the adjusting slide 38 is allowed to move by one unit step until the pin 44 abuts against the stop latch 43.

Notches 50 are provided at the lower edge of the adjusting slides 38, adapted for cooperation with resetting latches 51. As may be seen from Fig. 2, resetting latches 51 are provided in the four higher decimal orders only. The resetting latches 51 are rotatably mounted on levers 53 fixed on a common shaft 52. Springs 54 are connected to the levers 53 and the resetting latches 51, tending to engage the resetting latches 51 with the notch 50 of the corresponding adjusting slide 38. In the initial position of the mechanism shown in the drawings, the resetting latches 51 are held out of engagement with the notches 50 by a rod 55 engaging the back end of the resetting latches 51. The common shaft 52 of the levers 53 is controlled by a cam disc 58 through a control roller 56 and a lever 57. The cam disc 58 is fixed on a shaft 59 driven by the main shaft 33 of the cash register in a transmission ratio of 1:1.

Lateral projections 60 are provided on the resetting latches 51 of the decimal orders corresponding to the cipher rolls 5, 6 and 7, extending below the corresponding projection 60 of the next higher decimal order and below the resetting latch of the highest decimal order respectively. It is easily seen from Fig. 2 that due to this arrangement the resetting latch of all the decimal orders having a projection 60 cannot possibly engage the notch 50 of the adjusting slide 38 when belonging to a decimal order situated below a decimal order in which the resetting latch cannot engage the notch 50 for any reason.

The above described visual indicating device operates as follows:

At the beginning of the indicating and registering cycle at least one of the registering keys 35 (for instance the key corresponding to the cipher "2" of the decimal order of which the mechanism is shown in Fig. 1) is depressed and latched in depressed position, whereupon the main shaft 33 of the machine is turned in the direction of the arrow in Fig. 1. Thereby the cam levers 23 are turned anticlockwise (Fig. 1) by a cam mechanism not shown so that the plates 19 and 20 are lifted and the toothed wheels 13 disengaged from the toothed wheels 24. During the disengagement the toothed wheels 13 are reset into the position illustrated corresponding to the zero position of the cipher rolls wherein the free area 10 and the sign (—) respectively will appear in the indicating window. This resetting is effected by an anticlockwise rotation of the shaft 14 whereby the pins 17 of the toothed wheels 13 are driven by the stops 18. Immediately afterwards the shaft 14 is turned back so that the stops 18 are reset into the position shown in Fig. 1. The driving mechanism for the shaft 14 is fully disclosed for a similar indicating device in my copending patent application Serial No. 478,148, filed on December 28, 1954.

Meanwhile the main shaft 33 of the machine and the cam disc 34 fixed thereon have been turned to such a position that the resetting lever 30 may be released for

turning anticlockwise. Thereby the differential actuators 27 are also released and will be turned by the pull of the springs 29 until the adjusting slides 38 coupled with the differential actuators 27 abut against a stop. The rotation of the differential actuators 27 is transmitted to the toothed wheels 24 gearing with the toothed sectors 26 of the differential actuators 27.

In the decimal order represented, the adjusting slide 38 will be displaced until it abuts against the control pin 36 of the key "2" that is it is displaced by three unit steps as is clearly seen from Fig. 3. Consequently the toothed sector 26 of the differential actuator 27 and the toothed wheel 24 of this decimal will also be rotated by three corresponding unit steps. If in any other decimal order a cipher greater than zero has been registered, the adjusting slide 38 of that decimal order will be displaced by a number of unit steps which exceeds by one the cipher registered as was explained above. If, however no key is depressed in a decimal order that means if "zero" is registered, the corresponding control slide 45 will not be displaced as shown in Fig. 1 and the stop latch 43 of this decimal takes the position shown in dash-dotted lines in Fig. 1. Therefore the adjusting slide 38 of this decimal order may be displaced by one unit step only.

In the meantime the cam disc 58 has turned on in the direction of the arrow in Fig. 1 until the control roller 56 of the lever 57 engages this cam disc at A. Thereupon the lever 57 and consequently the lever 53 are turned clockwise, whereby the resetting latches 51 execute their resetting movement in which they are freed from the rod 55 and their opposite ends may engage the lower edges and the notches 50 of the adjusting slides 38. The position and the shape of the resetting latches 51, of the rod 55 and of the notches 50 are so designed that the resetting latches 51 are only able to fall into the notches 50 when the adjusting slide 38 has been displaced by one unit step only from its zero position. If the adjusting slide 38 is displaced by more than one unit step from its zero position, which condition always applies according to the foregoing when some cipher has been registered in the corresponding decimal order, the resetting latch 51 cannot engage the notch 50 but slides on the lower edge of the corresponding adjusting slide 38 forwards. Therefore, resetting of an adjusting slide 38 only takes place when no key has been depressed in the corresponding decimal order, that is, when "zero" has been registered. But, as explained in connection with Fig. 2 of the drawings, the above condition is not sufficient in order that resetting of the adjusting slide 38 is effected. If, for instance, a number having six digits is indicated, the resetting latch 51 of the decimal order belonging to the cipher roll 4 cannot engage the corresponding adjusting slide 38 because at least a "1" must be registered in this decimal order in order that a number comprising six digits is formed. It is easily seen from Fig. 2 that when the first resetting latch from the left, that is the resetting latch belonging to the cipher roll 4, cannot fall into the corresponding notch 50 of the adjusting slide 38, which means that this latch cannot follow upwards in Fig. 2, that also all the following resetting latches 51 provided with projections 60 are prevented from rising, that is engaging the notches 50 of the corresponding adjusting slides 38. Therefore, the simple rule may be given that resetting of the adjusting slide 38 only takes place in a decimal order which is not comprised in the number indicated. Therefore for the indication of —.25 shown in Fig. 2 the adjusting slides 38 belonging to the cipher rolls 4 to 7 are reset. The resetting movement of the adjusting slides 38 effected by the resetting latches 51 amounts to one unit step so that the adjusting slides 38 are reset into their zero position illustrated in Fig. 1.

No resetting latches 51 are provided in the two last decimal orders indicating the tenth and hundredth of the decimal fraction and therefore no resetting takes place in these decimals.

After having adjusted the adjusting slides 38 and therewith the differential actuators 27 and the toothed wheels 24 as set out above, and after having reset the cipher rolls into their zero position, the control levers 23 are returned by separate control means not shown in the drawing but fully described in my above copending patent application Serial No. 478,148 into the position illustrated in Fig. 1 whereby the toothed wheels 13 and 24 are engaged again. On further rotation of the cam disc 34 the control roller 32 of the resetting lever 30 reaches the point B on this cam disc whereafter the resetting lever 30 starts to turn back clockwise whereby the resetting rod 31 extending below the differential actuators 27 drives these differential actuators back into their zero position. Thereby every differential actuator 27 is turned back by the number of unit steps it had been displaced from its zero position and consequently the cipher rolls are turned out of their zero position by a corresponding number of unit steps over toothed gears 24, 13 and 11. In analogy all the cipher rolls belonging to a decimal order situated outside the number to be indicated remain in the zero position in which the free area 10 or the sign (—) is visible. If a null is to be indicated within the number or in the tenth or hundredth decimal fraction, the corresponding cipher roll is turned by one unit step so that the null appears in the indicating window. If a "1" is to be indicated, the cipher roll of the corresponding decimal order is turned out of its zero position by two unit steps so that the "1" appears in the indicating window, and so on.

Therefore the indication is always effected without unnecessary nulls. For instance the indication of five cents appears as —.05 because no resetting is effected in the tenth even though this decimal order is outside the real number. The indication of 10.05 exactly appears in this form whereas with known indicating devices it used to appear as 0010.05 which was obviously less clear.

When the differential actuators 27 and therewith the adjusting slides 38 have been returned to the zero position shown in Fig. 1 by the resetting mechanism 30, 31, the resetting latches 51 are also reset into their zero position under the action of a spring (not shown) where-with the visual indicating device has returned to the initial state illustrated in Fig. 1 and another indicating cycle according to the above description may be started.

Evidently the indicating device according to this invention might as well be used in connection with other types of visual indicating devices in which resetting of the cipher rolls is for instance effected in a different manner and wherein no disengagement of the indicating members from the adjusting members takes place.

If indication of integral numbers only is to be effected, resetting latches 51 are to be provided in all decimal orders and projections 60 must be provided in all decimal orders except for the highest one.

While the invention has been described and illustrated with reference to a specific embodiment thereof, it will be understood that other embodiments may be resorted to without departing from the invention. Therefore, the form of the invention set out above should be considered as illustrative and not as limiting the scope of the following claims.

What we claim is:

1. A visual indicating device for cash registers, having a number of adjustable cipher carriers, such as cipher rolls, equal to the number of digits to be indicated, an adjusting slide for each cipher carrier, registering key means and a stop on each of the said key means adapted for cooperation with stop means of the said adjusting slides, means for advancing the said adjusting slides into a position determined by the engagement of the said stop means of the adjusting slides with the stops formed on the said key means, a stop latch for each of the said adjusting slides and a stop on each adjusting slide adapted for operatively engaging the said stop latch, a control

slide for each adjusting slide adapted to be operatively engaged by any of the key means associated with one determined adjusting slide, the said stop latch being in operative connection with the said control slide, the control slide shifting the stop latch into a position in which it cannot engage the stop of the adjusting slide whenever a key means associated with the adjusting slide is operated and the stop latch being held in a position for engagement with the said stop of the adjusting slide when no key means associated with the adjusting slide are operated thereby allowing an advancing motion of the adjusting slide of one unit step only into zero-indicating position, a notch in each of the said adjusting slides and a resetting latch adapted to engage this notch, resetting means for actuating said resetting latch for resetting the said adjusting slides to an initial position at every indicating cycle, the said means for advancing the adjusting slides advancing the adjusting slide by one unit step when no key means associated with the adjusting slide are operated and the said notches of at least some of the adjusting slides advanced by one unit step only being engaged by the said resetting latch, whereby such adjusting slides are returned to their initial position, and means for adjusting the said cipher carriers to a position corresponding to the position of the associated adjusting slide, whereby at least some of the cipher carriers may remain in an initial position in which no cipher appears.

2. A visual indicating device according to claim 1, interlocking means on at least some of the said resetting latches preventing the resetting latch associated with one determined decimal order from engaging the said notch of the adjusting slide when the resetting latch associated with the next higher decimal order cannot engage the notch of the adjusting slide associated with it, whereby resetting of the adjusting slides by the resetting latches is prevented in all decimal orders within the number to be indicated so that the adjusting slides are at least advanced to zero-indicating position in such decimal orders and at least a zero will subsequently be indicated in such decimal orders.

3. A visual indicating device according to claim 1, the said adjusting slides having a supporting face comprising the said notch, the said resetting latch sliding on the said supporting face when executing its resetting motion thereby engaging the notch when the adjusting slide has been advanced by one unit step only, lateral projections on the said resetting latches associated with at least some determined decimal orders, engaging the resetting latch associated with the next higher decimal order on the side opposite the notch of the adjusting slide, the said projection preventing the resetting latch associated with one determined decimal order from engaging the said notch of the adjusting slide when the resetting latch associated with the next higher decimal order cannot engage the notch but is supported on the said supporting face of the adjusting slide, whereby resetting of the adjusting slides by the resetting latches is prevented in all decimal orders within the number to be indicated so that the adjusting slides are at least advanced to zero-indicating position in such decimal orders and at least a zero will subsequently be indicated in such decimal orders.

4. A visual indicating device for cash registers, having a number of adjustable cipher carriers, such as cipher rolls, equal to the number of digits to be indicated, one single adjusting slide for each cipher carrier, registering keys, first stop means formed on each of the said key means adapted to cooperate with stop means on the said adjusting slides, spring advancing means for the said adjusting slides, a stop latch for each of the said adjusting slides and a stop on each adjusting slide adapted for operatively engaging the said stop latch, control means associated with each of the said adjusting slides and co-operating with the key means associated with the same

adjusting slide for bringing the said stop latch into operative position when no key associated with the stop latch is operated and for bringing the said stop latch into inoperative position when an associated key is in operative position, first resetting means adapted to reset the said adjusting slides into a blank position during every indicating cycle, and second resetting means for each adjusting slide adapted to reset the adjusting slide into the said blank position when the said stop latch is in operative position, each adjusting slide being brought into its adjusted position by first being advanced by the said advancing means to one of the said first stop means formed on a key by more than one step or to the said stop latch by one step respectively according to whether a key associated with the adjusting slide is operated or not and at least some of the adjusting slides advanced by one step only being subsequently reset into their blank position by the said second resetting means, and means for adjusting the said cipher carriers to a position corresponding to the said adjusted position of the associated adjusting slide, whereby at least some of the cipher carriers may remain in an initial position in which no cipher appears.

5. A visual indicating device for cash registers, having a number of adjustable cipher carriers, such as cipher rolls, equal to the number of digits to be indicated, adjusting members, each cipher carrier being associated with one single adjusting member, registering keys, first stops being formed on each of said keys, a second stop formed on a stop member, stop means on the said adjusting member, spring advancing means for advancing the said adjusting member into a position in which its stop means engage one of the said first or second stops, means controlled by the said keys for rendering the said second stop operative when no key is actuated and inoperative when a key is actuated, first and second resetting means for bringing the said cipher carriers and the said adjusting members respectively into a blank position in which no cipher is indicated during every indicating cycle, the adjusting member being advanced during every adjusting motion by at least one unit step into engagement with the said second stop, and third resetting means effective when the said second stops are operative for resetting the adjusting members into the said blank position, and means for transmitting the adjusted position of the adjusting member to the cipher carrier associated therewith, the cipher carrier remaining in its blank position when the adjusting member has been reset into its blank position.

6. A visual indicating device for cash registers, having a number of adjustable cipher carriers, such as cipher rolls, equal to the number of digits to be indicated, each digital indicating mechanism comprising a cipher carrier, one single adjusting member, registering keys having stops formed thereon, a stop member controlled by the said keys to be in operative position when no key is actuated and in inoperative position when a key is actuated, stop means on the said adjusting member, means for advancing the said adjusting member into a position in which its stop means engage one of the stops formed on the keys or the said stop member respectively, first and second resetting means for bringing the said cipher car-

riers and the said adjusting members respectively into a blank position in which no ciphers are indicated prior to the adjusting motion of the adjusting member, third resetting means operative when the said stop member is in its operative position for resetting the said adjusting member into its blank position during the adjusting motion, and means for transmitting the adjusted position of the adjusting member to the cipher carrier associated therewith, the cipher carrier remaining in its blank position when the adjusting member has been reset into its blank position.

7. A visual indicating device for cash registers, having a number of adjustable cipher carriers, such as cipher rolls, equal to the number of digits to be indicated, each digital indicating mechanism comprising a cipher carrier, one single adjusting member, registering keys having rigid stops formed thereon, a rigid stop member controlled by the said keys to be in operative position when no key is actuated and in inoperative position when a key is actuated, rigid stop means on the said adjusting member, fixed rigid stop means for the said adjusting member, and first resetting means for resetting the adjusting member into an initial position in which it engages the said fixed stop means, means for advancing the said adjusting member to a position in which its stop means engage one of the stops formed on the keys or the said stop member respectively, second resetting means for bringing the said cipher carriers into a blank position in which no ciphers are indicated, third resetting means operative when the said stop member is in its operative position for resetting the said adjusting member into its initial position, so that each position of the said single adjusting member is determined by a rigid stop, and means for transmitting the adjusted position of the adjusting member to the cipher carrier associated therewith, the cipher carrier remaining in its blank position when the adjusting member has been reset into its blank position.

8. A visual indicating device for cash registers having registering keys with stops formed thereon and a number of cipher carriers equal to the number of digits to be indicated, each cipher carrier having a blank position wherein no cipher is indicated, one single adjusting member for each of the said cipher carriers, zero stops, means for adjusting the said adjusting members from an initial position including means for first advancing all the adjusting members by at least one unit step into engagement with a zero position stop or a stop formed on a registering key respectively, and means for subsequently resetting at least some of the adjusting members advanced by one unit step only into the said initial position for eliminating zero indication in decimal orders outside the number to be indicated.

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