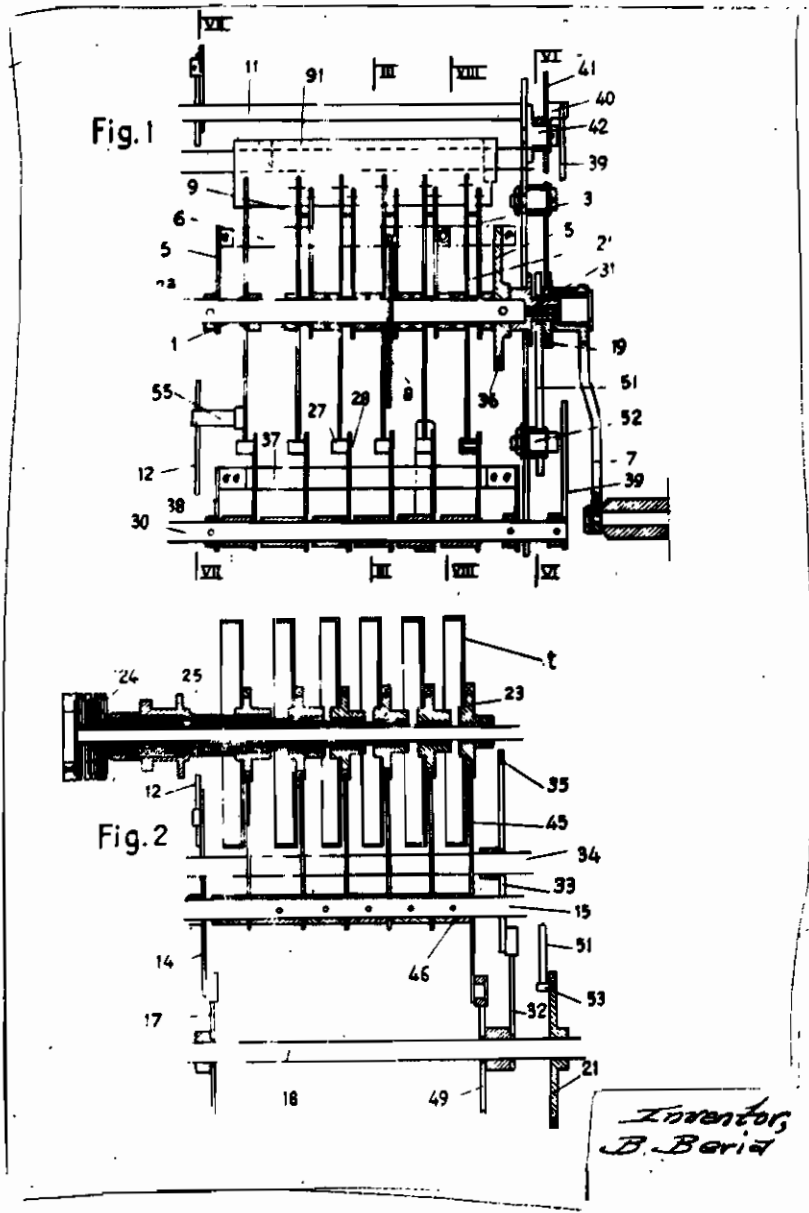


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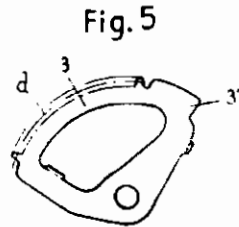
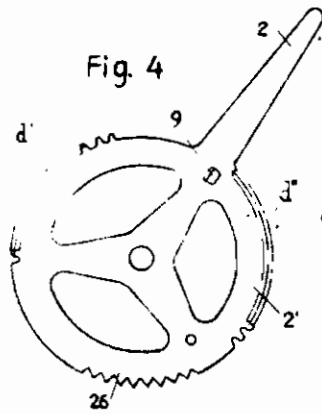
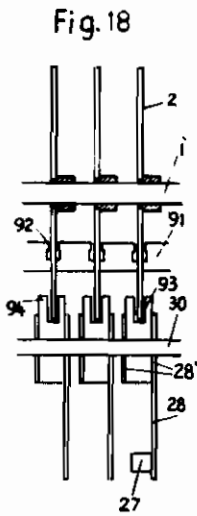
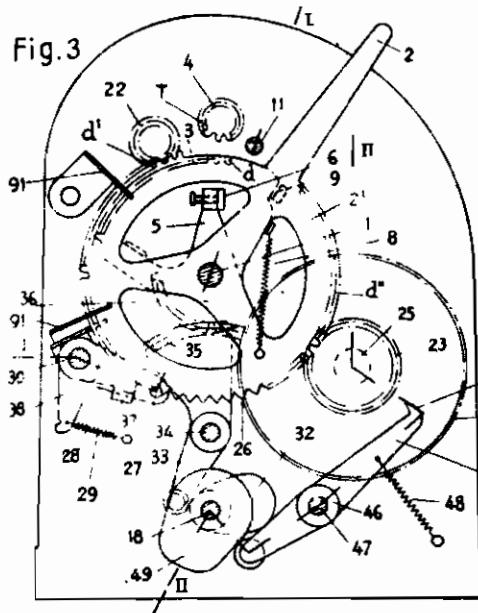
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Fig. 6

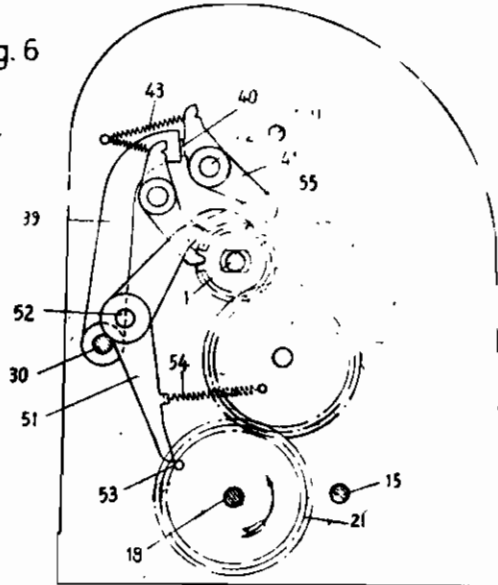


Fig. 7

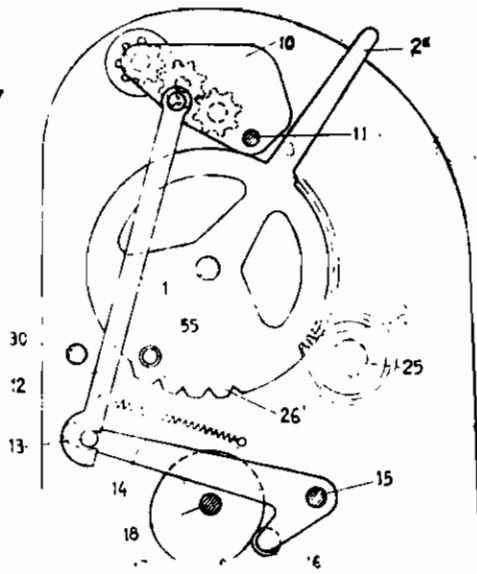


Fig. 7bis



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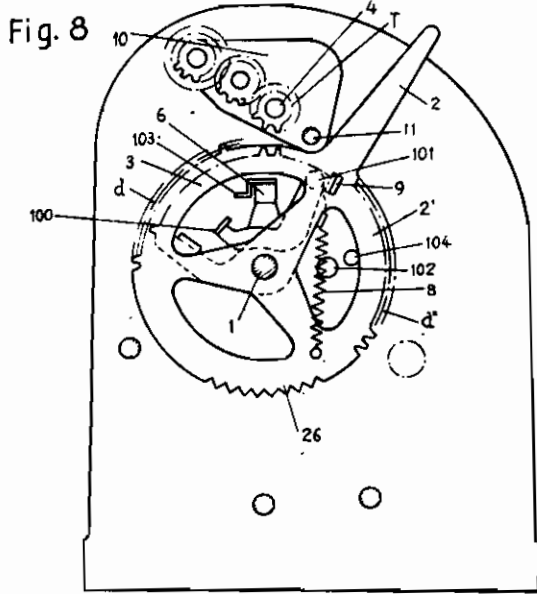
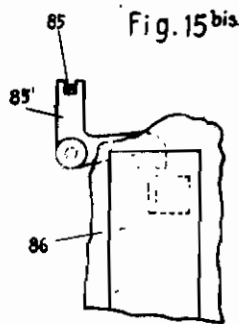
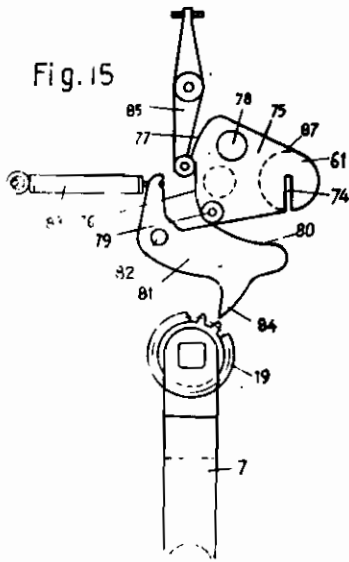


Fig. 9

0
A
B
C
D
5
5A
5B
5C
5D



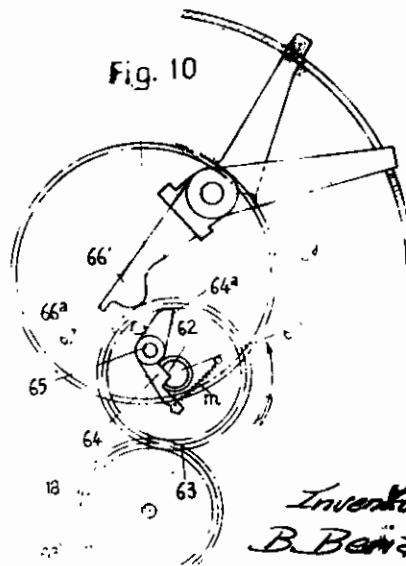
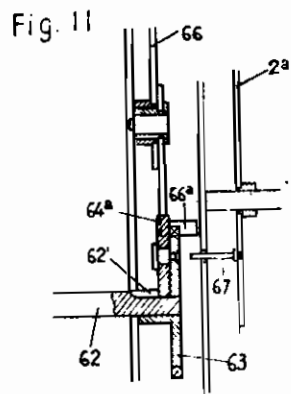
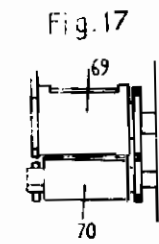
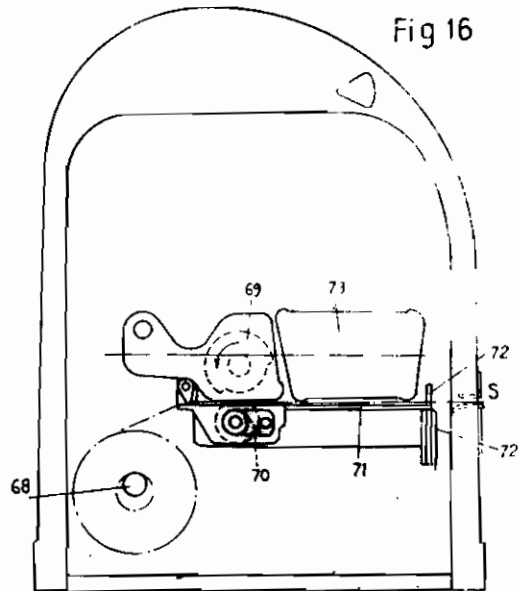
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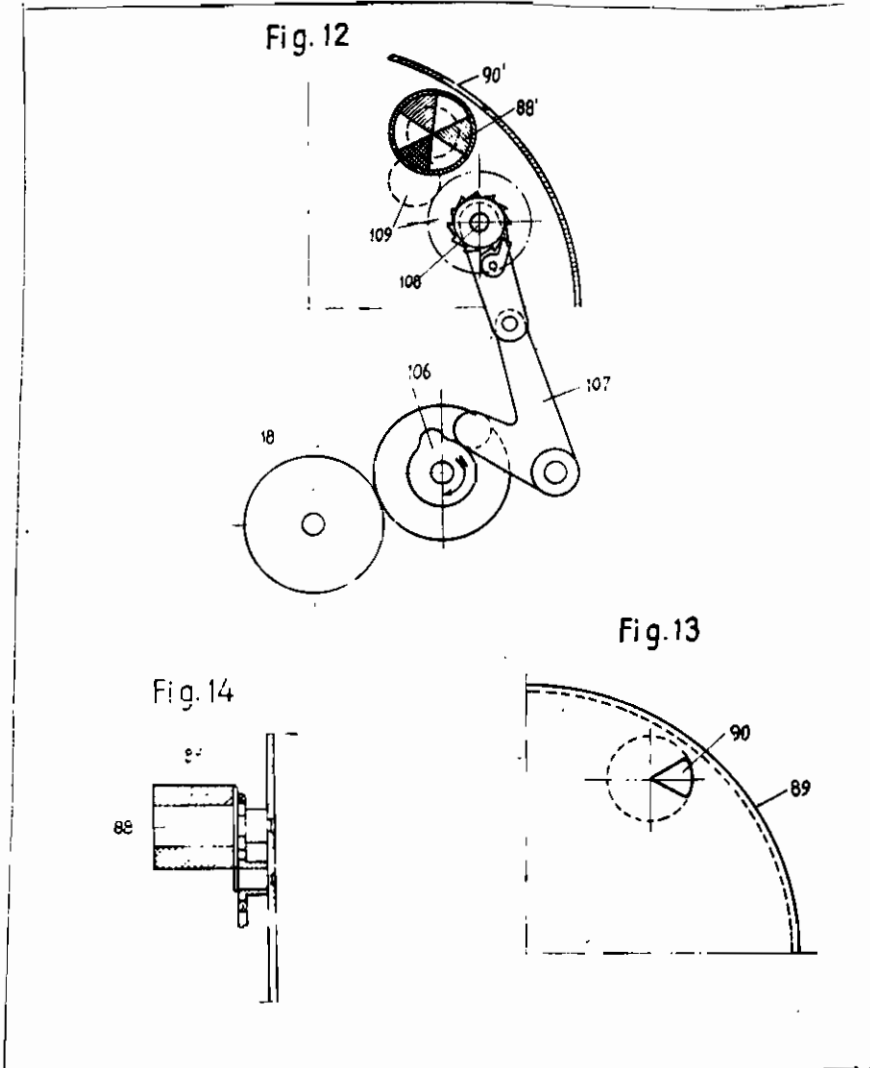
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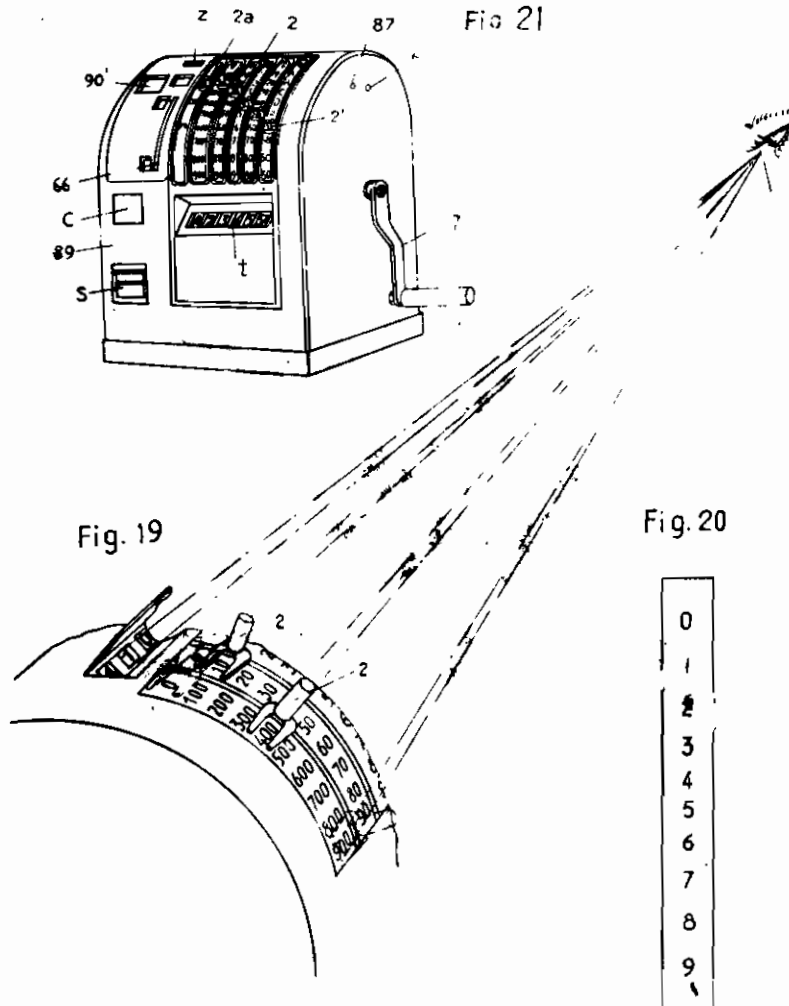
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7 Sheets-Sheet 7



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ALIEN PROPERTY CUSTODIAN

HAND-OPERATED CASH REGISTER

Biagio Beria, Turin, Italy; vested in the Alien
Property Custodian

Application filed October 14, 1940

This invention relates to a cash register with hand operation.

An object of this invention is to provide a compact arrangement of the various members.

A further object of this invention is to provide a safety device for preventing operation of the machine when the setting levers instead of being in their correct position are in an intermediate position.

A further object of this invention is to provide means for insuring a perfect visibility of the item set both by the operator and the supervising personnel who can check from a distance whether on each operation performed the machine has been duly operated so as to carry out its full normal cycle.

These and further objects of this invention will appear from the following description, in which reference is made to the accompanying drawing, in which:

Figure 1 is a partial axial section of the machine along the broken line I—I of Figure 3.

Figure 2 is a section on line II—II of Figure 3.

Figure 3 is a cross section on line III—III of Figure 1.

Figure 4 shows a setting lever and Figure 5 shows a sector connected with the setting lever.

Figure 6 is a cross section on the line VI of Figure 1, showing the safety device for preventing actuation of the handle if the setting levers are not in their correct position and the crank mechanism is at the cycle end.

Figure 7 is a section on line VII of Fig. 1 and shows the counter operating mechanism and means for uncoupling it when the operations of "credit" and "withdrawal" are performed, the counter remaining in its coupled position during the "cash" and "part payment" operations.

Figure 7bis shows the setting dial for the various operations relating to Figure 7.

Figure 8 is a section on line VIII of Figure 1, showing the mechanism for performing the registering operations, with the possibility of subdividing them into four classes for the items to be registered on the machine and effecting registration of 5 cents cashed.

Figure 9 shows the setting dial for the various operations relating to Figure 8.

Figure 10 shows the lever producing in a determined position delivery of the ticket, and the lever for setting the "cash," "partial payment," "on credit" and "withdrawal" operations, which in its two last mentioned positions automatically produces delivery of the ticket even in case the

special ticket delivery lever is not yet in the "delivery position."

Figure 11 is an axial section of the detail shown in Figure 10.

Figures 12, 13 and 14 are detail views of the device for checking the machine operation from a distance.

Figure 15 and 15bis are detail views of the machine lock which is operated when it is desired to read the counter by using the key.

Figures 16 and 17 are a side and front view, respectively, of the device for introducing the ticket roll.

Figure 18 shows a detail of the device for centering the successive members, setting levers, carrying position rollers, by means of a comb which holds the setting levers, in the correct position.

Figure 19 is a partial perspective view of the machine, showing the gradually increasing space between the numerals on the dials of the setting levers which advantageously improves the visibility thereof, and the tiltable lid acting as a visor for improving the visibility of the totalizer;

Figure 20 is a detail view of the setting lever dial;

Figure 21 is a perspective view of the machine.

Referring to the drawings, 1 (Figures 1, 2 and 3) denotes the main shaft on which are loosely mounted the setting levers formed by a handle 2 and a circular portion 2' (Figure 4) toothed at its periphery. The same shaft has loosely mounted thereon the toothed sectors 3 (Figure 5) adapted to transmit the setting movement imparted to the levers 2, to the totalizer, of which numeral 4 denotes the shaft carrying the driving pinions. Two arms 5 are further keyed on the shaft 4 and carry a bar 6 adapted to restore the sectors 3 to their initial position when the shaft 1 is rotated causing the machine to perform its operating cycle on operation of the crank 7.

The setting levers 2 and sectors 3 of each pair are connected together by a spring 8 which holds the sectors in a determined position against the setting levers by causing them to bear by their edge 3' (Figure 5) against a stop tooth 9 on each setting lever.

The sectors keep in contact with said stop tooth as the items are set by actuation of the setting levers but the totalizer remains inoperative, for it is kept in a raised position with respect to the sectors 3, in which its pinions do not mesh with the teeth on the sectors.

When the items are set, the machine is started

by the crank 7 and the totalizer is lowered by the fact that the shaft 4 of the totalizer (Figure 7) is carried by suitable arms 10 swinging about a shaft 11, the arms being actuated by a link 12 connected at 13 to the longer arm 14 of a bell crank lever 15 oscillating about a pivot 15' and the shorter arm of which carries a roller 16 riding on the cam keyed on the shaft 18 which is actuated on rotation of the crank by means of the pinion 19 (Figure 6), the intermediate wheel 20 and toothed wheel 21 keyed on the shaft 18.

Starting of the crank 7 on each operating cycle of the machine oscillates the bell crank lever 15 through the gradient on the cam 17, lowers the link 12 and moves downwardly the arms 10 carrying the totalizer, causing the pinions T of the totalizer to engage the teeth *d* on the sectors.

The setting levers 2 carry at the periphery of their circular portion 2' teeth *d'* meshing with the pinions 22 (Fig. 3) which actuate the usual wheels carrying the numerals adapted to form the figure set, visible at the rear towards the public (not shown).

The circular portion 2' is provided with a further set of teeth *d''* meshing with a pinion 23, each being connected with the corresponding wheel *t* (Figures 2 and 3) which carries the numerals adapted to form the figure set, visible at the front on the operator's side. As the numeral wheels for front reading are arranged at the lower portion of the machine, a further important advantage is secured both as regards cost and size, on account of the fact that each wheel *t* is keyed on a tubular shaft 25 carrying a printing disk 24, the tubular shafts being concentrically arranged on the same axis. The position of the wheels *t* permits the operation effected to be read at the front in a particularly convenient low position (see Fig. 21).

The circular portion 2' of the setting levers carries a further set of teeth 26 which are wedge-shaped; a roller 27 carried by an arm of a bell crank lever 28 rests in the V-shaped recess between said teeth, the other lever arm being acted upon by a spring 29 which tends to resiliently hold the roller between the teeth 26, so that the bell crank lever oscillates about the axis 30 on operation of the setting levers 2.

The operating cycle of the machine actuated by the crank 7 shall now be described.

The crank 7 is keyed on the polygonal end of the hub of a pinion 19 (Fig. 1) which is in turn loosely fitted on a bush 31 in which the end of the shaft 1 is freely mounted. On rotation of the crank 7, the latter carries along the pinion 19 which actuates through the toothed wheels 20 and 21 (Fig. 6) the cam shaft 18 carrying besides the totalizer driving cam 17 a cam 32 (Fig. 3) which actuates the arm 33 of a lever pivoted at 34, the other arm of which is in the shape of a toothed sector 35 meshing with teeth 36 of a toothed sector forming part of one of the two arms 5.

In this manner, rotation of the crank 7 first throws into gear by means of the cam 17 the totalizer pinions with the sectors 3, then oscillates through the cam 32 the arms 5 and bars 6 connecting them, restoring the sectors 3 and transmitting to the totalizer the figure previously formed by the setting levers 2. The rollers 27 are pushed by the spring 29 against wedge-shaped teeth 26 and enable snapping of each tooth, which corresponds to the displacement of a numeral on operation of the setting levers, to be

heard. A bar 37 rests on an arm of the levers 28 and is carried by arms 38 keyed on the shaft 30 (Fig. 1) having keyed on its end a lever 39 (Fig. 6) which cooperates by its other end with a foot 40 of a lever 41 loosely mounted on a pivot 42 and pressed by a spring 43 tending to keep the tooth 44 lifted and released from the pinion 19.

When setting a figure by means of the levers 2, if the numerals do not reach their correct position as required with the roller 27 in the recess between the teeth, the roller remains on the apex of a tooth, the bar 37 is moved as the roller 27 is raised and causes the lever 39 keyed on the same shaft 30 as the arms 38 of the bar 37, to oscillate the lever 41 and carry the tooth 44 into engagement with the pinion 19, whereby the crank 7 is locked and the operation cannot be performed.

In this case, the operator notices the wrong setting and can immediately place the machine in order to make its operation possible.

The machine is provided with a device for keeping the setting levers locked against the action of springs 8, as the operating cycle of the machine is started by the crank. For this purpose, each setting lever is provided with a lever 45 (Figs. 2 and 3), of which the hub 46 is keyed on the shaft 15. The levers 45 are pressed by a spring 48, which keeps one end thereof against a cam 49 carried by the camshaft 18, while the other lever end is formed with a tooth 50 adapted to engage under the action of the cam 49 the corresponding pinion 23 fixedly connected to the drum for front reading and directly meshing with the set of teeth *d''* on the corresponding setting lever 2. As the crank 7 starts rotating, it causes the cam 49 to promptly lift the end of the lever 45 and lock the setting lever 2 as described above.

As the crank completes the full operating cycle of the machine, which corresponds in the example shown to two full turns of the crank, a device which shall now be described automatically stops the crank. This device consists of a lever 51 (Figs. 1 and 6) oscillating on the pivot 52, one end of which is actuated by a pin 53 carried by the toothed wheel 21 which performs one turn as the crank turns twice and tends to lift said end against the action of the spring 54. The other end of the lever 51 comes under the tooth 55 solidly fixed to the pinion 19 as the opposite end of said lever 51 is lifted by the pin 53. On the last instant of its oscillation, the crank is stopped under the action of the tooth 55 by the end of the arm of the lever 51. As soon as the pressure of the hand tending to rotate the crank ceases, the pressure between the tooth 55 and the end of the lever 51 ceases also, and the spring 54 releases the lever from the tooth 55, again setting free the crank which is ready to perform another cycle.

Actuation of the crank 7 for a new cycle is made possible by the fact that on the last short length of the crank movement the pin 53 moves beyond the end of the arm of the lever 51, releasing said arm.

The first of the setting levers 2, which will be referred to as 2*a* (Fig. 7) is deprived of the sector 3 (while a sector 3 is coupled with all other levers by means of the spring 8) and has two sets of teeth only, viz. a set *d''* for connection with the associated pinion 23, and a set of teeth 26' having twice a pitch which is twice the pitch of the teeth 26 on the other levers, said lever 2*a* performing the function of setting, instead of the nu-

numerals, the type of operation to be performed, viz. "cash," "partial payment," "on credit" and "withdrawal" (Figure 7 bis) in accordance with the four snaps of the roller 27.

The connection with the corresponding pinion 23 permits actuation of a wheel, which repeats for front reading the inscriptions or symbols corresponding to the above operations ("cash," etc.) and actuation of the corresponding printing disk directly keyed by means of the tubular shaft 25. The circular portion of the lever 2a further carries a pivot 55 projecting laterally thereof (Figure 7) which is ineffective when the lever moves from the "cash" to the "partial payment" position, but strikes against the lever 12 on movement from the "partial payment" to "on credit" or "withdrawal" position, the lever 12 then disengaging from the pin 13 on the lever 14, so that the cam 17 no longer acts on the totalizer to bring it into engagement. In performing the "on credit" and "withdrawal" operations, the cycle of the machine does not affect the totalizer.

The setting lever 2 (Fig. 8) situated at the end remote from the above described lever 2a has its sector 3a provided with a pawl 100 pivoted at 101 and serving to introduce into the totalizer the 5 cent sum and actuate the pinions for this operation.

Adding of the cents must of course be completed, as will be seen from the dial (Figure 9) when the setting lever has reached numeral 5 or one of the following numerals 5A, 5B, 5C, 5D which correspond to 5 cents to be added in the particular case of operations of class A, B, C, D respectively. When operations of classes A, B, C, D must be performed without adding the 5 cents, the setting lever is behind numeral 5.

For the positions over numeral 5, during actuation of the setting lever and movement of the sector 3a under the action of the spring 3a, the pawl 100 moves underneath the collecting bar 6, which cannot return the sector 3a, so that the 5 cents are not added up in the totalizer. When the setting lever is brought to the position 5, the pawl 100 strikes against the pin 102 and is lifted within the path of the angle bar 103 carried by the bar 8, which on its return stroke engages the pawl 100 and returns the sector 3a to zero, thereby adding up in the totalizer the figure 5.

If the setting lever is brought to the position 5A, 5B, 5C, 5D, the sector 3a always stops in the position 5, in which it is retained by the pin 104 and the figure 5 is again added up in the totalizer.

A ticket control lever 66 (Figs. 10 and 11) is formed at its inner end with a boss 66' cooperating with the end 64a of a pawl pivoted at 65 on a wheel 63 and formed with a tooth 64 which, when it is held by a spring *m* in the notch 62' in the shaft 62, feeds the paper by causing the wheel 63 to be keyed on the shaft 62 by the tooth 64, thereby transmitting to the shaft 62 through the wheels 63 and 63' the motion of the camshaft 18 on each cycle of the machine. In the position of the lever 66 shown in Figure 10, the pawl holds the wheel 63 keyed on the shaft, while on displacing upwardly the lever 66, the boss 66' on the latter moves the pawl releasing the tooth 64 and disconnecting the wheel 63, thereby preventing delivery of a ticket on each cycle of the machine. The arrangement is such that, on performing "on credit" and "withdrawal" operations by bringing the lever 2a to the corresponding positions, Fig. 7, the lever, if not already in the position shown in Figure 10, is automatically brought thereto for the delivery of the ticket.

For this purpose, the circular portion of the lever 2a is formed with a pin 67 which, when the lever is brought in the "on credit" and "withdrawal" position, reaches the foot 65a of the lever 66, if the latter is in its raised position, bringing it down with its outer end to the ticket delivery position, in which the pawl 64a has its tooth 64 engaged in the corresponding recess in the shaft 62.

The ticket printing and delivery device shown in Figures 16 and 17 enables an easy rechange of the paper roller by introducing one end unwound from the roller between the printing cylinder 69 and pressure cylinder 70 at the same time as the paper roller is mounted on the supporting pivot 68. The printing roller 69 has a sector of a smaller diameter which, in the inoperative position of the machine, is in front of the pressure cylinder 70 (Fig. 16), enabling introduction of the unrolled paper end during fitting, as described above.

71 denotes the paper roller supporting surface and 72 denotes the blades cutting the ticket near the outlet S. The sector of a larger diameter of the printing roller 69 feeds the paper by the desired ticket length and at the same time advertisements or the like are printed, if desired.

The printing rollers 24 (Fig. 2) for printing on the ticket and check tape the figures and inscriptions are lodged in the frame 73 (Fig. 16). The record on the check tape may be inspected through the opening C (Fig. 21).

Figure 15 shows the device for locking the machine on reading of a sub-total or grand total. For this purpose a lock 61 with two keys is provided; the shorter key permits reading of the totalizer only, while the longer key further permits to zeroise the totalizer. The device comprises a sector 75, of which the outer profile 76 is formed with a step towards a projecting portion 77 and an opening 78, a roller 79 and a notch 74. The roller 79 acts on the profile 80 of a lever 81 pivoted at 82 and pressed by the spring 83, which tends to keep the tooth 84 released from the pinion 19. By fitting either key into the hole 74 in the lever 75, the roller 79 immediately lowers the tooth 84, causing it to engage with the pinion 19. At the same time the step on the profile of the sector 75 lifts the lever 85 which, through a lever 85', lifts the lid 86 (Fig. 19) that dissimulated the totalizer reading. If the key introduced into the lock 61 is the longer one, the sector 75 is free to rotate further, till its opening 78 comes into alignment with a further lock 87, of which the key zeroises the totalizer.

The record of the number of grand total readings performed by the machine is visible through the opening Z in the casing (Fig. 21).

The machine is provided with a device (Figs. 12 to 14) for checking its operation from a distance, comprising a drum 88 of which the cylindrical surface is divided into variously colored sectors 88' visible through a suitable opening 88' in the casing 89 of the machine. The head portion of the drum is also divided into sectors 88'' of different colors visible through an opening 80 in the side wall of the casing 89 of the machine. Motion is transmitted to the drum 88 from the camshaft 18 through gearing 105, cam 106, lever 107, ratchet gear 108 and toothed wheels 109. The width of the colored sectors corresponds to the angular displacement of the drum 88, so that only on completion of a full cycle a change in color takes place and is visible at a distance for checking purposes.

The construction of the machine is such that the various movable members may be perfectly centered on their shafts without any special arrangements and in a very easy and simple manner, as a centering device according to the invention and described hereinafter may fulfil the purpose for various interconnected members.

Figure 18 shows the device used in connection with the setting levers 2 and levers 28. As will be clearly seen from the drawing, the setting levers 2 are simply fitted on the shaft 1 and one or a plurality of combs 91 having cuts 92 hold in position and guide said levers during operation. The setting levers 2 fit within notches 93 cut in an extension 94 of the levers 28. The hub of the

latter is made of U-bent sheet metal and the notched extension 94 is formed from the sheet metal portion between the two flanges 28' of the U.

The distance between the numerals or letters on the dials 110 on which the pointers *i* (Fig. 19) of the setting levers 2, 2 α move, gradually increases from the center towards both ends, as will be clearly seen from Figure 20. This arrangement is of great importance, because (see Figure 19) the numerals placed towards the ends of the dials are as visible as those placed at the center, notwithstanding the thickness of the pointers *i* on the levers 2.

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