Sept. 11, 1956 N. E. HART ET AL 2,762,300

RECIPROCATING FEED DEVICE FOR PRINTING APPARATUS

Filed Oct. 8, 1954 5 Sheets-Sheet 1

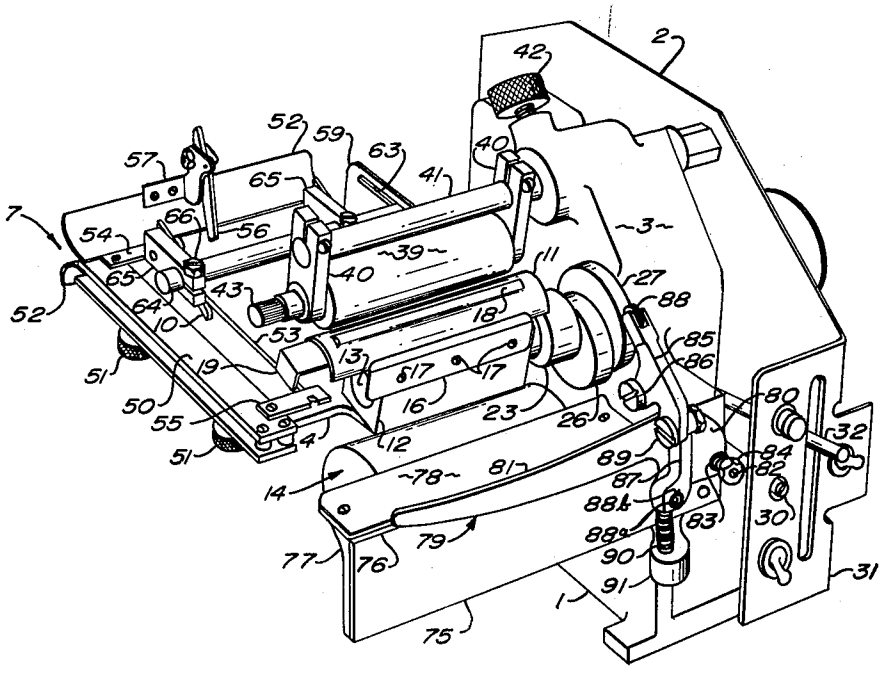


Fig. 1

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Filed Oct. 8, 1954 5 Sheets-Sheet 2

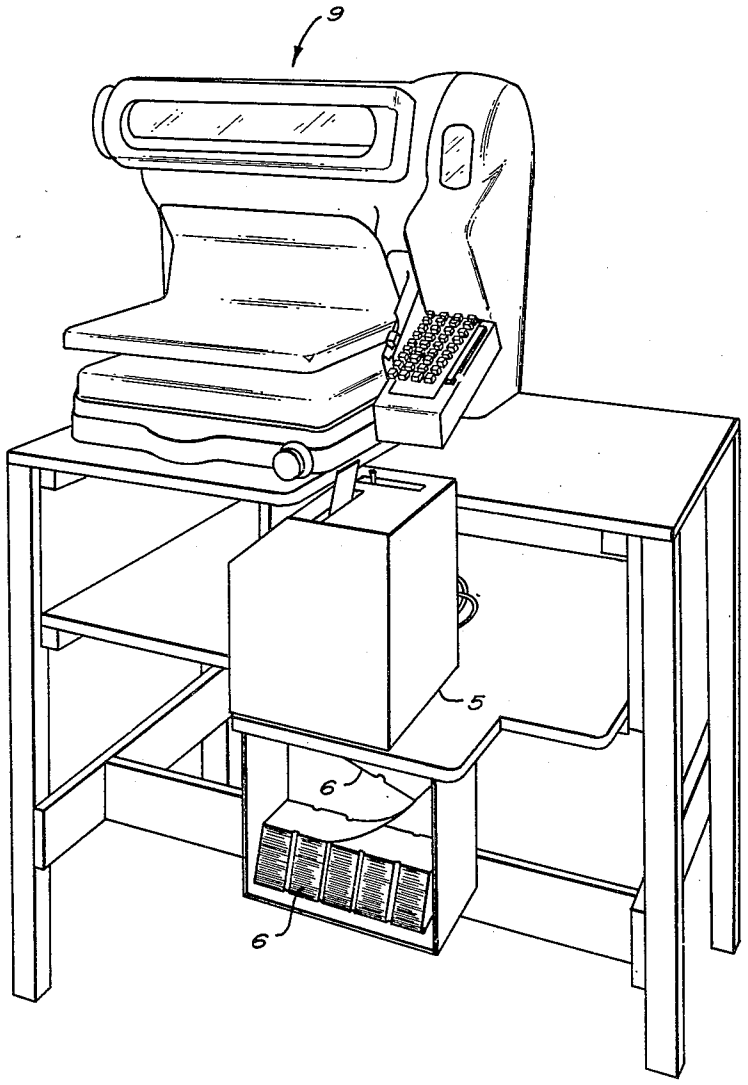


Fig. II

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RECIPROCATING FEED DEVICE FOR PRINTING APPARATUS

Filed Oct. 8, 1954 5 Sheets-Sheet 3

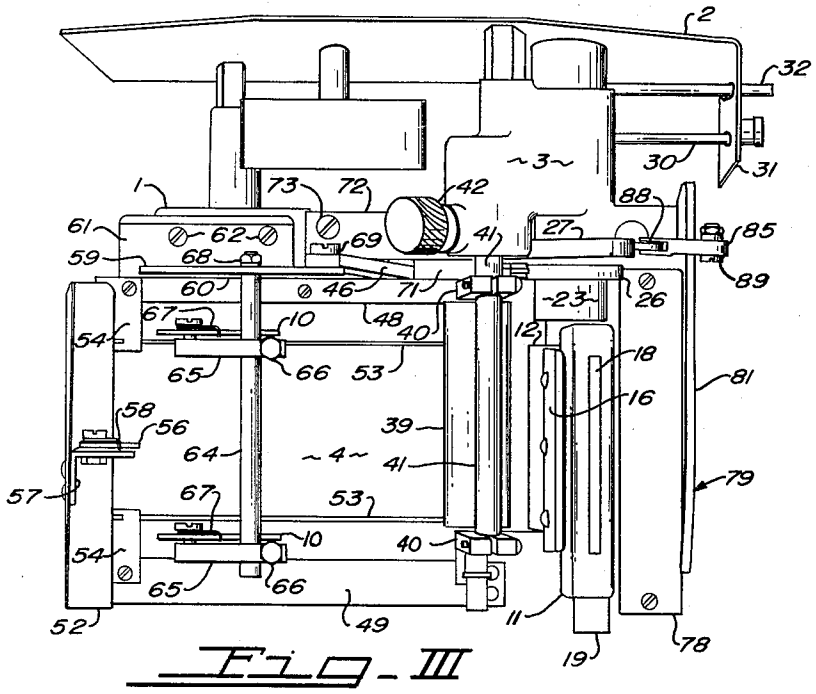


Fig. III

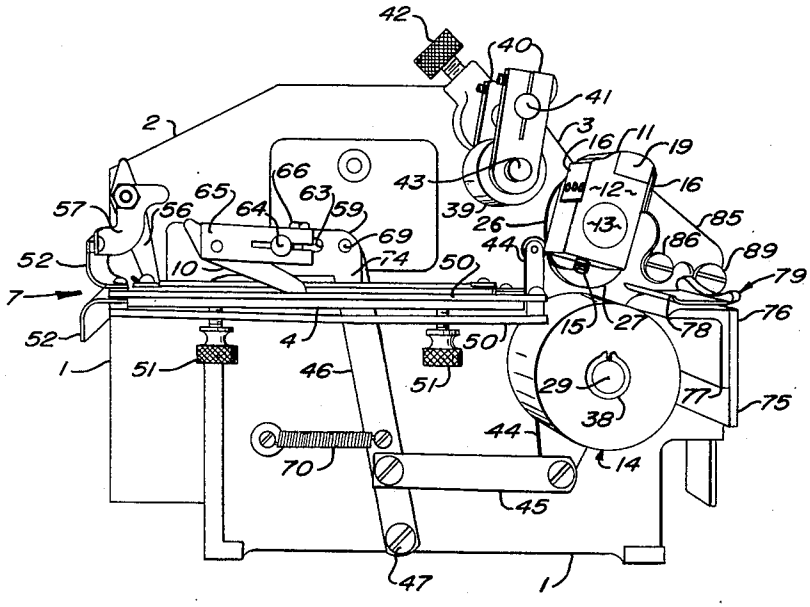


Fig. IV

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RECIPROCATING FEED DEVICE FOR PRINTING APPARATUS

Filed Oct. 8, 1954 5 Sheets-Sheet 4

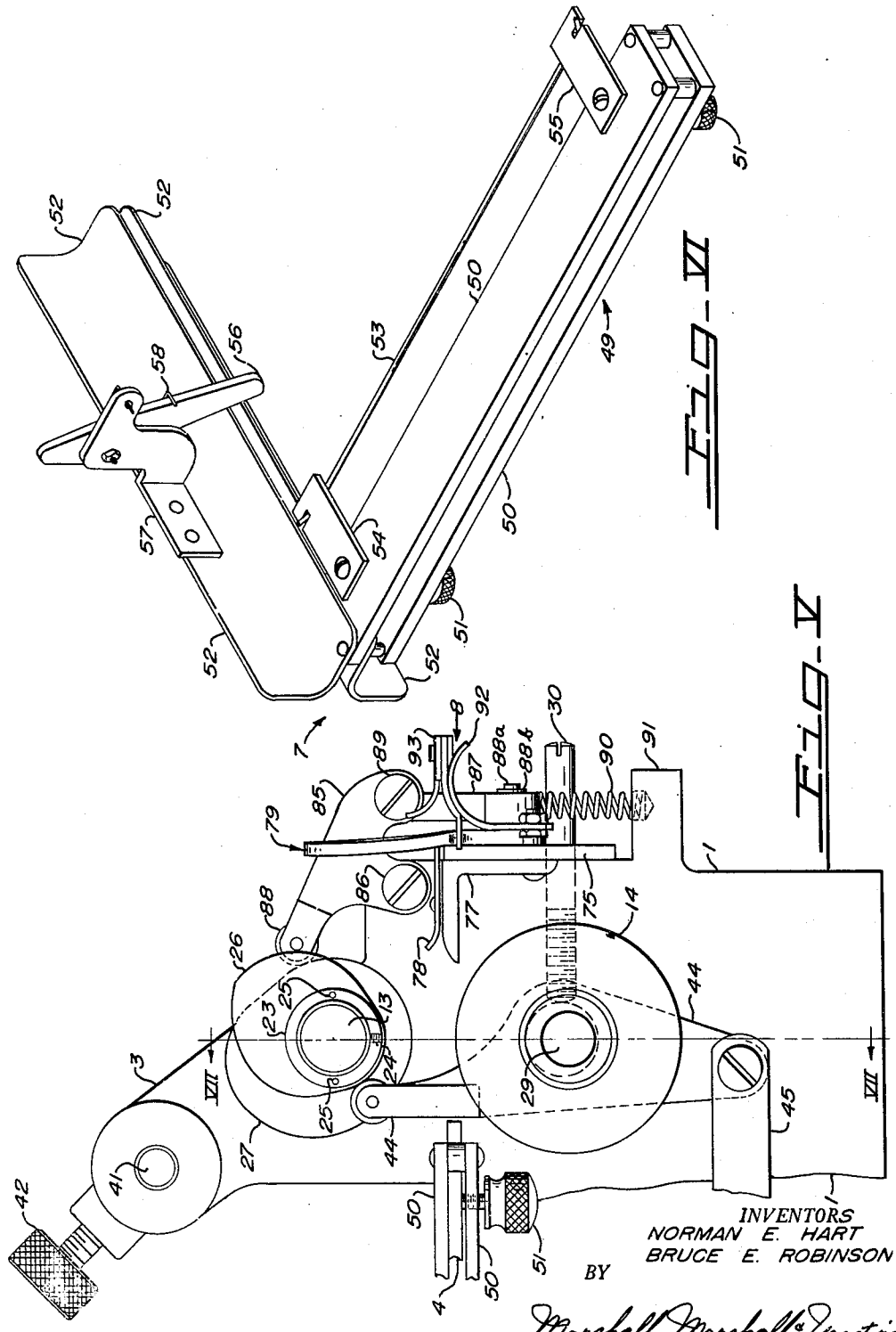


Fig. VI

Fig. IV

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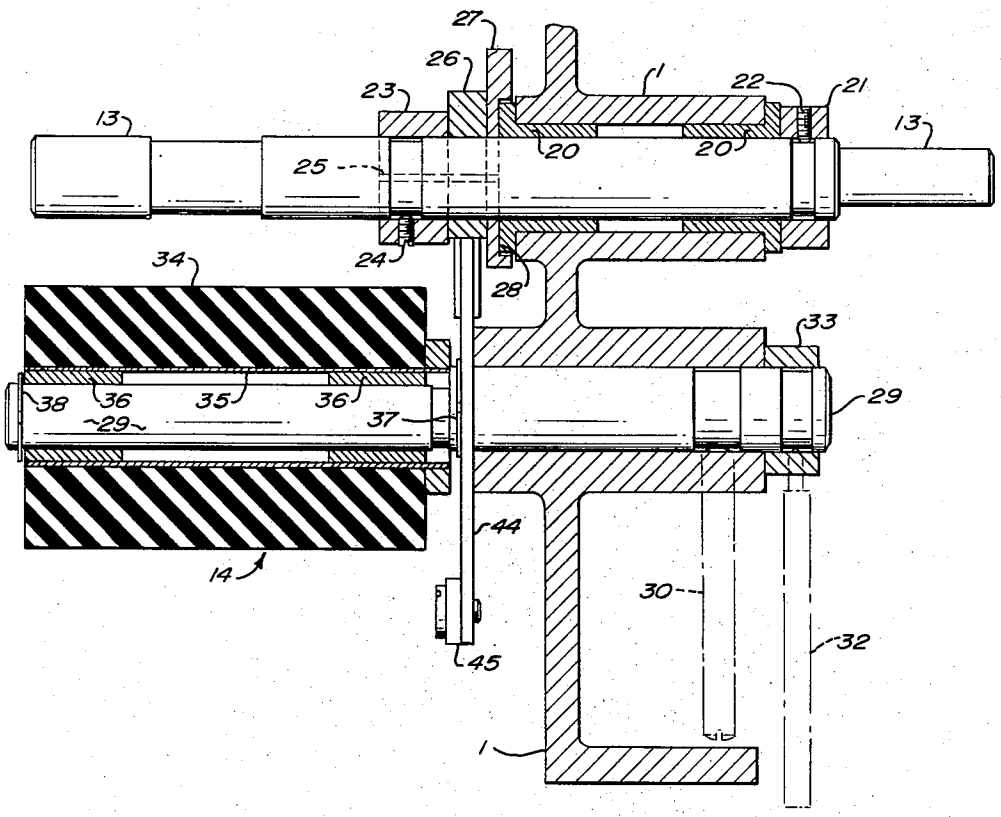


Fig. VII

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United States Patent Office 2,762,300 Patented Sept. 11, 1956

2,762,300

RECIPROCATING FEED DEVICE FOR PRINTING APPARATUS

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Application October 8, 1954, Serial No. 461,187

6 Claims. (Cl. 101—227)

This invention relates to improved rotary printing apparatus for printing successive labels on a strip of paper.

Such printing apparatus is used where successive labels must be provided with different information, e. g., in connection with the labeling of packaged meats in food stores. Each package must be marked to indicate the type of food, weight, cost per pound, and total cost. Several labels may bear information as to the type of meat, e. g., "veal steak," that must be changed for the next group of labels. Usually, the marking indicating the type of food is made by label printing apparatus and the markings indicating weight, cost per pound, and total cost is accomplished by a printing weighing scale in a successive operation.

Apparatus heretofore used for printing successive labels on a strip of paper has been complicated and impracticable. The prior art apparatus, even after the most careful adjustments, was unable to satisfactorily print successive labels during a sustained run.

The prior art printing apparatus has not been provided with an efficient means for feeding successive labels through the apparatus or an efficient means for driving the feeding means. Such constructions have been complicated, difficult to adjust, and became so misaligned in sustained runs as to be nearly useless.

Furthermore, the prior art printing apparatus has not been provided with a practical means for rapidly changing and positioning the printing type. The constructions of both the type and the type-holders have been expensive and difficulty has been experienced in rapidly locating the type in the holders. Where successive labels must be provided with different information, the changing of the printing type in the label printing apparatus constitutes an important element of time and cost.

Also, the prior art printing apparatus has not been provided with a practical cutter for severing the printed labels one from the other. Such cutters have included a knife formed with a cam surface contacted by a driving arm to move the knife downwardly and inwardly against a cooperating fixed cutting edge. The movement of the knife was accompanied by a grinding action between the cam surface of the knife and the driving arm which produced friction and a binding action. Furthermore, the knife was held against the cooperating fixed cutting edge in a manner which added to the friction.

The principal object of this invention is to provide, in rotary printing apparatus, improved means for feeding successive labels through the apparatus and also to provide improved means for driving the means for feeding.

More specifically, the principal object of this invention is to provide simplified means for positively guiding both the means for feeding successive labels and the means for driving the means for feeding to prevent misalignment, thus allowing the successive labels to move freely through the printing apparatus.

A second object of the invention is to provide, in rotary printing apparatus, simplified and efficient hold-down means for the successive labels as they pass through the printing apparatus.

More specifically, the second object of the invention is to provide adjustable, wire-like, rods bearing on the labels to hold them snugly in place and to provide a hold-down finger making constant, angular and dragging contact with the labels, whereby backward movement of the labels is prevented.

Another object of the invention is to provide a rotary printing plate holder for printing apparatus and a label printing plate having embossed printing indicia for the holder. One printing plate may be quickly substituted for another plate when a number of different labels must be printed in sequence.

Another object of the invention is to provide an improved cutter having a knife for severing printed labels, the knife being positively driven by means which produce little friction or binding action between the driving means and the knife, and the knife being pivotally connected to the cutter in a comparatively frictionless manner to hold the knife against the fixed cutting edge of the cutter.

These and other objects and advantages will be apparent from the following description of a preferred form of the invention.

A preferred embodiment is illustrated in the accompanying drawings.

In the drawings:

Figure I is a perspective view of the improved printing device for labels formed in a strip, with a label holder and knife guard removed from the front of the device to show a label cutter.

Figure II is a perspective view of a printing weighing scale and of a case used to enclose the printing device illustrated in Figure I showing a severed and printed label presented in a such manner that an operator may readily transfer the label to the weighing scale for a second printing operation.

Figure III is a perspective view of the printing device shown in Figure I looking down upon the device.

Figure IV is a perspective view of the printing device shown in Figure I looking towards the left-hand side of the device.

Figure V is an end elevational view of the printing device shown in Figure I looking towards the left-hand, front-side of the device, with a printing plate holder removed to show several cams and with the label holder and knife guard mounted on the device.

Figure VI is a perspective view of a movable label guide, a flexible wire-like, hold-down rod, means for adjustably spacing the rod, and a spring loaded hold-down finger, all removable as a unit from the printing device shown in Figure I.

Figure VII is a sectional view taken substantially along the line VII—VII of Figure V.

Referring to the drawings in detail:

The improved printing device for labels formed in a strip includes a frame 1 having an upright wall 2 and a vertical column 3. The frame 1 supports a bed 4 extending outwardly from the wall 2. The printing device is normally enclosed in a case 5 and used in food pre-packaging as shown in Figure II. Labels in a strip 6 are fed into a receiving mouth 7 of the printing device, advanced in steps over the bed 4, and, after being printed and severed from the strip, held in a holder and knife guard 8 (Figure V) in the position at the top of the case 5 shown in Figure II so that an operator may readily transfer the label to a printing weighing scale 9 for a second printing operation. The marking indicating the type of food to be packaged is printed by the label printing device and the markings indicating weight, cost per pound, and total cost are printed by the weighing scale.

The labels in the strip 6 are guided over the bed 4 by means of pawls 10 to feed between a printing plate 11 removably held in a printing plate holder 12 and a cooperating pressure roller 14. A conventional impression roller carrying individual pieces of type in grooves may be substituted for the printing plate 11 and its holder 12. However, it is difficult to rapidly locate the individual pieces of type in the grooves of such an impression roller.

The printing plate holder 12 has flat and substantially parallel sides, a rounded top and a longitudinally extending opening for attaching the holder to a drive shaft 13. The drive shaft 13 constitutes the basic drive means for the device. The printing plate holder 12 can be slid back and forth on the drive shaft 13 by loosening a lock screw 15 (Figure IV) which retains the holder 12 on the drive shaft 13. This adjustment enables one to position the printing plate holder 12 transverse to the path of movement of the labels over the bed 4 so that the printed matter appears in its proper place on the labels. The printing plate holder 12 carries a pair of resilient tension plates 16 attached to the holder by screws 17 for removably holding the printing plate 11 on the rounded top of the holder.

The printing plate 11 comprises a curved printing element having an embossed raised portion 18 including indicia to be printed on labels and is provided with a fixed handle 19. The handle 19 in addition to providing a convenient grasping means performs the functions of locating the printing plate in the holder 12, i. e., the printing plate is inserted in the holder underneath the tension plates 16 until the end of the handle nearest the raised portion 18 contacts the holder, and also prevents the printing plate from being inserted backward in the holder. When a different group of labels is to be printed, the printing plate 11 is slipped from its position and another quickly slid into its place.

The drive shaft 13 to which the printing plate holder 12 is attached is hand or motor rotated in flanged bearings 20 set in the frame 1 as shown in section in Figure VII. The shaft 13 is held in proper position within the bearings 20 by means of a collar 21 fixed to the shaft by a screw 22 and by means of a spacer 23 fixed to the shaft by a screw 24. The spacer 23 carries a pair of pins 25 extending parallel to the axis of the drive shaft and tapped-fitted through holes in the spacer. The pins 25 extend and are loosely fitted through a pawl-actuating cam 26 and a knife-driving cam 27 and serve to properly position the cams as a unit assembly on the drive shaft 13. The knife-driving cam 27 has a recessed portion 28 for clearance.

The pressure roller 14 is supported beneath the printing plate holder 12 and is carried by an eccentric shaft 29 (Figure VII). The shaft 29 extends through the frame 1 and is locked in place and kept from turning by means of a locking pin 30 threaded through the frame and accessible for turning from a control panel 31. The shaft 29 is turned, when the locking pin 30 is loosened, by up or down movement of an adjusting pin 32 threaded into a collar 33 fixed onto an end of the shaft 29. The free end of the adjusting pin 32 is also accessible from the control panel 31. When the shaft 29 is turned by movement of the adjusting pin 32, the eccentric action of the shaft 29 moves the pressure roller 14 toward or away from the printing plate holder 12 so that the proper printing pressure can be obtained. The pressure roller 14 is made of a flexible outer section 34 mounted on a thin, rigid, concentric, metallic liner 35. A pair of bushings 36 are press-fitted within the liner 35 and turn on the shaft 29. A snap ring 37 helps to hold the shaft 29 in proper position and a second snap ring 38 holds the pressure roller 14 in place on the shaft. When the pressure roller 14 is properly positioned by movement of the adjusting pin 32 in relation to the printing plate holder 12, the holder 12 friction drives the pressure roller 14.

An inking roller 39 is rotatably mounted between a pair of hangers 40 suspended from a shaft 41 mounted on the upper part of the column 3. A cone-pointed lock screw 42 is threaded through the column 3 and bears against the shaft 41 to hold it in place. When the lock screw 42 is loosened, the shaft 41 may be turned to swing the inking roller toward or away from the printing plate holder 12. When the inking roller 39 is operatively positioned, the printing plate holder 12 friction drives the inking roller. A knurled stopper 43 may be removed from the inking roller 39 when the roller is to be filled with ink.

The several operating components of the device, such as the printing plate holder 12 and the pawls 10, are coordinated by means of the pawl-actuating cam 26 carried on the drive shaft 13 and rotated with the printing plate holder 12. The cam 26 cooperates with a cam follower 44 pivoted on the shaft 29 (Figure V). The end of the cam follower 44 remote from the cam 26 is coupled with a tie bar 45 which in turn is coupled with a drive link 46 that actuates the pawls 10. The drive link 46 is pivotally connected to the frame 1 by means of a shoulder screw 47.

The labels to be printed are fed into the receiving mouth 7 between a fixed guide 48 attached to the bed 4 and a movable guide 49 adjustable over the bed to accommodate various widths of labels. The movable guide 49 includes a pair of spaced apart bars 50 between which the edge of the bed 4 is inserted. A pair of lock screws 51 fix the movable guide 49 in place on the bed 4. The movable guide 49 carries the receiving mouth 7 which includes a pair of curved sheets 52 rigidly attached to the movable guide 49 and is removable as a unit assembly as shown in Figure VI.

Since the printing device is often used in a position such that the bed 4 is vertical to present printed and severed labels as shown in Figure II, it is necessary that the labels be snugly held on the bed 4 as they pass through the device so that the lavels are completely coordinated with the several operating components. A pair of wire-like, flexible rods 53 is provided to hold the labels on the bed 4. The rods 53, the ends of which are bent up approximately 45°, are attached to the guides 48 and 49 by means of fixed brackets 54 and are adjustably spaced from the table by means of pivot members 55 pivotally attached one to each guide. The rods 53 stretch between the fixed brackets 54 and the pivot members 55 so that the turning of the pivot members adjustably lifts the rods 53 from the surface of the bed 4.

When the labels are advanced over the bed 4 by the pawls 10, the labels are exactly located to cooperate with the printing plate 11 and a label cutter. To prevent backward movement of the labels, a hold-down finger 56 is used and makes constant, angular and dragging contact with the labels. The hold-down finger is pivotally mounted on a bracket 57 riveted to one of the curved sheets 52. A spring 58 having an end loosely held in a hole in the bracket 57 has its other end looped over the hold-down finger 56 and urges the finger against the labels.

Means actuated by the rotation of the printing plate holder 12 for feeding successive labels through the apparatus are provided and include a slide arm or plate 59 guided in a trackway 60 on the bed extending parallel to the path of movement of the labels which trackway is formed by the fixed guide 48 and a member 61 spaced apart from the fixed guide and rigidly attached to the frame 1 by screws 62. It is necessary that the plate 59 be accurately guided in a direction parallel to the path of movement of the labels so that the pawls 10 carried by the plate 59 always coincide with holes in the strip of labels to advance the labels over the bed. The plate 59 has a slot 63 holding a bar 64 in a direction transverse to the path of movement of the labels over the bed 4. A pair of hanger brackets 65 are attached to the bar 64 by means of screws 66 and carry the pawls 10 which make constant angular and dragging contact with the labels which pawls are urged towards the bed 4 by means of pawl tension coils 67 attached between the hanger brackets 65

and the pawls 10. The hanger brackets 65 are slidable on the bar 64, when the screws 66 are loosened, to adjust the pawls 10 in accommodating various widths of tickets. The bar 64 is slidable in the slot 63 when a nut 68 is loosened to adjust the stroke of the pawls 10 in accommodating various lengths of tickets.

Means for driving the plate 59 and its pawls 10 are provided and include the drive link 46 connected to the plate 59 by a shoulder screw 69. Rotation of the pawl-actuating cam 26 pivots its follower 44 about the shaft 29 and pulls the drive link 46 towards the follower 44. When the follower 44 is on the low part of the pawl-actuating cam 26, a spring 70 stretched between the frame 1 and the drive link 46 urges the drive link 46 away from the follower 44 to retract the pawls 10 after they have advanced a label over the bed 4. The spring 70 holds the cam follower 44 in constant contact with the periphery of the cam 26. In order to prevent misalignment of the drive link 46 and to prevent sidewise play in the drive system for the means for feeding the labels over the bed 4, an extension 71 of the trackway 60 is used to positively guide the drive link 46. One side of the extension 71 of the trackway 60 is formed by a plate or second member 72 similar to the member 61 and rigidly attached to the frame 1 by screws 73. The plate 72 is spaced apart from the fixed guide 48 which forms the other side of the extension 71 of the trackway 60. An arm 74 (Figure IV) of the plate 59 fits between the side of the extension 71 of the trackway formed by the fixed guide 48 and the drive link 46 which arm 74 slides back and forth against the fixed guide 48. The drive link 46 slides back and forth against the plate 72. The arm 74 and the drive link 46 make a snug sliding fit in the extension 71 of the trackway and are positively guided without sidewise play in the extension.

As the labels are printed, provision is made in the form of a cutter to sever each label for removal by an operator for attachment to the goods for which it is intended. The cutter is positioned adjacent the printing plate holder 12 and the pressure roller 14 and is carried by the frame 1.

The cutter includes a fixed shear blade 75 attached to the frame 1. The shear blade 75 has a cutting edge 76 on its one side and carries a label guide on its other side. The label guide includes an angle bracket 77 carrying a spaced apart strip 78. The labels, after passing between the printing plate 11 and the pressure roller 14, are guided between the surface of the angle bracket 77 to which the spaced apart strip 78 is attached and the strip, and are accurately aligned for the cutting operation. An L-shaped knife 79 having a flattened end portion 80 and a blade 81 extending generally in the plane of the flattened end portion and adapted to cooperate with the cutting edge 76 of the fixed shear blade 75 to form a shearing means is pivotally connected to the shear blade 75 by means of a stud 82. A spring 83 surrounds the stud 82 between the free end of the stud and the knife 79 and is forced against the knife by an adjusting nut 84. The spring 83 is used as a means for exerting pressure against the knife to hold the cutting edge of the knife against the cutting edge of the shear blade 75.

The blade 81 of the knife 79 is slightly bent or curved to extend over the fixed shear blade 75 to press tightly against the cutting edge 76 of the shear blade throughout its travel, and the blade 81 and its cutting edge is also curved in the plane of movement of the blade to produce an efficient shearing action.

The knife 79 is automatically actuated at the completion of each cycle of the printer to sever the printed label. This action is accomplished by a drive including the knife-driving cam 27, a pivotally mounted bell crank 85 pivoted at 86 to the frame 1 for rotation about an axis generally parallel to the cutting edge of the shear blade 75, and a link 87 coupling the bell crank 85 and the flattened end portion 80 of the knife for moving the blade 81 of the knife past the cutting edge of the shear blade 75.

The bell crank 85 includes a cam follower wheel 88 adapted to contact the periphery of the knife-driving cam 27. It is very important that the bell crank 85 never contacts the knife 79, since such contact causes a friction-producing grinding action. The bell crank 85 is connected to the knife 79 by means of the link 87 which extends downwardly from the bell crank at an angle towards the knife to assist the spring 83 in urging the cutting edge of the knife against the cutting edge of the shear blade. The link 87 is pivotally connected to the flattened end portion of the knife by means of a pin 88*a* riveted in the knife and extending loosely through a hole in the link. A snap ring 88*b* retains the link on the pin 88*a*.

The connection between the bell crank 85 and the link 87 includes a knife-adjusting, eccentric shoulder screw 89. The eccentric screw 89 is turned until the tip of the knife 79 has a small amount of overtravel beyond the cutting edge of the shear blade 75 after a label has been cut off. The overtravel of the knife prevents the severed label from backing up. Rotation of the bell crank 85 about its pivot 86 under the action of the knife-driving cam 27 drives the link 87 which in turn moves the knife downwardly about its pivot point and inwardly against the cooperating fixed cutting edge of the shear blade 75. A helical compression spring 90 interposed between a boss 91 of the frame 1 and the link 87 urges the knife 79 toward open position.

After a printed label is severed from the strip 6, it is held by the overtravel of the knife in the holder and knife guard 8 (Figure V) in the position at the top of the case 5 shown in Figure II so that an operator may readily transfer the label to the printing weighing scale 9 for a second printing operation. The holder and knife guard 8 includes a first curved member 92 attached to but spaced apart from the shear blade 75 to allow room in between for the knife 79. A second curved member 93 is carried by the first curved member 92 and cooperates with the first curved member in holding the label after it has been cut.

Various modifications may be made in specific details of construction without departing from the spirit and scope of the invention.

Having described the invention, we claim:

1. Rotary printing apparatus for labels comprising a frame, a bed mounted on the frame for supporting a strip of labels to be moved along a longitudinally extending path, a printing member mounted for rotation on the frame, a pressure roller mounted for rotation on the frame and cooperating with the printing member, a fixed label guide at one side of the bed, an adjustable label guide at the other side of the bed, a member fixed to the frame and spaced apart from the fixed label guide forming with the fixed label guide a trackway extending parallel to said path of movement of the labels, the width of said trackway being independent of the position of said adjustable label guide, a slide arm guided in the trackway, a cross bar mounted on the slide arm, a pawl driven by the cross bar and adjustable relative thereto for feeding successive labels over the bed and between the printing member and the pressure roller, and a drive link pivotally connected to the slide arm and actuated by the rotation of the printing member for driving the slide arm, the drive link being guided in said trackway along with the slide arm in a snug sliding fit to prevent misalignment and thus allow successive labels to be moved freely through the apparatus.

2. Rotary printing apparatus according to claim 1 wherein said printing member comprises a printing plate which includes a curved printing element having an embossed raised portion and a holder for the printing plate mounted for rotation on the frame.

3. Rotary printing apparatus for labels comprising a frame, a bed mounted on the frame for supporting a strip of labels to be moved along a longitudinally extending path, a printing member mounted for rotation on the frame, a pressure roller mounted for rotation on the

frame and cooperating with the printing member, a fixed label guide at one side of the bed, an adjustable label guide at the other side of the bed, a flexible rod pivotally connected to each guide for holding the labels on the bed, said rods being so pivotally connected to facilitate the spacing of the rods from the bed, a member fixed to the frame and spaced apart from the fixed label guide forming with the fixed label guide a trackway extending parallel to said path of movement of the labels, a slide arm guided in the trackway, a cross bar mounted on the slide arm, a pawl driven by the cross bar and adjustable relative thereto for feeding successive labels over the bed and between the printing member and the pressure roller, and a drive link pivotally connected to the slide arm and actuated by the rotation of the printing member for driving the slide arm, the drive link being guided in said trackway along with the slide arm in a snug sliding fit to prevent misalignment and thus allow successive labels to be moved freely through the apparatus.

4. Rotary printing apparatus according to claim 3 wherein said printing member comprises a printing plate which includes a curved printing element having an embossed raised portion and a holder for the printing plate mounted for rotation on the frame.

5. Rotary printing apparatus for labels comprising a frame, a bed mounted on the frame for supporting a strip of labels to be moved along a longitudinally extending path, a printing member mounted for rotation on the frame, a pressure roller mounted for rotation on the frame and cooperating with the printing member, a fixed label guide at one side of the bed, a flexible rod pivotally connected to the fixed label guide, a label guide assembly removably fixed as a unit at the other side of the bed, said assembly including an adjustable label guide, a label receiving mouth carried by the adjustable guide, a hold-down finger pivotally mounted on the mouth for preventing backward movement of labels over the bed and a

flexible rod pivotally connected to the adjustable guide, said rods holding the labels on the bed and being so pivotally connected to facilitate the spacing of said rods from the bed, a member fixed to the frame and spaced apart from the fixed label guide forming with the fixed label guide a trackway extending parallel to said path of movement of the labels, a slide arm guided in the trackway, a cross bar mounted on the slide arm, a pawl driven by the cross bar and adjustable relative thereto for feeding successive labels over the bed and between the printing member and the pressure roller, and a drive link pivotally connected to the slide arm and actuated by the rotation of the printing member for driving the slide arm, the drive link being guided in said trackway along with the slide arm in a snug sliding fit to prevent misalignment and thus allow successive labels to be moved freely through the apparatus.

6. Rotary printing apparatus according to claim 5 wherein said printing member comprises a printing plate which includes a curved printing element having an embossed raised portion and a holder for the printing plate mounted for rotation on the frame.

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