March 15, 1932. C. W. GREEN 1,849,921

PRINTING MECHANISM

Filed Nov. 29, 1926 2 Sheets-Sheet 1

Fig.1

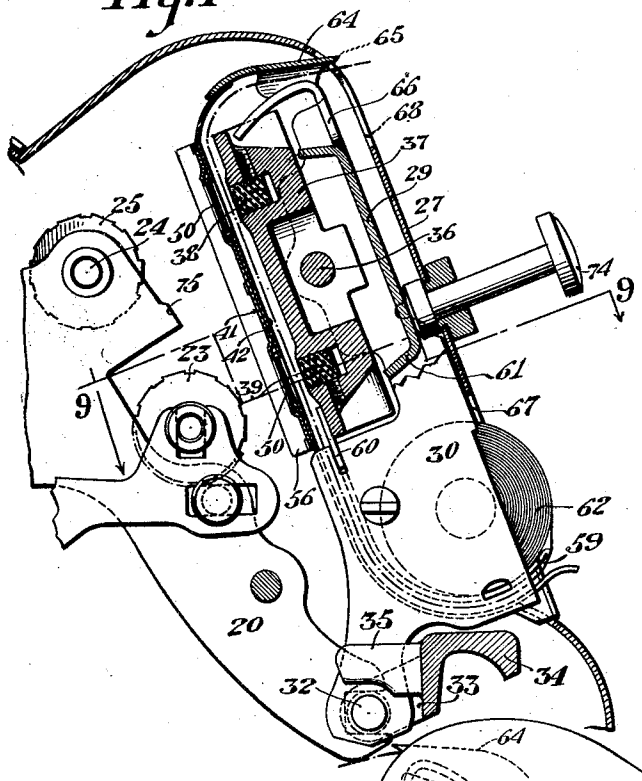


Fig.2

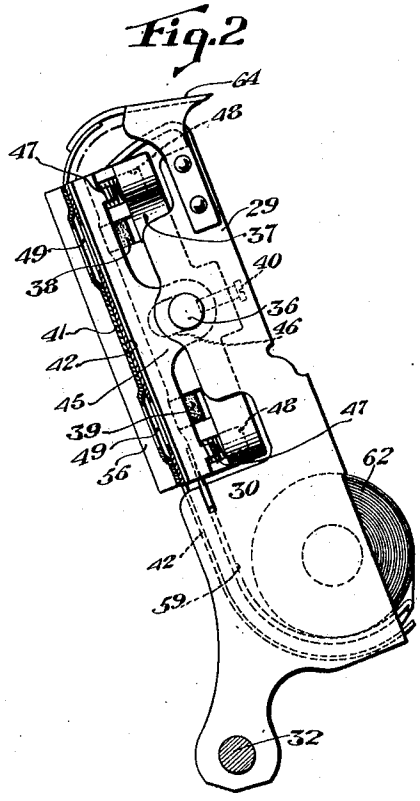
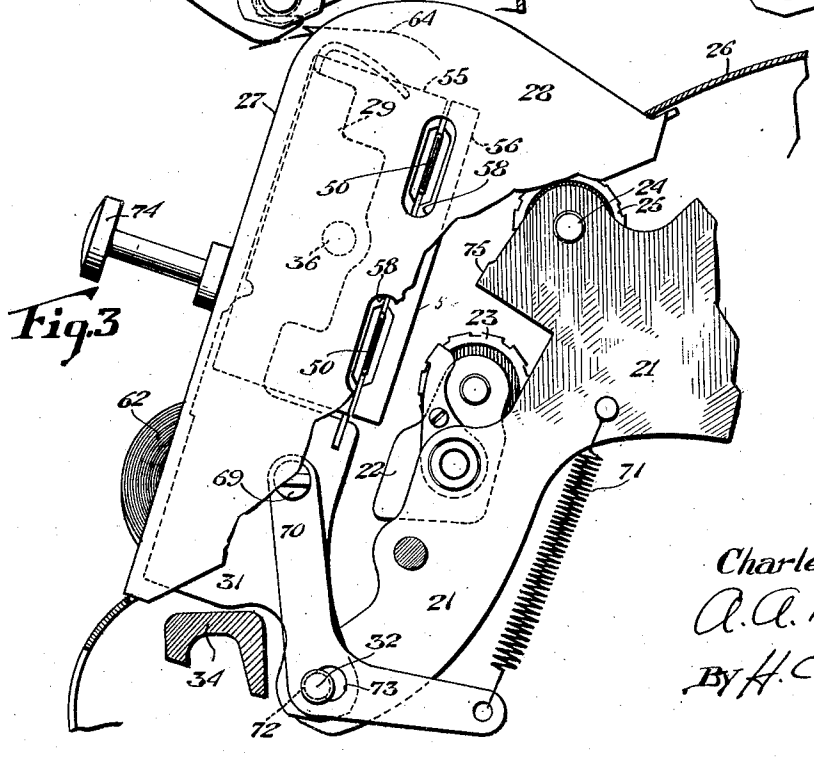


Fig.3



Inventor

Charles W. Green

A. A. Hicke Jr.

By H. C. Miessner

Attorneys

March 15, 1932. C. W. GREEN 1,849,921

PRINTING MECHANISM

Filed Nov. 29, 1926 2 Sheets-Sheet 2

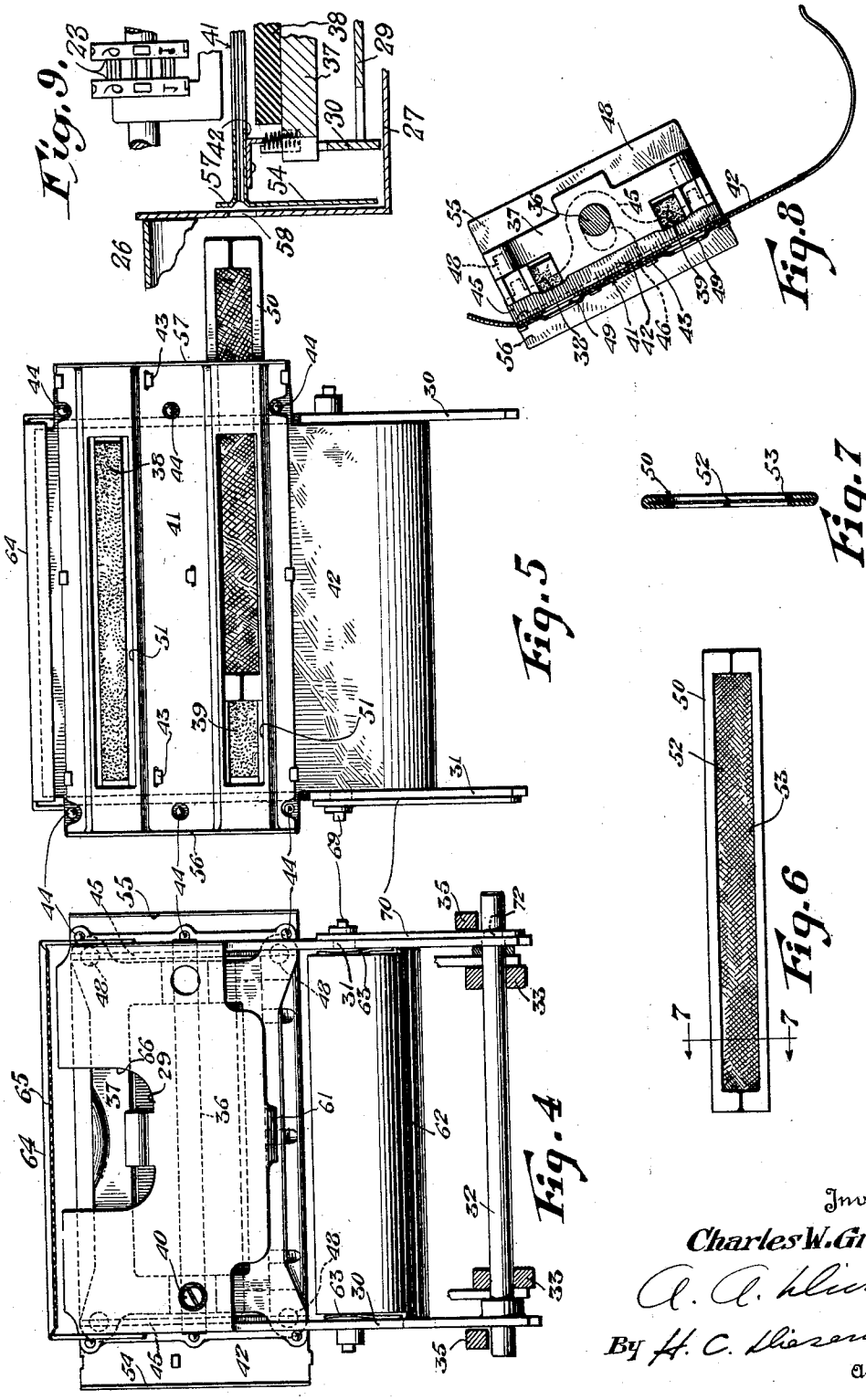


Fig. 9.

Fig. 8

Fig. 7

Fig. 5

Fig. 6

Fig. 4

Inventor
Charles W. Green
A. A. Klicke Atty
By H. C. Diezemann
Attorneys

Patented Mar. 15, 1932 1,849,921

UNITED STATES PATENT OFFICE

CHARLES W. GREEN, OF ILION, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF MARYLAND

PRINTING MECHANISM

Original application filed March 6, 1925, Serial No. 13,470. Divided and this application filed November 29, 1926. Serial No. 151,293.

This invention relates to printing mechanisms and the embodiment thereof selected for the purpose of illustration is particularly adapted for use in a cash register, although it is susceptible of ready adaptation for use in other types of accounting or printing machines and analogous devices.

This application is a division of the application of Charles W. Green, Ser. No. 13,470, filed March 6, 1925, to which application reference may be had for a complete disclosure of the cash registering mechanism and other devices not herein shown.

The cash register shown and described in the parent application above identified comprises sets of keys representing numbers, and registering and indicating devices under the control of said keys. A registering device or totalizer is provided for accumulating the total of all the items entered in the machine and there is furthermore provided a number of item counting or registering devices which are intended to afford complete information regarding the particular use of the cash register during an arbitrary period.

In cash registers of the general class shown and described in the parent application, the total of the sales registered and other information is usually obtained by reading the amounts standing upon the totalizer elements and other registering devices. It is preferable, however, to have this information printed upon a record bearing material as it then forms a permanent and unchangeable record which may be referred to at any time.

It is the main object of the present invention to provide an improved construction of the printing mechanism for accomplishing the above result which is inherently simple in construction and effective in operation.

Among the objects of the invention is to provide a printer of the class specified having improved inking devices, improved record holding devices, and improvements in the platen employed whereby the construction of said printer is rendered more simple and desirable and less liable to get out of order and whereby the operation thereof is rendered more simple and effectual. One construction by which the desired results are obtained is illustrated by the accompanying drawings in which:

Fig. 1 is a fragmentary sectional view taken through the improved machine shown in the parent application showing particularly the totalizing or printing elements and their relation to the improved printing mechanism for effecting printing from the elements upon a record bearing material.

Fig. 2 is an end view of an assembly of the printer.

Fig. 3 is a view in side elevation of the side of the printer opposite to that shown in Fig. 2. This view shows the printing mechanism in relation to the cabinet covers.

Fig. 4 is a front view of the printer.

Fig. 5 is a back view of the printer showing the platens which force the inking ribbons against the type and showing how a new ribbon frame may be readily inserted.

Fig. 6 is a plan view of the ribbon and its associated supporting frame.

Fig. 7 is an enlarged sectional view taken through the ribbon supporting frame on line 7—7 of Fig. 6.

Fig. 8 is an end view of the platen unit showing the rubber impression blocks and their relation to the plates for supporting the inking ribbon frames.

Fig. 9 is a fragmentary transverse sectional view taken on line 9—9 of Fig. 1.

Referring to Figs. 1 and 3 it will be noted that the illustrative machine is provided with two side frames 20 and 21 between which is journaled a rockable frame 22 carrying a series of total printing elements 23. These elements as shown for the purpose of illustration are in the form of wheels and the peripheries are provided with raised printing characters. Also journaled in the frames 20 and 21 by means of a transverse shaft 24 is a supplemental series of printing elements 25 which are similar in form to the printing elements 23. The illustrative machine is provided with two lines of printing elements but this number is not essential and to practice the present invention a single line of type or more than two lines may be utilized and, furthermore, any other form of type printing elements may be employed so that

they may be adapted to print any desired data upon the record bearing material through the use of the improved printing mechanism to be hereinafter described. The interior mechanism is enclosed by a cabinet 26 which may be made of any desired material. The printing and other associated mechanisms are concealed by a cover 27 having side plates 28, the cover being rigidly attached to the cabinet 26 but being apertured so as to permit access to some of the parts.

In general the printing mechanism comprises a printing frame which is pivotally mounted and adapted to be manually swung about its pivot by the use of a knob or key to carry a pair of impression elements against the two lines of printing type already described. This frame is normally spring-held in its outward position and is provided with suitable inking devices and means for carrying and guiding the record strip. The details of construction of the various elements of the printer will now be described.

Referring to Fig. 4 it will be noted that the printing frame comprises a plate 29 integral with which are two side plates 30 and 31 the lower ends of which are apertured to receive a shaft 32 carried by ears 33 integral with a cross bar or frame piece 34 (Fig. 1). All of the associated printing members are carried by the frame just referred to and in order to prevent lateral movement of the printing mechanism the cross bar 34 is provided with rearwardly extending projections 35 (Figs. 1 and 4) between which the lower end of the printer is positioned. Journaled in the side plates 30 and 31 at their upper portions is a shaft 36 (Figs. 1 and 4) forming the pivotal point of a platen 37 (Fig. 8) carrying upper and lower rubber impression blocks 38 and 39, respectively. In order to retain the shaft 36 in the proper position there is provided a set screw 40 (Figs. 2 and 4) mounted in the platen 37 and adapted to contact with a groove in the shaft 36, and since the platen is prevented from an appreciable lateral movement by the side plates 30 and 31, the shaft 36 is likewise retained in position.

The ribbon supporting plates are comprised by two parallel plates 41 and 42 which may be attached to each other by any suitable means such as bent-over lugs 43 (Fig. 5). The ribbon supporting plate 42 has attached thereto, by means of rivets 44 a pair of plates 45 (Figs. 2, 4 and 8) fitting between the side plates 30 and 31 and the sides of the platen 37 substantially at right angles to the plate 42, and they are formed with elongated slots 46 to receive the platen supporting shaft 36. Springs 47 (Fig. 2) extend between projections on the plates 45 and the base of sockets 48 formed in the platen 37. By means of the four springs 47 the ribbon supporting plates 41 and 42 will be forced away from the rear face of the platen to the position shown in Figs. 1 and 2 wherein it will be noted that there is normally a considerable clearance between the plate 42 and the face of the impression blocks 38 and 39, thus facilitating the insertion of a paper strip in a manner which will be described hereinafter in detail.

It will also be noted from an inspection of Figs. 2 and 8 that the supporting plates 41 and 42 are suitably bent so as to form channels 49 located just beneath the impression blocks 38 and 39 for the reception of a ribbon carrying frame or plate 50 (Fig. 1) and that plates 41 and 42 are apertured at 51 (Fig. 5) so as not to interfere with the printing action when the printing frame is rocked.

The inking ribbon 52 comprises a narrow strip of ribbon (Figs. 6 and 7) which is held or fixed in the frame 50 apertured at 53 and which is formed by bending so as to grip the ribbon. This construction permits the detachment of an old ribbon from the printer and the insertion of a new one without touching the moistened ribbon itself. There is a ribbon frame for each printing line so that they can be removed or replaced independently of each other. When it is desired not to print the information set upon a certain line of type this can readily be done by removing the associated printing ribbon.

Referring to Fig. 1 it will be noted that the ribbon supporting plate 42 extends upwardly as well as downwardly from the section opposite the impression blocks and is curved so as to suitably guide the paper when it is inserted in the printing frame. The plate 42 also extends laterally beyond the side plates 30 and 31 and is bent transversely at 54 and 55 (Figs. 2, 3, 4 and 8) while the plate 41 is bent similarly to form side plates 56 and 57 (Figs. 3, 5 and 8). The guard plates thus formed are adapted to cover at times the ribbon receiving apertures 58 (Fig. 3) in the side 28 of the cover 27 for a reason which will be explained hereinafter.

Also extending between the side plates 30 and 31 is a curved plate 59 (Figs. 1 and 2) which is securely held in place by means of lugs 60 projecting through slots formed in the side plates 30 and 31 and this curved plate serves as a support and guide for the record material. It will be noted in Fig. 1 that the upper end of the fixed curved plate 59 contacts with the lower rear edge of the pivoted platen 37 thereby limiting the rocking movement of the platen in a clockwise direction as viewed in Fig. 1 under the influence of the upper springs 47, while a lug 61 (Figs. 1 and 4) integral with the plate 29 will hold the platen against a counter-clockwise movement if the lower springs 47 should exceed the force of the upper springs and urge it in this direction.

As is best shown in Fig. 1 the paper strip is drawn from a roll 62 which rests upon the concave surface of the curved plate 59 the roll being held in the proper position by means of spring plates 63 (Fig. 4) which are secured to the side plates 30 and 31. The end of the paper strip is inserted between the plates 42 and 59 which guide it over the rear face of the platen 37 after which it will be guided by the upper curved portion of the plate 42 so that it passes forwardly under a plate 64 (Fig. 1) which is riveted or otherwise secured to the side plates 30 and 31 and is formed at its extreme forward edge with serrations 65 adapted to facilitate the tearing of a section of a record strip from the rest of the roll. From an inspection of Fig. 4 it will be noted that the plate 29 is cut away at 66 so as to permit the insertion of a finger to draw the upper portion of the record strip outwardly before detaching a section of it from the rest of the roll.

The relation of the printing devices to the cabinet cover is best shown in Fig. 1 wherein it will be noted that the cover 27 is apertured at its lower end at 67 to receive the roll of paper and is also apertured at 68 in line with opening 66 of plate 29 to permit the insertion of a finger to draw out the printed record strip. The side portions 28 of the cover 27 are provided with the four elongated apertures 58, two of which are shown in Fig. 3 and are duplicated on the opposite side these being provided for the purpose of permitting a new ribbon frame to be inserted in the printer when the printer is in its normal position. When the printing mechanism is in its normal or raised position and it is desired to insert a new ribbon frame, the latter is merely inserted in the aperture 58 and by forcing it laterally the old frame will be ejected sufficiently to permit the withdrawal by the fingers so that the printer may then fully accommodate the new ribbon frame.

In some instances it would be of particular advantage to persons who are permitted to obtain the printed information from the machine to fraudulently manipulate the printing elements if that could be done so as to print information other than that which is proper and correct. In order to guard against such a mis-operation the printing mechanism is so constructed and provided with shields as to prevent the insertion of an instrument in the various apertures in the cabinet.

One way in which it might be possible to manipulate the printing wheels if no protective means were provided would be to withdraw one of the ribbon frames and insert a wire or some other instrument in one of the apertures 58 in the side 28 of cover 27, and through the apertures 51 until the wire strikes one of the printing elements in such a manner as to rotate it fraudulently. It is evident that this mis-operation would be facilitated if the platen were swung rearwardly and brought close to the printing type as in a printing operation.

It is in this connection that plate 42 is bent laterally to form the side plates 54 and 55 while the plate 41 similarly is bent to form side plates 56 and 57. Each plate is in a plane adjacent and fits closely against one or the other of the sides of the cover 27 for the printer. It will be understood, therefore, that whenever the printer frame is moved rearwardly toward the type wheels the apertures 58 will be covered by means of the plates 54 and 55 (see Fig. 3).

In order to retain the printer in its forward or normal position the side plate 31 has attached thereto by means of a lug 69 (Figs. 3 and 5) a bell-crank 70 loosely mounted upon the pivotal shaft 32 of the printer. The tension in a spring 71 attached to the horizontal arm of the bell-crank normally retains the printing devices in the position shown in Fig. 3.

In order to prevent any lateral movement of the shaft 32 after it has been placed in its proper position one end of the shaft is provided with a reduced portion or groove 72 (Figs. 3 and 4). The bell-crank is provided with an irregular shaped aperture 73 (Fig. 3) one portion of which has merely the diameter of the shaft 32 at its grooved portion 73, while another portion is sufficiently large to receive the outer diameter of the shaft 32. It will be clear that when the shaft 32 is inserted and shifted laterally to its proper location the spring 71 will force the bell-crank to co-operate with the grove in the shaft and rigidly hold the latter in place.

In order to permit the printing mechanism to be forced rearwardly so as to take a printing impression from the adjusted type carriers there is provided a button 74 which as shown in Fig. 1 is slidably mounted in the cover 27 and has its rearward end contacting with the plate 29.

Let it be assumed that the record strip has been properly inserted and that the ribbon frames are also in their proper places. The printing button 74 if now depressed will force the printing devices rearwardly, tensioning the spring 71. As the printing frame is forced rearwardly towards the type the rear ribbon supporting plate 41 will contact with forward projections 75 (Figs. 1 and 3) of the side frames 20 and 21 thereby holding the ribbons and their supporting plates against further movement. As the printing button is depressed still further the side plates 30 and 31 will, through the shaft 36 continue to force the platen rearwardly compressing the springs 47. At substantially this point of the operation the lower impression block 39 will contact with the printing elements 23 thereby holding the lower portion of the

platen rigid and forcing the platen to rock slightly counter-clockwise so as to permit the upper impression block 38 to strike the upper series of printing elements 25 with the result that the printing elements of the two printing lines are struck successively but with substantially equal force. It will be understood that the rubber impression blocks during the movement mentioned will act to force the paper against the inking ribbons and adjusted type. For the best results the button 74 should be depressed sharply and quickly with the thumb so as to obtain a clear and legible print on the record strip.

After this has been accomplished the finger is inserted in the apertures 66 and 68 provided for that purpose and the portion of the printed record strip is withdrawn and detached from the rest of the roll by tearing against the serration 65 of the plate 64.

While the form of mechanism herein described is admirably adapted to fulfill the objects primarily stated, 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. In a machine of the class described, the combination of a plurality of lines of printing type members, a depressible printer frame having means provided therein for supporting a record medium, a platen pivoted to the printing frame to co-operate with the lines of type and a button for operating the printer frame to effect printing.

2. In a machine of the class described, the combination of a plurality of lines of printing type, a rockable printer frame, a platen pivoted to the printer frame to co-operate with the lines of type, means whereby a record bearing material may be carried by the printer frame, inking strips also carried by said frame one for each line of type, and a button for operating the printer frame to effect printing.

3. In a cash register, the combination of a pivoted printer frame, a platen in said frame, means on said frame for carrying a paper supply roll, inking strips, means carried by the printer frame for holding the inking strips, and spring devices to hold the platen and said means in spaced relation to permit the insertion of the paper from the supply roll.

4. In a cash register, the combination of a pivoted printer frame having means provided therein for supporting a record medium, a platen pivotally carried by the frame and having a plurality of impression blocks, a plurality of lines of printing type co-operating with the impression blocks, a button for operating the printer frame to effect printing, and yielding means for normally holding said platen in a central position on said frame, said means permitting the platen to rock slightly so that the rubber impression blocks strike the plurality of lines of type with equal pressure.

5. In a cash register, the combination of a pivoted frame carrying a platen, a plate carrying a plurality of inking strips mounted in said frame by means permitting a limited movement, and tensioning means to normally hold said plate spaced from said platen.

6. In a cash register, the combination of a pivoted frame carrying a platen, a plate carrying a plurality of inking strips mounted in said frame by means permitting a limited relative movement, tensioning means to normally hold said plate spaced from said platen, a printer button for rocking said frame to effect printing, and a member co-operating with said plate to arrest the movement of the inking strips while the button continues to move the printer frame and platen to effect printing.

7. In a printing mechanism, the combination of a printer frame operable to effect printing impressions, a member carried by said printer frame, and an inking strip supported by a frame, said member being adapted to receive said inking strip frame.

8. In a printing mechanism, the combination of a platen carrying a plurality of impression members, a plate carried by the platen, a plurality of inking ribbons, frames for supporting each ribbon individually, and guide means on the plate for receiving and retaining the ribbon supporting frames.

9. In a printing mechanism, the combination of a printing frame carrying plates spaced apart to form a channel, an inking ribbon, and a frame for supporting said ribbon received and retained by said channel.

10. In a cash register, the combination with a printer frame carrying a platen, inking ribbons, frames for carrying the inking ribbons, plates carried by the platen frame for receiving the ribbon frames, means whereby a record receiving material may be passed between the inking ribbons and platen, and a manipulative device for operating the printer frame to effect printing impressions from the ribbons onto the record material.

11. In a cash register, the combination with a printer frame carrying a platen, inking ribbons, frames for carrying the inking ribbons, a member carried by the printer frame for receiving the ribbon frame, springs for normally holding the platen spaced apart from said member to facilitate the insertion of record material therebetween, and a manipulative device for operating the printer to effect printing impressions.

12. In a machine of the class described, the combination with a printer member movable for taking impressions and mounted in and

enclosed by a cabinet, inking devices, means carried by said printer to receive the inking devices, apertures formed in the cabinet to permit the insertion of the inking devices, and means for covering the ribbon receiving apertures when the printer is moved to effect printing impressions.

13. In a machine of the class described, the combination with a movable printer frame, a platen carried by the printer, a plurality of individual and detachable inking ribbon frames carried by the printer, means for supporting a paper strip supply roll on the printer, means to guide the paper strip between the platen and the inking ribbons, and a manipulative device to move the printer for effecting printing impressions.

14. In a machine of the class described, a printer frame, a guideway formed in said frame, and a ribbon frame removably supported in said guideway, said ribbon frame being slidable in said guideway so that insertion of a new ribbon will force the old ribbon frame out of the guideway.

15. In a machine of the class described, a series of printing elements, a movable printer frame co-operating therewith, means on said frame for supporting and guiding a record strip, a passageway formed in said frame and adapted to receive a removable inking ribbon frame, and means for moving said printer frame to carry said ribbon and record strip against the printing elements.

16. In a machine of the class described, a cabinet, a movable printer frame within said cabinet, a guideway formed in said frame and adapted to receive a detachable inking ribbon frame, an opening in said cabinet through which said ribbon frame is inserted in said guideway, and means for blocking said opening upon movement of said printer frame.

17. In a cash register, a printer frame, a platen carried thereby, a plate mounted in said frame and movable relatively thereto, an inking strip carried by said plate, and springs to normally hold the plate and strip spaced apart from the platen.

18. In a cash register, the combination of a rockable printer frame having means provided therein for supporting a record medium, a platen pivotally carried by said frame and having impression blocks on opposite sides of its pivot, a plurality of lines of printing types cooperating with the impression blocks, means for operating the printer frame to effect printing, and a yielding centralizing means for said platen, said means permitting said platen to rock slightly so that the impression blocks strike said lines of type with equal pressure.

19. In a printing mechanism, the combination of a movable printer frame provided with an inking ribbon supporting means, an inking ribbon carried by a frame, and guide means carried by the inking ribbon supporting means for receiving and retaining the ribbon frame.

20. In a printing mechanism, a movable printer frame, means carried thereby for supporting a record strip supply roll, means carried by said frame for receiving an inking ribbon, a platen carried by said frame, means whereby the record strip may be passed between said ribbon and said platen, means for operating said frame to effect printing, and means carried by said frame whereby a portion of said strip may be detached at will.

21. In a printing mechanism, a frame adapted to carry a paper supply roll, and a plate for supporting an inking ribbon, said plate being carried by said frame and having an extension for guiding the paper.

22. In a printing mechanism, a printer frame adapted to carry a paper supply roll, a platen carried by said frame, inking ribbon supporting means carried by said frame and having a portion thereof forming a guide for the paper, and means for operating said frame to effect printing.

23. In a printing mechanism, a rockable printer frame having means provided therein for supporting a record medium, a platen pivotally carried by said frame and having impression blocks on opposite sides of its pivot, and centralizing means for said platen.

24. In a printing mechanism, a rockable printer frame having means provided therein for supporting a record medium, a pivotally mounted platen carried by said frame having a plurality of widely spaced impression blocks on opposite sides of its pivot, a plurality of lines of type, and yielding means permitting said impression blocks to strike each of said lines of type with equal pressure.

25. In a printing mechanism, the combination of a plurality of lines of printing type, a rockable printer frame having means provided therein for supporting a record medium, a platen pivoted to said printer frame, and yielding means mounted adjacent each of said impression blocks for centralizing said platen and permitting said impression blocks to strike the lines of type with equal pressure.

26. In a machine of the class described, a rockable printer frame, type carriers, slidable members supported by said frame carrying inking means, said members being so supported that they may be readily removed from said frame, and means for rocking said frame.

27. In a printing mechanism, the combination of a rockable printer frame, a slidable member carrying an inking ribbon and guide means in said frame for receiving said slidable member.

28. In a printing mechanism, the combination of a rockable printer frame, a detachable member carrying an inking ribbon, and means provided in said frame for receiving said

detachable member, and means for rocking said frame.

29. In a printing mechanism, the combination of a movable printer frame, a plurality of removable members carried by said frame, inking ribbons attached to said members, and means for moving said printer frame.

CHARLES W. GREEN.