

July 10, 1934.

C. W. GREEN

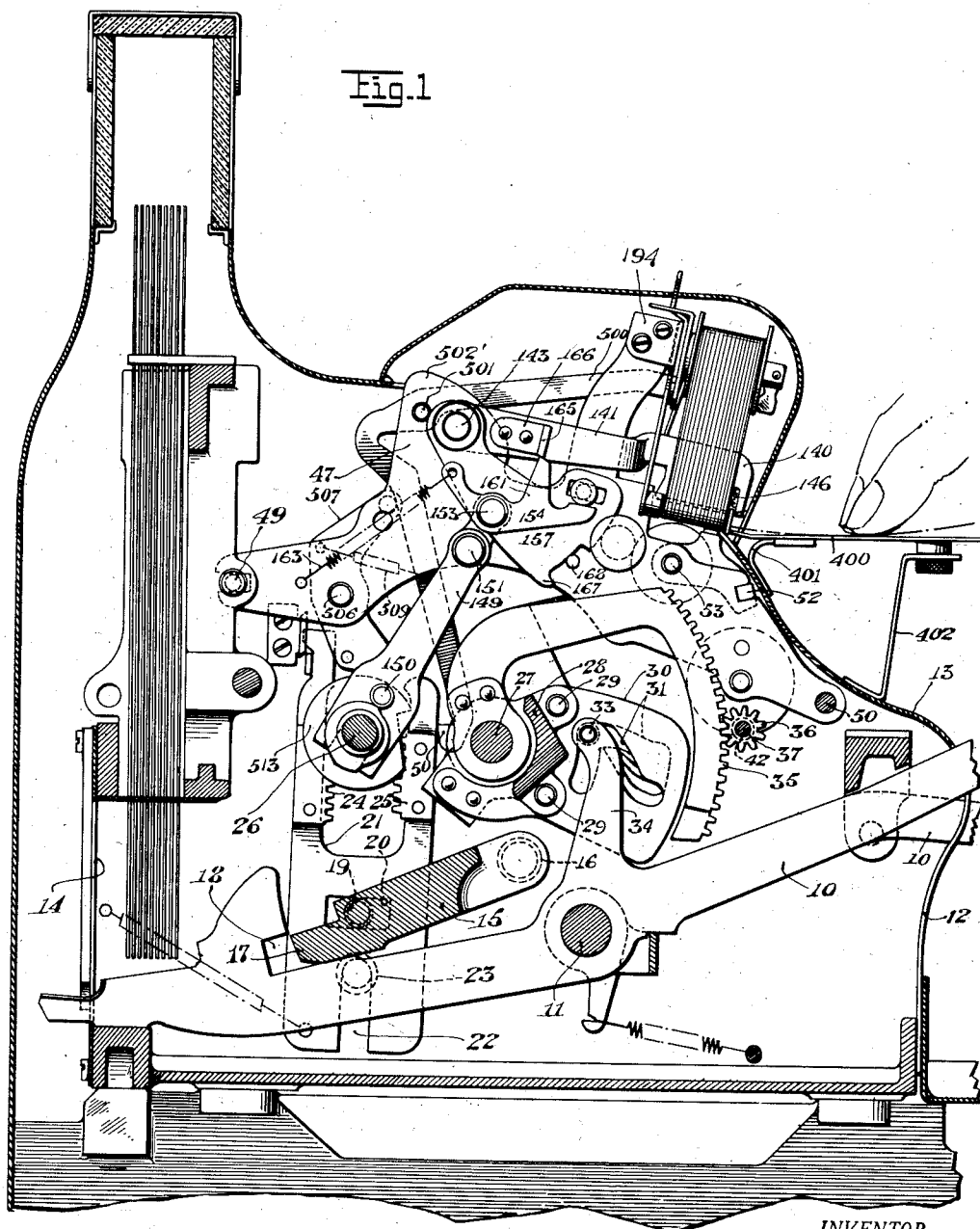
1,965,740

CASH REGISTER

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3 Sheets-Sheet 1

Fig.1



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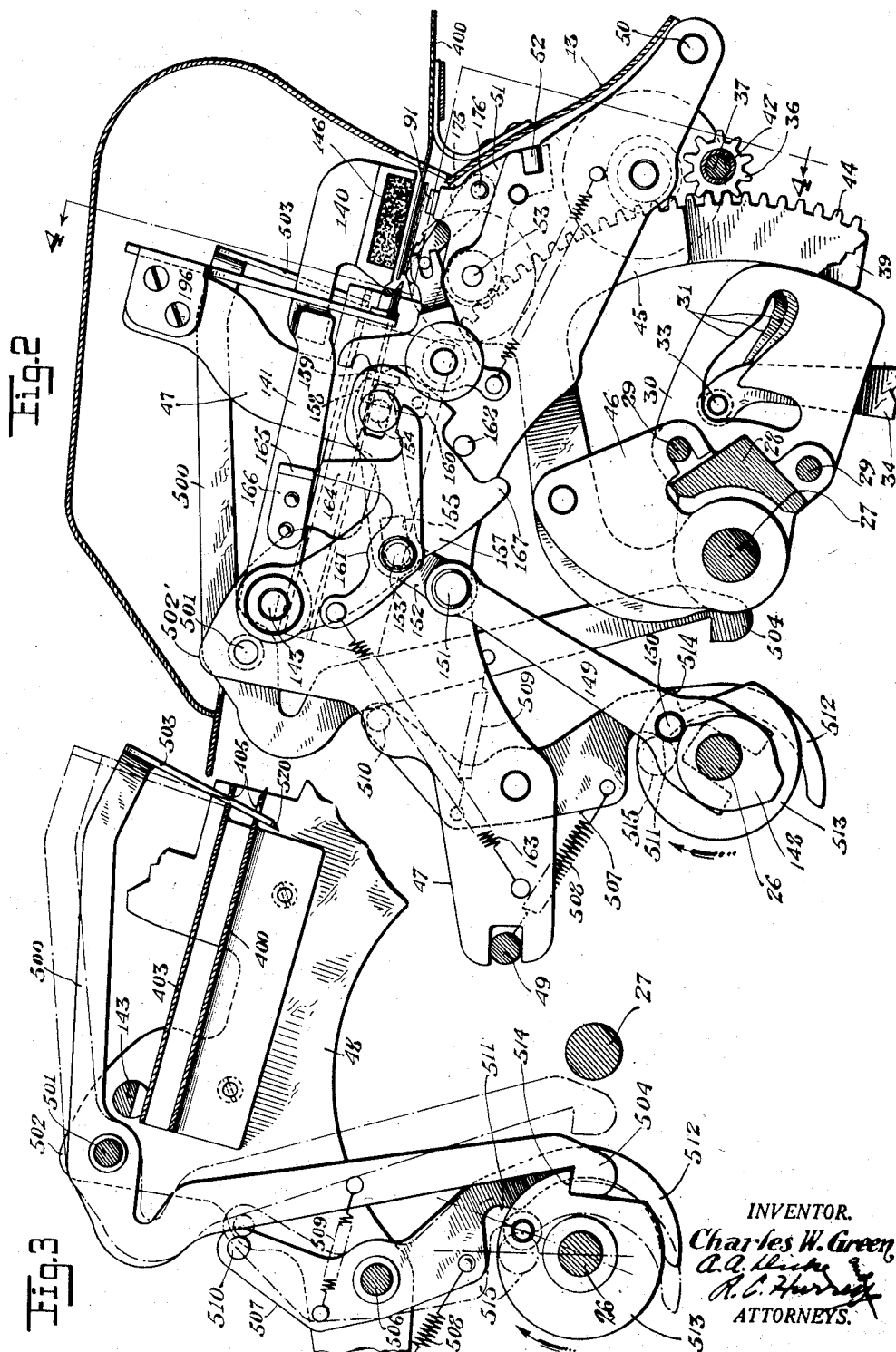
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CASH REGISTER

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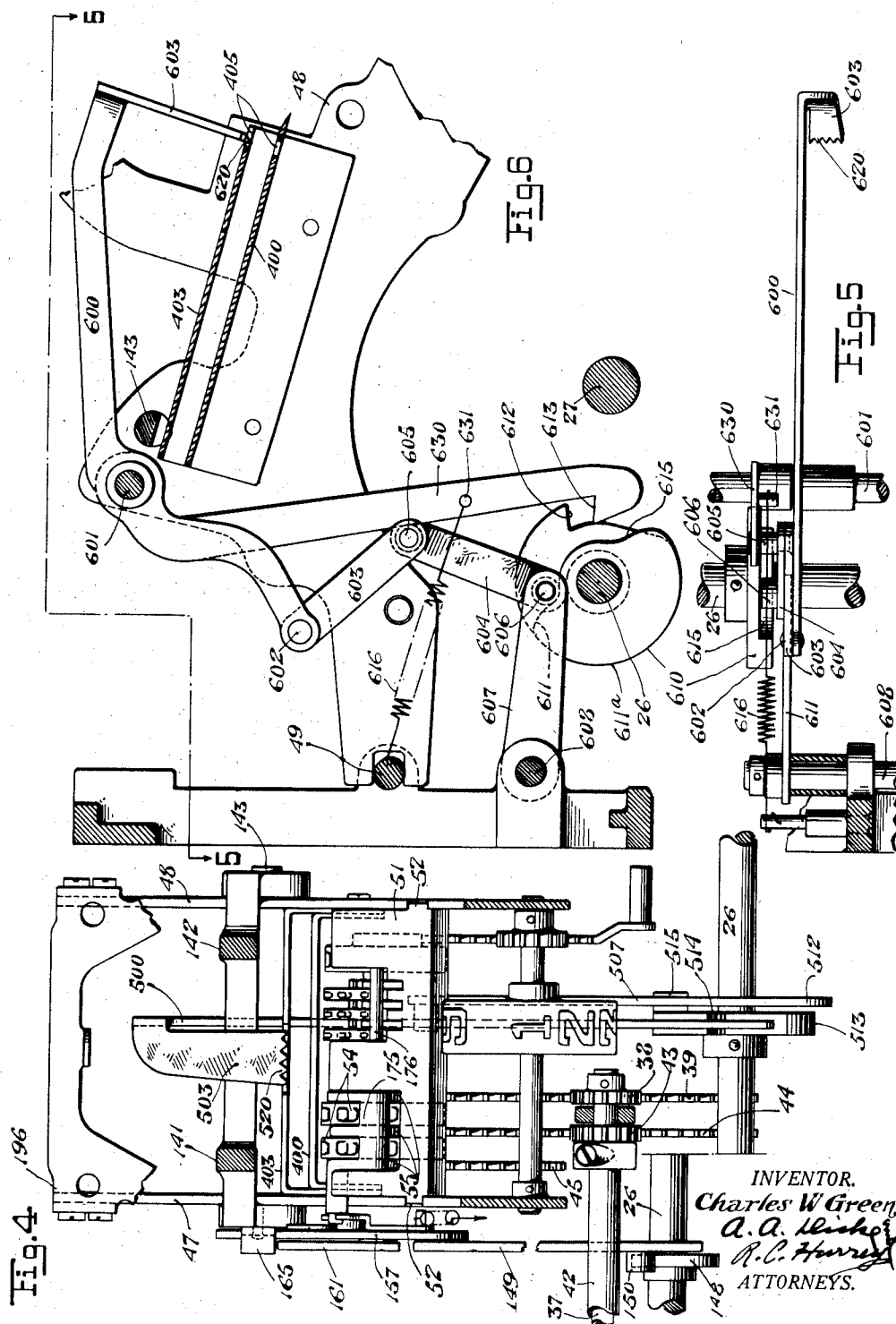
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,965,740

CASH REGISTER

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mesne assignments, to The National Cash Reg-
ister Company, Dayton, Ohio, a corporation of
Maryland

Application August 31, 1931, Serial No. 560,325

13 Claims. (Cl. 101—93)

The invention relates to improvements in cash registers, particularly in the means for printing items registered upon an inserted slip.

It is an object of this invention to provide means whereby the machine will be locked against operation unless a slip has been inserted in the printer.

It is a further object of this invention to prevent withdrawal of a slip, once it has been inserted, until completion of the printing operation.

It is a further object of this invention to release the slip and permit its withdrawal at once upon completion of the printing operation, and before the operation of the machine as a whole has been completed.

With these and incidental objects in view the invention consists in certain novel features of construction and combination of parts, the essential elements of which are set forth in the appended claims, and a preferred form of embodiment of which will now be described with reference to the drawings which accompany and form part of the specification.

Of said drawings:—

Fig. 1 is a sectional view of the illustrative machine taken substantially through its mid-portion, the machine being shown with the improved devices applied thereto. This view shows particularly the differential devices, the platen operating mechanism and other details of the slip printing device.

Fig. 2 is a view in side elevation of the slip printing devices, showing the differential devices, the platen operating mechanism, and the machine locking means.

Fig. 3 is a detail view of the locking means.

Fig. 4 is a sectional view on the line 4—4 of Fig. 2.

Fig. 5 is a view on the line 5—5 of Fig. 6.

Fig. 6 is a side elevation of a modified form of locking means.

This particular embodiment of the invention is an adaptation of the machine disclosed in the application of H. F. Sadgebury, Serial No. 137,664 filed September 25, 1926. Except for the addition of the locking means of the instant invention, the machine of that application is substantially identical with that herein disclosed. It is to be understood, however, that the invention is applicable to various machines.

When it is desired to have a cash register print certain data upon an inserted slip, various problems arise. The applicant has discovered that due to carelessness on the part of the operator, the slip may not be inserted at all, or only part

way, so that no printing occurs. This defect is remedied by the present invention which comprises means to prevent operation of the machine until a slip has been placed properly in printing position.

The slips used frequently are not at all rigid and will not transmit pressure in a lengthwise direction. In such a case the slip cannot be used to move a trigger or latch and thus release the machine. In fact, it is absolutely requisite that there be nothing whatever in the path of the slip which might in any way impede its insertion.

A further problem arises in such machines. Printing usually will not occur until the operation of the machine is well under way, in the instant case, not until nearly the end of the downward stroke of the keys. It is quite possible for the operator, acting in haste, to attempt to withdraw the slip after the machine is unlocked, but before printing takes place. It is desirable, therefore, to provide some means for preventing withdrawal of the slip until printing has taken place. In the interest of efficiency the slip should be released to permit withdrawal at the earliest possible moment. Accordingly, the slip retaining means should be released immediately after printing, whether or not the operation of the machine as a whole is complete.

The above summarizes the problems which are solved by this invention.

A description of the machine follows:

The amount keys 10 (Fig. 1) are loosely pivoted upon a key shaft 11 so that they may be moved through an angle about said shaft as a pivot. The amount keys 10 are guided in their movements at their forward ends by slots 12 formed in a cabinet 13, and at their rearward ends by slots formed in a plate 14 which is attached to a portion of the framework. Resting upon the rear ends of the keys is a key coupler 15 provided with trunnions 16 by which it is pivoted, and with a flange 17 co-acting with notches 18 formed in each of the operating keys. The key coupler serves in the usual way to insure simultaneous and uniform depression of the keys.

The key coupler is provided with a pin 19 extending through a horizontal slot 20 in an upright double rack member 21. The rack has a slot 22 embracing a fixed pin 23 and is thus guided in its vertical movement by the pin, but is rocked around the pin so that the sets of teeth 24 and 25, carried by the rack member 21 will alternately engage a pinion (not shown) attached to the driving shaft 26 of the machine.

The shaft 26 is the main shaft of the machine and carries cams and other devices for operating certain mechanisms which will be described hereinafter. This arrangement of operating mechanism is similar to that shown in the United States patent to Frederick L. Fuller, 1,742,701 issued January 7, 1930 to which reference may be had for a more complete description.

The differential mechanisms or devices controlled by each of the various banks of keys for adjusting type carriers are all similar in construction and principle and the description of these devices will therefore be confined to that associated with the dollars bank of keys.

Loosely mounted upon a transverse shaft 27 is a frame 28 provided with spaced slots in which are inserted and secured by pins 29 a series of cam plates 30. The cam plates 30 are provided with differentially inclined slots 31, the slot in each cam plate being correlated with a roller 33 carried by an upstanding arm 34 of the adjacent operating key 10. From the foregoing, it will be evident that upon the depression of an amount key a differential movement will be imparted to the frame 28 and to the connected devices which will now be described.

In the illustrated machine the differential devices besides having other functions are utilized to adjust a plurality of type carriers for printing the amounts upon an inserted slip. To this end the differential frame 28 has connected thereto a segmental rack 35 which meshes with a pinion 36 attached to a transverse shaft 37. The other end of the shaft carries a pinion 38 (Fig. 4) which meshes with a segment 39 similar to the segment 35 but loose on the shaft 27.

A similar type of connection is effected between the differential devices for the dimes bank and the actuating segment for differentially adjusting the dimes type carrier, and in the present instance a segment rack similar to the rack 35 is attached to the dimes differential frame and meshes with a pinion attached to one end of a sleeve 42 (Fig. 4). The sleeve 42 carries at its other end a pinion 43 meshing with a segment 44.

In order to adjust the cents type carrier the differential frame 28 (Fig. 2) associated with the cents bank of keys has connected thereto a segmental rack 45. The segmental rack 45 is loosely mounted upon the shaft 27 but is connected to the differential frame 28 by the type of connection shown in Fig. 2 which comprises the plate 46, connected by a pin or rivet to the rack 45 and by means of a hook to one of the pins 29 of the frame.

The devices for printing on the inserted slips are, in the main, carried by two side frames 47 (Fig. 1) and 48 (Fig. 4). The side frames are connected together in spaced relation by shafts and cross members so that most of the elements comprising the printing devices may be carried by said framework. The framework is supported at its rear end by a transverse pin 49 and at its forward end by a pin 50 both of which pass through ears integral with the machine framework. By reason of this construction the printing unit as a whole may be readily detached from the machine for the purpose of inspection, adjustment, etc.

The type carriers forming part of the slip printing devices are carried by an independent frame or casting 51 (Fig. 4). The frame 51 extends between the side frames 47 and 48 and is provided with rectangularly formed ears 52 fitting

within similarly formed notches in each of the frames 47 and 48. The frame 51 carries a shaft 53 (Fig. 2) which is the supporting shaft for the item type carriers 54. Each of the item type carriers 54 is provided with a pinion 55 (Fig. 4) meshing with the teeth of its associated rack 39, 44 and 45, so that by the connections just described, the differential devices may adjust the associated type carriers to positions determined by the keys depressed. The type carrier associated with the cents bank of keys differs from the dollars and dimes type character, since the dollars type carrier is provided with a "\$" character and the dimes type carrier is provided with a period or decimal point.

The platen for effecting printing impressions from the printing elements comprises a cross member 140 (Figs. 1 and 2) integral with which are two rearwardly extending arms 141 and 142, said arms being pinned to a shaft 143 extending between the frames 47 and 48. The cross member 140 has affixed to it a rubber impression block 146 of sufficient size to overlie all the printing elements.

In order to effect a printing impression at the proper time the following mechanism is provided.

Mounted upon the driving shaft 26 is a cam 148 (Fig. 2) adapted to elevate a pitman 149 since the latter carries a roller 150 cooperating with the profile of the cam. The pitman 149 is connected by a pin 151 to a bent plate 152, which carries two studs 153 and 154 fitting in slots 155 and 156, respectively, which are inclined at different angles and formed in a plate 157 loosely mounted upon the platen supporting shaft 143. The forward end of the bent plate 152 terminates in a forward projection 153 normally engaging a lug 159 integral with a bracket 160 attached to the side frame 47. The stud 153 serves as the pivotal point of a retracting pawl 161 which is urged by a spring 163 so that its forward extension engages the head of the stud 154 and its upward extension 164 cooperates with a lug 165 integral with a member 166 attached to the platen supporting arm 141. The plate 157 is cut away to form a shoulder 167 adapted to cooperate with a stud 168 carried by the printer side frame 47.

The operation of the parts just described is as follows: During the downward depression of one of the operating keys, at which time the item type elements are being adjusted differentially, the shaft 26 will be rotated and due to the profile of the cam, the pitman 149 will be raised. Since the bent plate 152 is connected to the pitman 149 by the pin 151, it will also be elevated. Elevation of the bent plate 152 will also raise the retracting pawl 161 and due to the pin and slot connection between the bent plate 152 and the plate 157, the latter will be rocked counter clockwise, it being understood that during this time the cooperation of the extension 164 with the lug 165 will gradually lift the platen upwardly against the tension of a spring (not shown) until the platen is some distance away from the adjusted type carriers.

At substantially the time the type carriers are differentially adjusted and are stationary, the high point of the cam 148 cooperating with the roller 150 will give the bent plate 152 a further upward movement, but at this time the shoulder 167 will be in engagement with the stud 168 and further clockwise movement of the plate 157 is prevented. As the pitman 149 is still further elevated, it will produce a movement of the plate 150

152 toward the right in Fig. 2, the direction of movement being governed by the sliding of the studs 153 and 154 in the slots 155 and 156, respectively. At a certain point in the operation, the extension 164 of the retracting pawl which, at this time was moved upwardly and forwardly, will slide off and be disengaged from the lug 165 permitting the spring to retract the raised platen, thereby effecting an impression upon the slip paper from the type.

It will be understood that the above described mechanism forms no part of the present invention, but is disclosed to provide a better understanding of the operation of my device.

In Fig. 1 is shown a table 400 attached by means of brackets 401 and 402 to the casing 13. This table supports the slip for insertion into the printing mechanism.

Referring to Figs. 2 and 3, a bell crank 500 is pivoted on a shaft 501 which passes through ears 502 and 502' formed on the frame members 48 and 47, respectively. At the forward end of the bell crank 500 is a downwardly extending feeler tongue 503. Rearward of the shaft 501, the bell crank 500 extends downwardly and terminates in a hook 504.

The rearward portions of the frame members 47 and 48 support a shaft 506 on which is pivotally mounted a lever 507. Below the shaft 506, a spring 508 is attached to the lever 507 and tends to rotate the same clockwise. Another spring 509 considerably less in strength than the spring 508 is connected at one of its ends to the bell crank 500 and at its other end to the lever 507, above the shaft 506. The effect of this spring 509 is to draw the lever 507 toward the bell crank 500 and also to rotate the bell crank clockwise. At the upper end of the lever 507 is a lug or pin 510 which normally bears against the bell crank 500. At its lower end, the lever 507 is formed with an abrupt cam surface 511 and a hook-shaped portion 512.

It will be noted that the lower end of the lever 507 and also the hook 504 on the bell crank 500 are adjacent the shaft 26 which, as previously described, must make a full rotation at every operation of the machine.

On shaft 26 is mounted a disk 513 having a cutaway portion which forms an abrupt shoulder 514 for co-action with the hook 504 on the bell crank 500. If the hook engages the shoulder, the machine will be locked against operation.

The disk 513 carries near its periphery a pin 515. This pin is designed to co-act with the cam portion 511 and the hook-shaped portion 512 of the lever 507.

The slip to be printed is inserted in a passage between the table 400 and a plate 403. These plates are apertured as shown at 405 to permit passage of the feeler tongue 503. It will be evident from Fig. 2 that unless a slip be inserted, so as to extend fully over the printing wheels, it cannot be brought into the path of the feeler tongue 503.

The normal position of the parts is shown in dotted lines in Fig. 3. The bell crank 500 is in raised position, held so by the pressure of the pin 510 on the lever 507 under the tension of the spring 508. The lug 515 on the disk 513 is on the vertical center line of the disk and the shoulder 514 is as shown in the dotted line view. The hook 504 on the bell crank 500 at this time rests against a stop 510.

Assuming now that a key is depressed, and that no slip is in place, the disk 513 will be rotated.

The pin 515 will contact with the cam surface 511 of the lever 507 and will rock the lever counter clockwise, thus relieving the bell crank 500 of any effect of the spring 508. The bell crank will then be rocked clockwise under the action of the other and lighter spring 509. This motion will cause the tongue 503 to pass through the apertures 405 in the plates 400 and 403, there being no slip to prevent such passage. As a result, the hook 504 will rock towards the disk 513 and will engage the shoulder 514 thus locking the machine against further operation.

If a slip be inserted so as to overlie the aperture 405 in the plate or table 400, the tongue 503 on the bell crank 500 will be prevented from descending to its fullest extent. This will hold the hook 504 in such position that it will not contact with the shoulder 514 on the disk 513. The machine will not be locked, and so the operation may be completed.

In order to prevent a too hasty withdrawal of the slip, the lower end of the tongue 503 is provided with teeth 520, sharpened and inclined so as to bite into the material of the slip and prevent retrograde movement.

It is desirable that the slip be retained in position until printed, and then immediately be released. This is done by the co-action of the pin 515 on the disk 513 with the hook-shaped lower portion 512 of the lever 507. If the lever 507 were terminated at the end of the cam surface 511, the lever would be released as soon as the pin 515 rode over said cam surface. By means of the hook-shaped end 512, the inner surface of which is substantially concentric with the disk 513, the pin 515 is enabled to hold the lever 507 retracted, thus allowing the spring 509 to hold the teeth 520 on the tongue 503 against the slip. The length of the hook-shaped portion 512 is such that as soon as printing takes place, the pin 515 rides past the end of the portion, and the parts spring back to normal, releasing the slip.

Figs. 5 and 6 show a modified form of mechanism for accomplishing the same result. This form comprises a lever 600 rotatable on a shaft 601. The forward end of the lever carries a downwardly projecting tongue 603 at the end of which are teeth 620 similar in form and function to the teeth 520 on tongue 503 (Fig. 3). Rearward of the shaft 601, the lever 600 is inclined downwardly. At its lower terminus it is pivoted (602) to the upper one 603 of a pair of toggle links 603 and 604. The lower end of the lower link 604 is pivoted on a pin 606 to a link 607. The other end of the link 607 is pivoted at 608 to the machine frame. The pin 606 projects laterally (Fig. 5) and bears on a cam surface 611 of a disk 610. The disk is mounted on the shaft 26 and rotates therewith. The pin 605 also projects laterally and bears against a lever 630.

The last mentioned lever (630) is also rotatable on the shaft 601. At its lower end is a hook 613 to cooperate with a shoulder 612 formed on one portion of the disk 610. A spring 616 secured at one of its ends to the machine frame has its other end secured to a pin 631 on the lever 630. This spring acts to draw the lever 630 toward the shaft 26. Due to the fact that the lever 630 bears against the pin 605, the spring 616 tends, by straightening the toggle, to rock the lever 600 clockwise, thus lowering the tongue 603 through the apertures 405 in the plates 403 and 400.

The operation is as follows:

The normal position of the parts is shown in Fig. 6. The hooks 613 of the lever 630 is drawn

by the spring 616 so as to rest against the disk 610. The balance of the parts is such that the tongue 603 is in raised position, and the pin 605 rests against the lever 630.

5 If a slip be inserted and a key depressed, the shaft 26 will begin to rotate. The cam surface 611 of the disk 610 will then lift the pin 606. The spring 616 will restrain the toggle against breaking, hence the pivot 602 will be raised, lowering the tongue 603 until its teeth 620 engage the slip. 10 The resistance of the slip is sufficient to restrain the lever 600 against further movement, and continued lifting action of the cam 611 will break the toggle, forcing the pin 605 and consequently the lever 630 laterally. The hook 613 is thus forced out of the path of the shoulder 612 on the cam 611, and the machine is free to operate.

The pin 606 will be supported on the high, concentric portion 611a of the cam 610, thus holding the teeth 620 of the tongue 603 in engagement with the slip, and preventing withdrawal.

At the time printing occurs, the portion 615 of the disk 610 is coming under the pin 606 and will allow the pin 606 to drop, thus lifting the tongue 603 and freeing the slip.

25 If no slip is present, the lifting movement of the pivot 602 continues and the position of the lever 630 is undisturbed, hence locking will occur between the hook 613, and the shoulder 612 on the disk 610.

It will be understood that regardless of which mechanism is used, only about $4\frac{1}{2}$ degrees of rotation of the key lever 10 about the shaft 11 is necessary to bring the parts into locking condition, or to free them, as the case may be.

The form of mechanism herein described is well adapted to fulfill the objects stated, but, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein shown, since it may be embodied in various forms, all coming within the scope of the claims which follow:

What is claimed is:

1. A key-operated register having means for printing upon an inserted slip; means normally clear of the slip for sensing the presence or absence of a slip; means for actuating the sensing means at the start of an operation of the machine; and means controlled by said sensing means for preventing continuance of such operation of the machine if no slip be present.

2. In a cash register, keys to operate the machine; means for printing upon an inserted slip; a feeler bar for sensing the presence or absence of a slip; means controlled by said keys for actuating the feeler bar at the start of an operation of the machine by the keys; and means controlled by said feeler bar for locking the machine and keys against the continuance of such operation if no slip be present.

3. A cash register having machine operating keys; a shaft to operate the machine, said shaft rotated by each operation of the keys; means for printing upon an inserted slip, including a passage to receive the slip in printing position; a feeler; means normally holding said feeler clear of said passage; means actuated by said shaft for projecting said feeler across said passage; means for locking said shaft against rotation and thereby arresting the operation of the machine; and means whereby interception of the movement of said feeler will prevent engagement between said locking means and said shaft.

4. A cash register having machine operating keys; a shaft to operate the machine, said shaft

positively rotated by each operation of the keys; means for printing upon an inserted slip including a passage to receive said slips in printing position; a feeler bar; resilient means tending to project said feeler bar across said passage; resilient means normally holding said feeler bar clear of said passage; means on said shaft for disabling said last named means at the start of an operation of said keys; and means controlled by said feeler bar for locking said shaft, and through the shaft locking said keys against continuance of such operation if no slip be present.

5. A cash register having means for printing upon an inserted slip; means for sensing the presence of a slip; means controlled by said sensing means for locking the machine against operation in the absence of a slip; means on said sensing means for retaining said slip against withdrawal; and means for releasing said retaining means on completion of a printing operation.

6. A cash register having operating keys; a shaft rotated by each operation of the keys; means for printing upon an inserted slip including a passage to receive the slips in printing position, a pivoted lever having at one end a feeler bar adapted to pass transversely through said passage and having at its other end a laterally projecting shoulder; a spring urging said feeler bar toward said passage; a pivoted spring urged arm bearing against said lever and holding said feeler bar out of the passage; a cam on said shaft adapted to rock said arm out of engagement with said lever; and a shoulder on said cam adapted to engage the shoulder on said lever to lock said shaft.

7. A cash register having operating keys; a shaft rotated by each operation of said keys; means for printing upon an inserted slip including a passage to receive said slip in printing position; a feeler bar normally clear of said passage; means actuated by said shaft for projecting said feeler bar across said passage; locking means for said shaft normally in locking position; and means whereby interception of the movement of said feeler bar disables said locking means.

8. A cash register having operating keys; a shaft operated by each operation of said keys; a cam disk on said shaft; means for printing on an inserted slip including a passage to receive said slip in printing position; a pivoted lever having at one end a feeler bar adapted to pass transversely through said passage; a toggle connected at one end to said lever; a laterally projecting pin at the central joint of said toggle, the opposite end of said toggle being guided and having a pin bearing on said cam disk; an arm, pivoted at one end having a shoulder at its free end, said shoulder being resiliently drawn into contact with said cam disk, the central portion of said arm bearing against said central pin on said toggle; and a shoulder on said cam disk adapted to lock against the shoulder on said arm.

9. A device for printing upon an inserted slip including means for sensing the presence of a slip; means controlled by said sensing means for locking the device against operation in the absence of a slip; means on said sensing means for retaining said slip against withdrawal; and means for releasing said retaining means on completion of a printing operation.

10. A device for printing upon an inserted slip including a main operating shaft; a pivoted lever having at one end a feeler bar for sensing the presence or absence of a slip in the device, and having at its other end a laterally projecting

shoulder; a spring urging said feeler bar into sensing position; a pivoted, spring urged arm bearing against said lever and holding said feeler bar out of sensing position, a cam on said shaft
5 adapted to rock said arm out of engagement with said lever; and a shoulder on said cam adapted to engage the shoulder on said lever to lock said shaft.

11. A device for printing upon an inserted slip
10 including a main operating shaft, a cam disk on said shaft; a pivoted lever having at one end a feeler bar adapted to sense the presence or absence of a slip in the device; a toggle connected
15 at one end to said lever; a laterally projecting pin at the central joint of said toggle, the opposite end of said toggle being guided and having a pin bearing on said cam disk; an arm, pivoted at one

end, and having a shoulder at its free end, said shoulder being resiliently drawn into contact with said cam disk; the central portion of said arm bearing against said central pin on said toggle; and a shoulder on said cam disk adapted to lock against a shoulder on said arm. 30

12. In a machine of the class described, a slip receptacle adapted to receive an insertable slip, a slip feeler, and means on the feeler to retain the slip in the receptacle. 35

13. In a machine of the class described, a slip receptacle adapted to receive an insertable slip, a slip feeler, means on the feeler for retaining said slip against withdrawal, and means for releasing the retaining means during the operation of the machine. 40

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