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[54] PRINTING MACHINE WITH A ROLLER PLATEN RELEASING DEVICE

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[58] Field of Search 101/269-274, 101/45, 56

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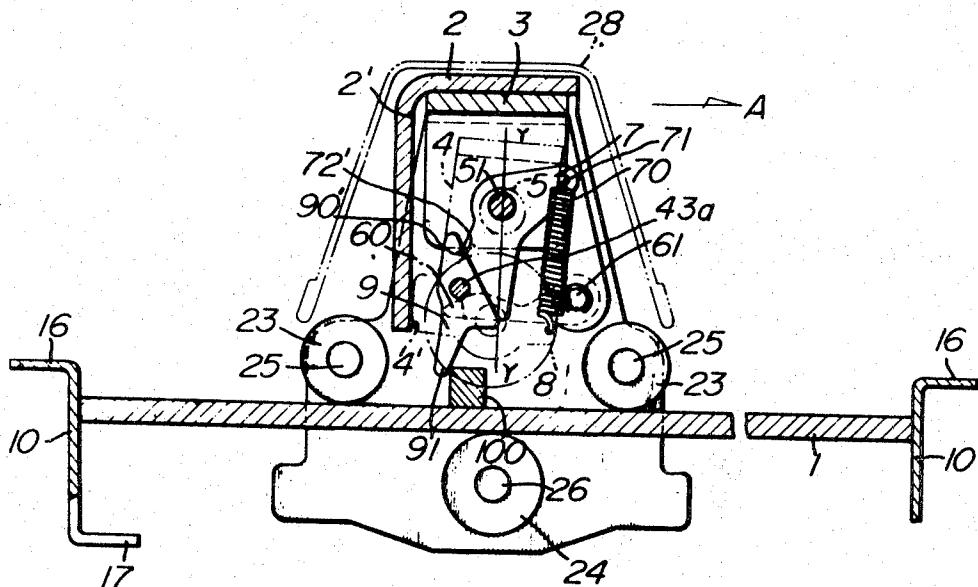
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ABSTRACT

A carriage supporting a roller platen frame is manually moved in a printing stroke and in a return stroke over type wheels on a printing bed. A releasing lever, resiliently connected with the roller platen frame, shifts the same between a printing position and an inoperative position when engaged and displaced by fixed actuating blocks during the carriage movements. A biased holding lever arrests the roller platen frame in either position. The resilient connection between the releasing lever and the roller platen frame, preferably including abutting slide faces, permits movement of the yielding releasing lever over the actuating blocks after the frame has been placed in the printing position or the inoperative position.

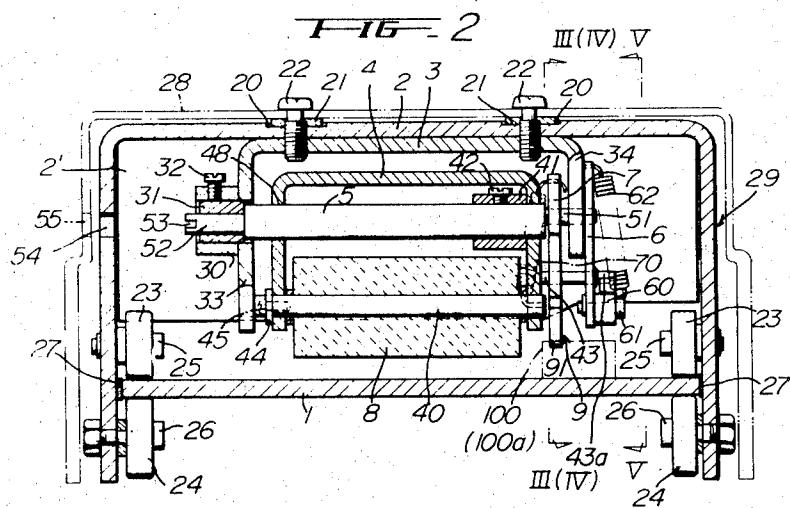
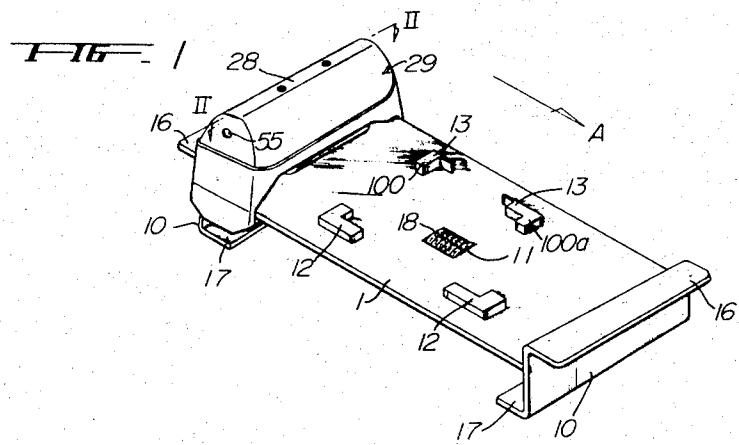
9 Claims, 6 Drawing Figures



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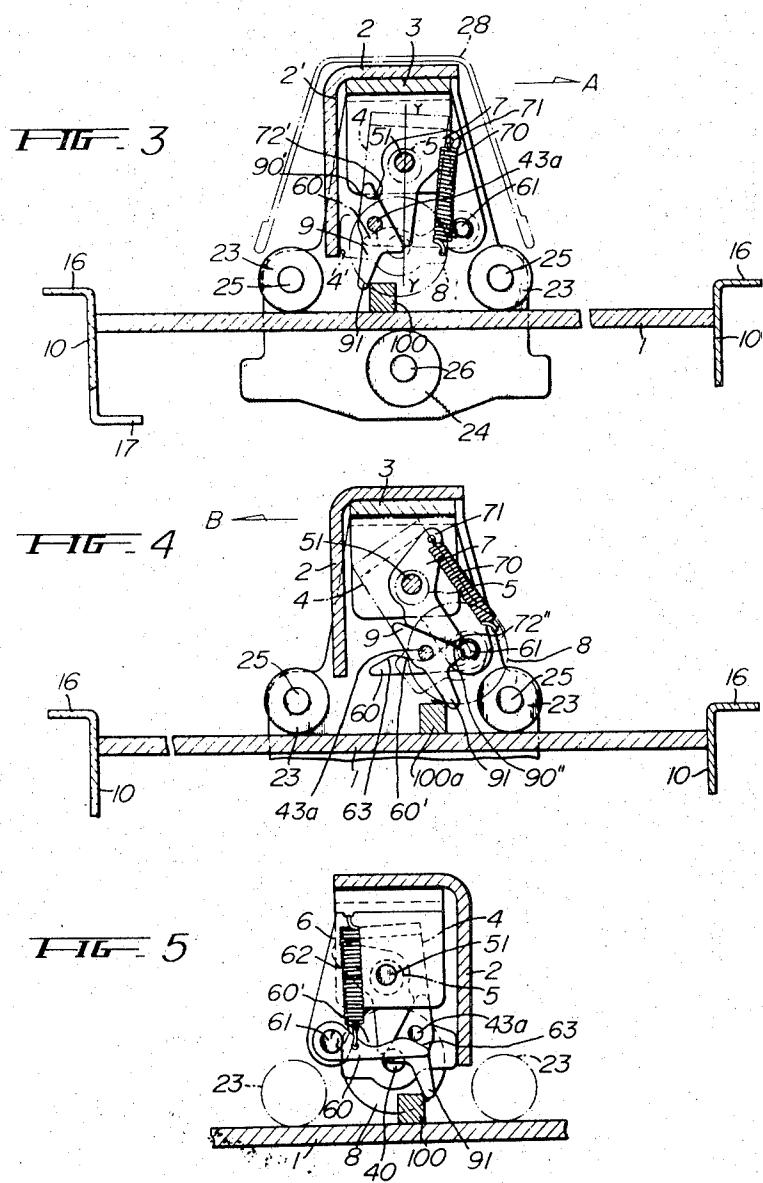
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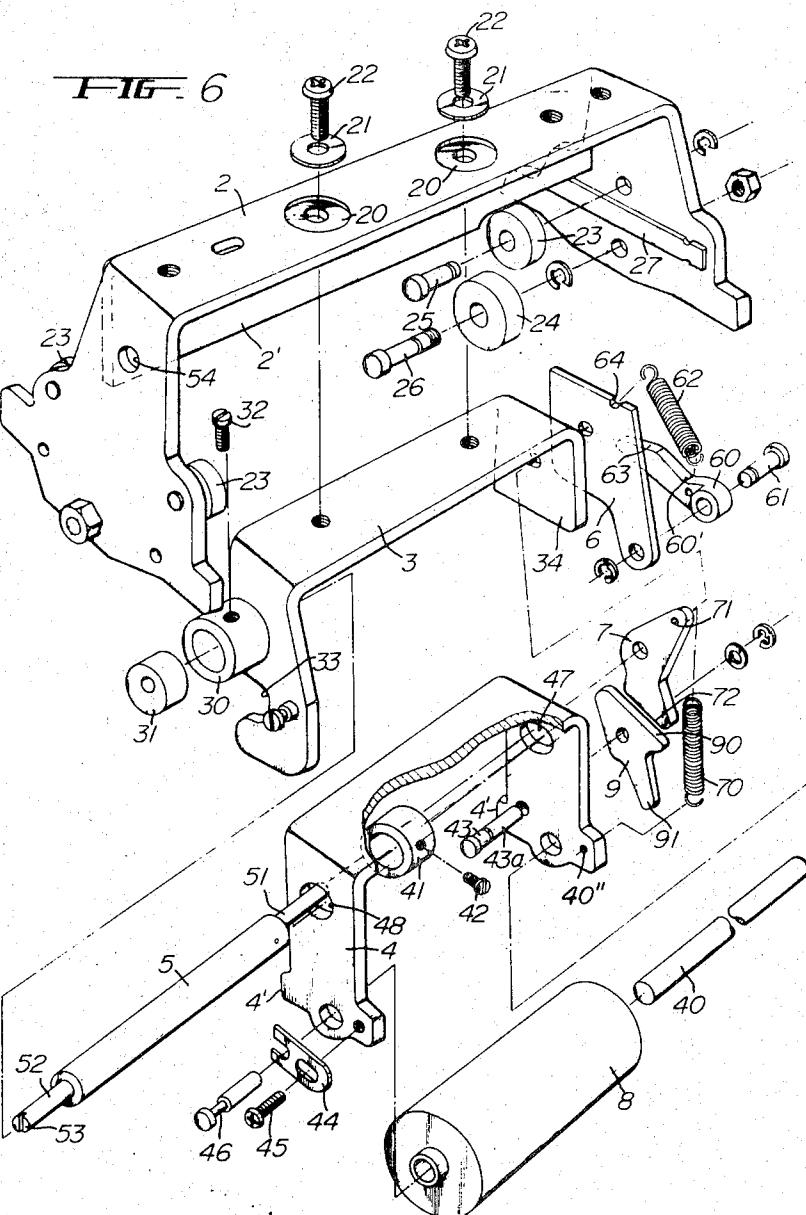
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**PRINTING MACHINE WITH A ROLLER PLATEN
RELEASING DEVICE**

BACKGROUND OF THE INVENTION

SIMPLE EXPLANATION OF THE INVENTION

The invention relates to printing machines and more particularly relates to a roller platen releasing device for printing machines. In a printing machine having a carriage mounted on the printing bed for transverse movement over type characters and a material to be imprinted such as a sales slip provided on the printing bed, it is a primary object of the invention to make the roller platen on the carriage press the copy sheet onto the type characters during transverse movement of the carriage in one direction for realising printing on the material to be printed, and then to hold the roller platen in a position spaced up from the printing bed during return movement of the carriage in the opposite direction so that reprinting on the printed material may be prevented. Another object of the invention is to provide a roller platen support which is adjustable to adjust the printing pressure of the roller platen in accordance with the thickness of the material to be printed.

In order to avoid a reprinting operation of the machine during the return stroke of the carriage with the roller platen, it has been proposed that the roller platen is to be pressed against the printing bed during the movement of the carriage in one direction transversely of the printing bed, and that the roller platen is to be held in a position spaced from the printing bed during the returning movement of the carriage in the opposite direction. But the conventional roller platen releasing devices are not suited for precise operations.

SUMMARY OF THE INVENTION

The present invention has been designed to eliminate such disadvantages of the conventional printing machines. According to the present invention, the roller platen supported on the carriage is held arrested in two restricted positions for printing and non-printing by means of a spring biased holding lever. For the purpose of preventing the roller platen from reprinting the sales slip, the roller platen is turned to printing and inoperative positions against the action of the holding lever by means of a releasing lever which is actuated during each cycle of transverse movements of the carriage and roller platen over the printing bed.

As a roller platen support, the present invention uses an eccentric shaft which turnably supports a swingable frame which in turn rotatably supports the roller platen, and the eccentric shaft is adjustably mounted on the carriage. According to the present invention, by adjusting the eccentricity of the eccentric shaft with respect to the swingable frame, the position of the roller platen is appropriately adjusted relative to the printing bed. Thus the printing pressure of the roller platen is variably changed in accordance with the material to be printed. In this invention, such an adjustment of the roller platen will be easily accomplished.

The other features and advantages of the present invention will be apparent from the following description of the preferred embodiment in reference to the attached drawings:

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows a printing machine embodying a roller platen releasing device of the present invention.

FIG. 2 shows a sectional elevation of the carriage of the printing machine taken along the line II — II in FIG. 1.

FIG. 3 shows a sectional view taken along the line III — III in FIG. 2 and shows the roller platen in a printing position.

FIG. 4 shows the same sectional view as the view in FIG. 3, but shows the roller platen in a non-printing retracted position.

FIG. 5 shows a sectional view taken along the line V — V in FIG. 2.

FIG. 6 shows an exploded perspective view of a preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In reference to FIG. 1, a printing bed 1 is at both ends thereof provided with a pair of end plates 10,10 which are each formed with an outwardly bent horizontal portion 16 at the top thereof and an inwardly bent horizontal portion 17 as a foot at the lower part thereof. On the printing bed 1, there are provided a plurality of type wheels 18 for representing dates or sales accounts. The type wheels have type characters formed on the periphery thereof and are arranged in a stack on the underside of the printing bed. Each type wheel has a part exposed above the printing bed 1 projecting from an opening 11 formed in the printing bed. Around the type wheels 18 on the printing bed 1, there are provided positioning pieces 12,12 and 13,13 in a spaced relation. These positioning pieces are adapted to position a credit card and a material to be printed such as a sales slip (not shown) in a predetermined position on the printing bed 1. Tipping actuating blocks 100,100a are fixed on the printing bed, which are, as will be described later in detail, adapted to actuate a releasing lever for shifting the roller platen. A carriage 29 is mounted on the printing bed 1 for transverse movement in a printing stroke and a return stroke between the end plates 10,10.

In reference to FIGS. 2 and 6, the device of the present invention is accommodated in the carriage 29 and comprises mainly a main frame 2, a supporting frame 3, a swingable roller platen frame 4 on an eccentric shaft 5, a supporting plate 6, a connecting plate 7, a releasing lever 9, a holding lever 60 and a roller platen 8. The carriage 29 has a cover 28 of U-shape in the cross section to cover the U-shaped main frame 2. On the depending walls at both ends of the main frame 2, wheel rollers 23 and 24 are rotatably mounted by means of shafts 25 and 26 respectively. As shown in FIG. 2, the rollers 23 are in engagement with the upper faces along the edges of the printing bed 1 while the rollers 24 are in engagement with the lower faces along the edges of the printing bed so that the carriage 29 may be moved on the printing bed transversely thereof.

The supporting U-shape frame 3 is fixedly attached to the main carriage frame 2 by means of fastening screws 22,22 with washers 21,21 being inserted between the screws and the upper transverse wall of the main frame 2 and placed in the depressions 20,20 in the transverse wall. The eccentric shaft 5 is fixedly supported on the supporting frame 3 between the depend-

ing leg walls thereof. The reduced portion 51 of the eccentric shaft is eccentric to the central axis of the shaft 5 and fitted into a bearing hole in the depending wall 34 of the supporting frame 3 while the reduced portion 52 is concentric with the central axis of the shaft 5 but fitted into an eccentric ring 31 which is in turn fixedly fitted in the boss 30 on the opposite depending wall of the supporting frame 3 by means of a screw 32.

The roller platen frame 4 is swingably supported within the supporting frame 3 on the eccentric shaft 5 which passes through the aligned holes 47,48 respectively formed in the upper parts of the depending walls of the swingable frame 4. The roller platen 8, which is made of plastic or other known material, is rotatably supported by frame 4 on a transverse shaft 40 which is at both ends thereof fitted into the aligned holes formed in the lower part of the oppositely depending walls of the swingable frame 4. However, in the embodiment shown in FIG. 6, one end of the roller platen 8 is supported by a support shaft 46 which is fitted into the axial bore of the roller platen 8. The support shaft 46 is supported on a support piece 44 adjustably mounted by means of a screw 45 on one depending wall of the swingable frame 4.

The angular movement of frame 4 in one direction is restricted by a vertical wall 2' provided between the opposite depending walls of the main frame 2, on which abut the projections 4',4' respectively formed at the lower ends of the opposite depending walls of frame 4 when the swingable frame 4 is swung on one direction around the eccentric shaft 5 to a printing position in which the central axis of the roller platen 8 is, as shown in FIG. 3, located at a point in the one direction just passed over the vertical plane Y — Y from the axis of the shaft 5 to the printing bed 1. The swinging movement of frame 4 in the opposite direction to a retracted inoperative position is restricted by a recessed portion 33 provided on one depending wall of the supporting frame 3, which is engaged by the extension of the roller platen shaft 40 or the supporting shaft 46 on one side of the depending wall of frame 4 when frame 4 is swung in the opposite direction around the eccentric shaft 5. It is to be noted that the displacement angle of the swingable frame 4 in the opposite direction around the eccentric shaft 5 is larger than the displacement angle in the one direction in relation to the plane Y—Y from FIGS. 3 and 4.

The eccentric shaft 5 is prevented from axially shifting by the eccentric ring 31 which is at one end thereof in contact with the stepped shoulder of the eccentric shaft 5 and also by a collar 41 which is fixedly secured on the opposite end portion of the eccentric shaft 5 by screw 42 and is in contact with the inner face of the opposite depending wall of the swingable frame 4.

For the purpose of holding the roller platen 8 in arrested restricted positions, a holding plate 6 is at the upper part thereof mounted on the extension of the reduced portion 51 of the eccentric shaft 5 at one end of the supporting shaft 3, and a holding lever 60 is turnably mounted on the lower end part of the holding plate 6 by means of a pin 61. A spring 62 is at one end hooked into a notch 64 at the top edge of the holding plate 6 and is at the other end anchored in the holding lever 60 to bias the holding lever in upward, see FIG. 5. The holding lever 60 is at the upper surface thereof provided with a depressed engaging face 60' at the in-

termediate part thereof and has a sloped depressed engaging face 63 at the free end part thereof. The engaging faces 60',63 of the holding lever 60 are adapted to be in engagement with the free follower part 43a of an arresting pin 43 which also turnably supports the releasing lever 9 on the lower part of one depending wall of roller platen frame 4.

The releasing lever 9 is at the top thereof provided with an inclined contacting surface or edge 90 and has 10 a lower arm portion 91 which is adapted to engage the fixed actuating blocks 100,100a on the printing bed 1 as shown in FIGS. 3, 4 and 5 during the transverse movement of the carriage 29 over the printing bed 1. At the upper part of one depending wall of the swingable frame 4, the connecting contact plate 7 is turnably mounted on the reduced portion 51 of the eccentric shaft 5. The plate 7 is provided with an inclined contact face 72 at the lower end thereof. Spring 70 is at one end hooked into a hole 71 at the top part of the plate 7 and 20 is at the other end anchored to a hole 4" in the lower part of the one depending wall of the swingable frame 4 to press the inclined contact edge 72 of plate 7 against the inclined contact face 90 of the releasing lever 9. It is to be noted that the spring 70 is of a force 25 stronger than the force of the spring 62 acting on the holding lever 60. The resilient connecting means 7, 70 connect the releasing lever 9 with the roller platen frame 4.

Therefore, the frame 4 can be swung by the shifting 30 means 9, 91, 90, 72; 7, 70 to the opposite restricted positions against the cam action of holding lever 60 biased against follower projection 43a by spring 62, and is at the same time held arrested in the restricted positions by the action of the same spring 62, due to the contact 35 engagement between the holding lever 60 and the extension 43a of the pin 43 on the swinging frame 4.

The reduced portion 52 of the eccentric shaft 5 has 40 a slot 53 for a tool at the free end thereof, and the free end of the reduced portion 52 is located in alignment with openings 54 and 55 respectively provided in the depending walls of the main frame 2 and of the cover 28. Therefore, the operator can insert an instrument such as a screw driver through the openings 54 in frame 2 and 55 in cover 28 and rotate the eccentric shaft 5 to adjust the same relative to the swingable frame 4, thereby to adjust the position of the roller platen 8 with 45 respect to the printing bed 1 for variably changing the pressure of the roller platen on the material to be printed. Such an adjustment of the roller platen 8 will, 50 according to the present invention, give no adverse effects to the normal cooperation between the releasing lever 9 and the fixed actuating blocks 100,100a on the printing bed 1, because such a cooperation is maintained by the tensioning action of spring 62.

OPERATION

After the type wheels 18 are manually rotated to select the type characters for dates or sales accounts, and 60 the credit card and the sales slip (not shown) are placed in the predetermined position on the printing bed 1, the carriage 29 is transversely moved over the printing bed in a printing stroke in the direction as indicated by an arrow mark A in FIG. 3 from the initial position as shown in FIG. 1.

During the transverse movement of the carriage 29, the lower arm portion 91 of the releasing lever 9 engages the block 100 on the printing bed 1 before the

carriage arrives over the sales slip and turns the frame 4 with the roller platen 8 in one direction around the eccentric shaft 5 through the contact plate 7 and the spring 70 against the action of spring 62, which causes resilient engagement between the holding lever 60 and the extension 43a of the pin 43. The swinging movement of frame 4 in this first direction is restricted by the vertical wall 2' of the main frame 2, which is contacted by the projections 4', 4' provided respectively on the lower ends of the opposite depending walls of the swingable frame 4, and the roller platen 8 is held in a printing position closest to the printing bed 1 as shown in FIG. 3. The swingable frame 4 is held in an arrested restricted position, since the extension 43a of the pin 43 is supported by the sloped depressed engaging face 63 of the holding lever 60 which is biased on by spring 62.

As the carriage 29 is further moved in the same direction out of the position shown in FIG. 5 the releasing lever 9 is now turned by block 100 around the pin 43 against the action of the spring 70 and passes over the block 100, moving together with the carriage 29. The arm portion 91 is forced by block 100 to rotate releasing lever 9 clockwise about pin 43a so that the contact face 90 presses against the contact face 72, particularly at point 90'. However, since point 72' of connecting lever 7 is in this position located on the extension of a line connecting shaft portion 51 with the attaching point 71 of spring 70, the connecting plate 7 is hardly rotated in counterclockwise direction while the releasing lever 9 turns clockwise to pass block 100. As the carriage is further moved, the roller platen 8 presses the sales slip (not shown) against the type characters on the printing bed 1 to print the same. During such a transverse movement of the carriage 29 in the printing direction the lower arm portion 91 of the releasing lever 9 engages another tipping block 100a which is located at a position on the printing bed 1 where the carriage 29 has passed over the sales slip and beyond the end of the stack of type wheels 18. The releasing lever 9 passes over the tipping block 100a in the same manner as it passes over the first tipping block 100.

When the carriage 29 is now transversely moved in the return direction to the initial position as indicated by an arrow mark B in FIG. 4, the lower arm portion 91 of the releasing lever 9 engages the tipping block 100a and turns the frame 4 in the opposite direction around the eccentric shaft 5 through the contact plate 7 and the spring 70, while spring 62 causes contact engagement between the holding lever 60 and the extension 43a of the pin 43. The opposite swinging movement of the frame 4 is restricted by the recessed portion 33 of the depending wall of the supporting frame 3, which is to be contacted by the extension of the shaft 40 supporting the roller platen 8 or by the supporting shaft 46 supporting the roller platen on one side thereof. The frame 4 is resiliently held in the inoperative retracted position of FIG. 4, since the extension 43a of the pin 43 is now supported by the depressed engaging face 60' of the holding lever 60 which is biased by spring 62. In the retracted position of the swingable frame 4, the roller platen 8 is raised up from the printing position away from the printing bed 1.

During further returning movement of the carriage 29, the releasing lever 9 is now turned in the opposite direction around the pin 43 against the action of spring 70 and gets over the tipping block 100a. The arm por-

tion 91 is rotated so that face portion 90" of edge 90 of releasing lever 9 presses against face portion 72" of contact face 72 of connecting contact plate 7, since in this position face portion 72" is located far away from the extension of the line connecting point 71 with shaft portion 51, connecting plate 7 is rotated about shaft portion 51 and the turning of members 7 and 9, with contact faces 90 and 72 sliding on each other, permits arm portion 91 to pass block 100a during the return stroke of the carriage 29. As the carriage 29 is further moved in the return direction, the retracted roller platen 8 will no more press the sales slip onto the printing bed 1. The releasing lever 9 91 passes block 100 in the same manner as block 100a, and then the carriage 29 returns to the initial position as shown in FIG. 3 completing the printing cycle.

We claim:

1. A printing machine with a roller platen releasing device, comprising a printing bed, type means mounted on said printing bed; carriage means mounted on said printing bed for reciprocating movement over said type means in a printing stroke and in a return stroke; a roller platen frame mounted on said carriage means for angular movement, and a roller platen having a follower projection and mounted on said frame for movement therewith between a printing position cooperating with said type means and a retracted position for bypassing said type means by; holding means for arresting said roller platen frame and said roller platen in said printing position during said printing stroke, and in said retracted position during said return stroke; shifting means including releasing means turnably mounted on said frame and having a contact face, connecting means mounted on said carriage means and having an other contact face slidably abutting said contact face, and a spring connecting a portion of said connecting means with said frame; and two actuating blocks secured to said printing bed on opposite sides of said type means and located in the path of movement of said releasing means during said strokes of said carriage means so that said releasing means is turned in opposite directions during said printing and return strokes of said carriage means when engaging the respective actuating block, and causes through said abutting contact faces and said connecting means turning of said frame between said printing and retracted positions, said holding means blocking said frame in said printing and retracted positions so that said slidably abutting contact faces and said releasing means and connecting means moved relative to each other when said releasing means passes over the respective actuating block after shifting said frame to one of the blocked positions thereof; said holding means including a holding lever mounted on said carriage means for angular movement and having a cam face with a dwell separating two depressed portions cooperating with said follower projection, and a spring biasing said holding lever toward said follower portion so that shifting of said releasing means and of said frame places said projection in one of said depressed portions whereby said frame is yieldingly arrested in said printing position and in said retracted position, respectively.
2. Printing machine as claimed in claim 1, wherein said spring of said resilient connecting means is stronger than said spring of said holding lever so that said spring of said holding lever yields when said releasing means turns said frame between said printing and re-

tracted positions; wherein said follower projection is part of a pin; and wherein said releasing means is a lever mounted on said pin.

3. Printing machine as claimed in claim 1, wherein said spring of said holding means is tensioned in a dead center position when said follower projection engages said dwell so that said frame tends to assume one of said positions thereof.

4. A printing machine with a roller platen releasing device, comprising a printing bed, type means mounted on said printing bed; carriage means mounted on said printing bed for reciprocating movement over said type means in a printing stroke and in a return stroke; a roller platen frame having a follower projection and mounted on said carriage means for angular movement, and a roller platen mounted on said frame for movement therewith between a printing position cooperating with said type means and a retracted position for passing said type means by; resilient holding means for yieldingly arresting said roller platen frame and said roller platen in said printing position during said printing stroke, and in said retracted position during said return stroke, shifting means including releasing means mounted on said frame, and resilient connecting means connecting said releasing means with said carriage so that turning of said releasing means in opposite directions causes turning of said frame between said printing and retracted positions; and two actuating blocks secured to said printing bed on opposite sides of said type means and located in the path of movement of said releasing means during said strokes of said carriage means so that said releasing means is turned in opposite directions during said printing and return strokes when engaging the respective leading actuating block and turns said roller platen frame between said printing and retracted positions; said holding means including a holding lever mounted on said carriage means for angular movement and having a cam face with a dwell separating two depressed portions cooperating with said follower projection, and a spring biasing said holding lever toward said follower portion so that shifting of said releasing means and of said frame places said projection in one of said depressed portions whereby said frame is yieldingly arrested in said printing position and in said retracted position, respectively, said spring being tensioned in a dead center position when said follower projection engages said dwell so that said frame is biased in a dead center position when said follower projection engages said dwell so that said frame is biased to assume one of said positions.

5. A printing machine with a roller platen releasing device, comprising a printing bed, type means mounted on said printing bed; carriage means mounted on said printing bed for reciprocating movement over said type means in a printing stroke and in a return stroke; a roller platen frame mounted on said carriage means for angular movement, and a roller platen mounted on said

frame for movement therewith between a printing position cooperating with said type means and a retracted position for passing said type means by; holding means for arresting said roller platen frame and said roller platen in said printing position during said printing stroke, and in said retracted position during said return stroke; shifting means including releasing means turnably mounted on said frame and having a contact face, connecting means mounted on said carriage means and having an other contact face slidably abutting said contact face, and a spring connecting a portion of said connecting means with said frame; and two actuating blocks secured to said printing bed on opposite sides of said type means and located in the path of movement of said releasing means during said strokes of said carriage means so that said releasing means is turned in opposite directions during said printing and return strokes of said carriage means when engaging the respective actuating block, and causes through said abutting contact faces and said connecting means turning of said frame between said printing and retracted positions, said holding means blocking said frame in said printing and retracted positions so that said slidably abutting contact faces and said releasing means and connecting means move relative to each other when said releasing means passes over the respective actuating block after shifting said frame to one of the blocked positions thereof.

6. Printing machine as claimed in claim 5 wherein said releasing means includes a releasing lever having said contact face and an arm for engaging said actuating blocks, wherein said connecting means includes a connecting lever having said other contact face, and wherein said portion of said connecting lever is located remote from said other contact face.

7. Printing machine as claimed in claim 5, wherein said carriage means includes an eccentric shaft means turnably supporting said roller platen frame, and including an end portion projecting from said carriage and having means for engaging a tool so that said eccentric shaft means can be manually turned for adjusting the distance between said roller platen on said roller platen frame and said type means in said printing position.

8. Printing machine as claimed in claim 7, wherein said eccentric shaft means includes a main shaft portion, a first reduced end portion, eccentric to the axis of said main shaft portions and mounted in said carriage means, a second reduced end portion concentric to said axis, and being said projecting end portion and an eccentric ring for mounting said second reduced end portion on said carriage means.

9. Printing machine as claimed in claim 5, wherein said carriage means includes an abutment means; and wherein said roller platen frame abuts said abutment means in said printing position.

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