

Aug. 8, 1967

C. E. ADLER

3,334,583

TICKET PRINTING AND ISSUING MACHINE

Filed Aug. 9, 1965

8 Sheets-Sheet 1

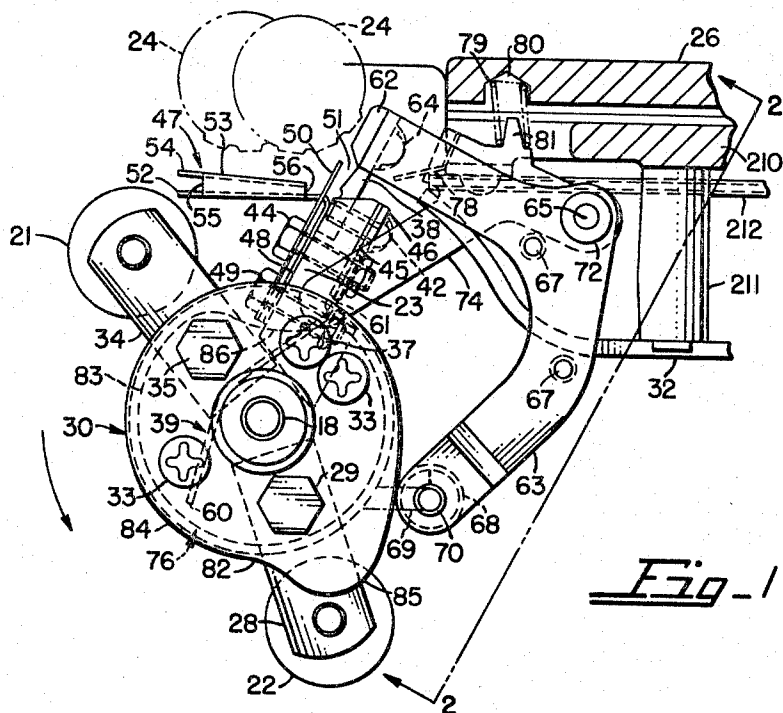


Fig. 1

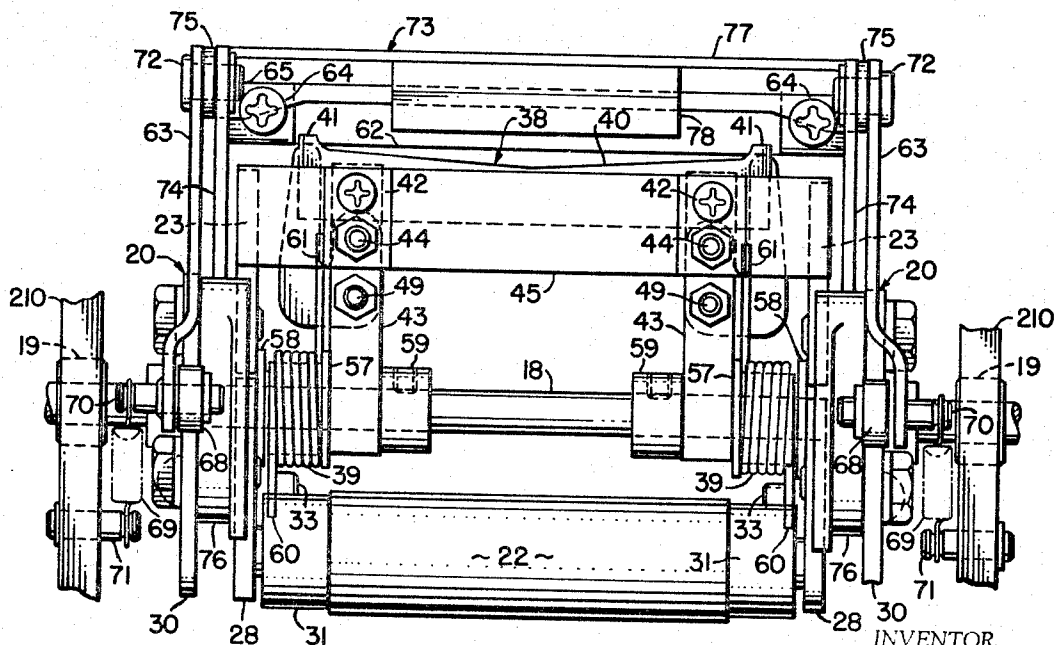


Fig. 2

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8 Sheets-Sheet 2

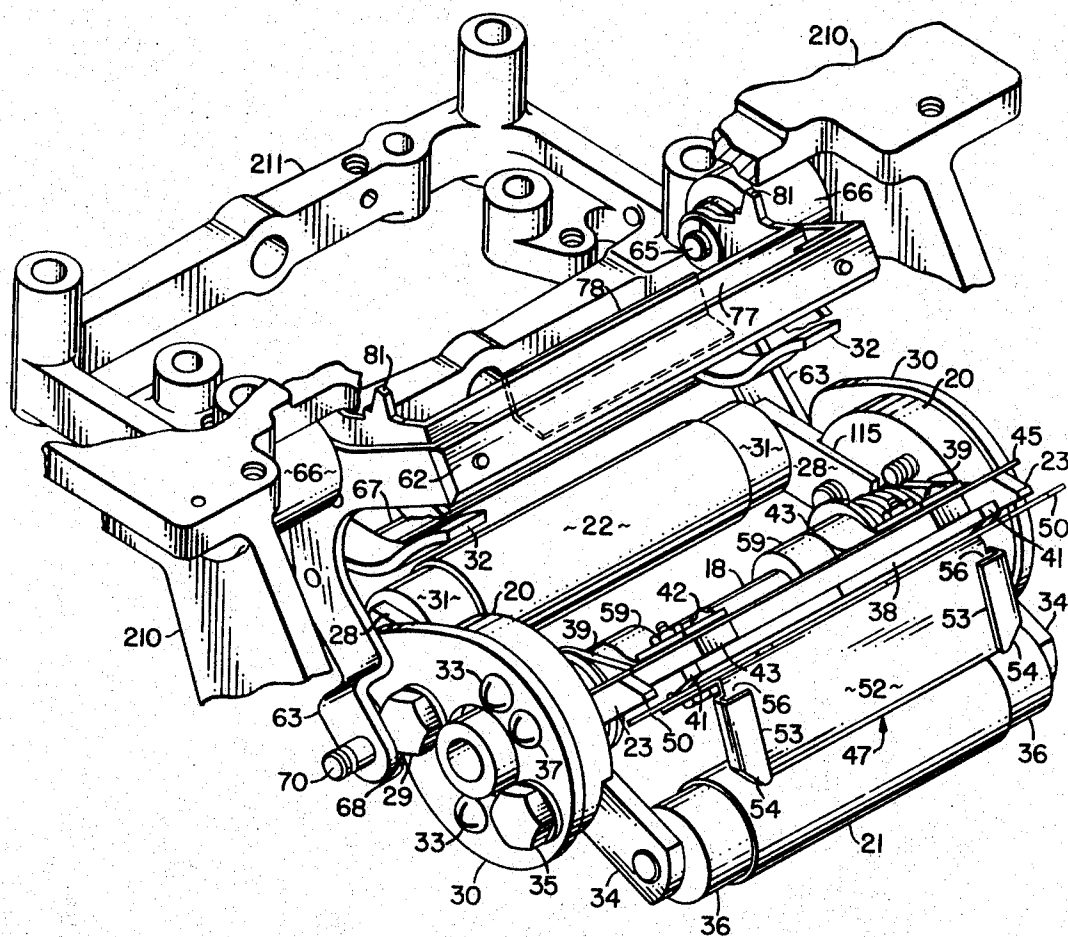


Fig-3

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8 Sheets-Sheet 3

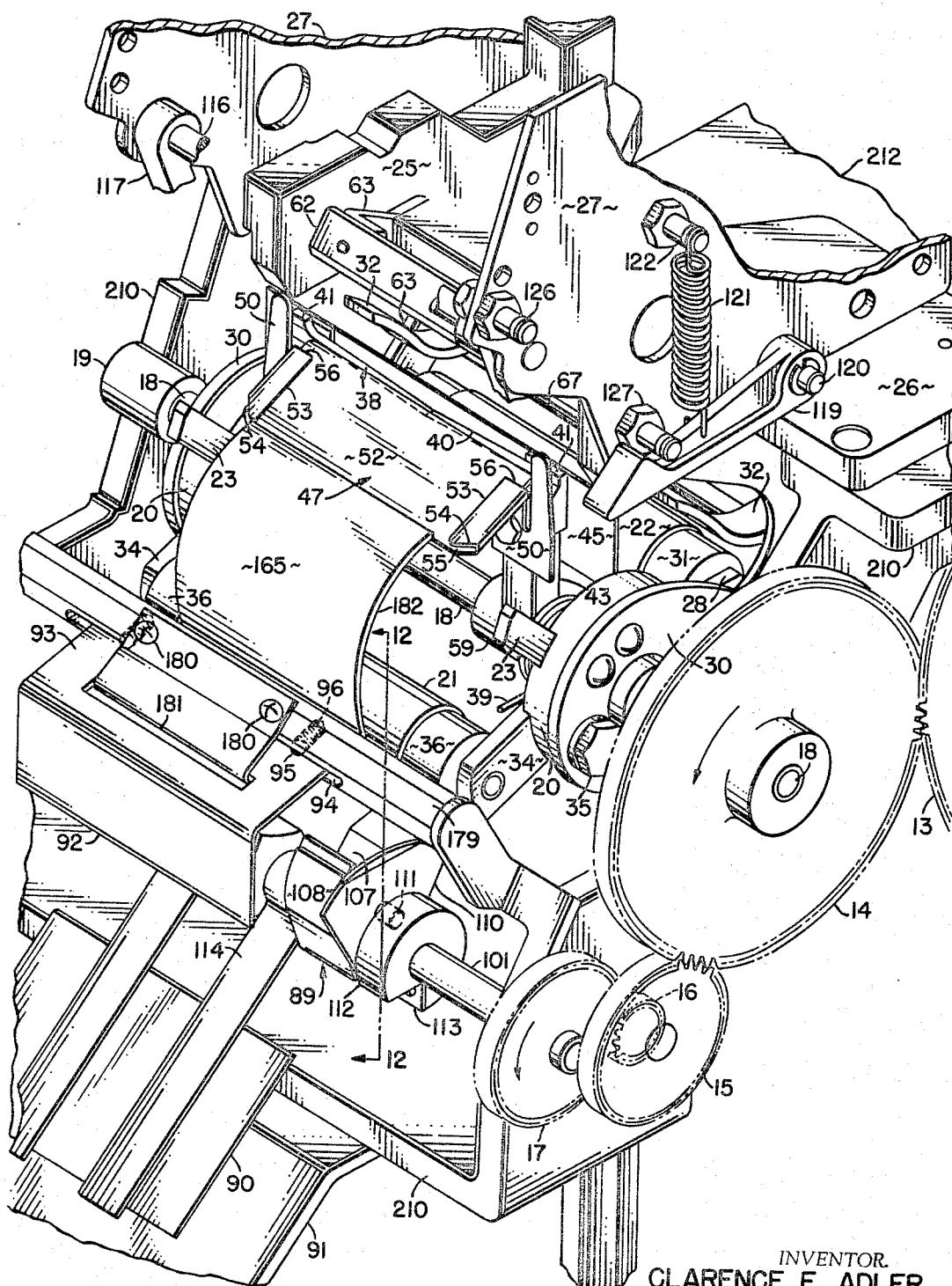


Fig. 4

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TICKET PRINTING AND ISSUING MACHINE

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8 Sheets-Sheet 4

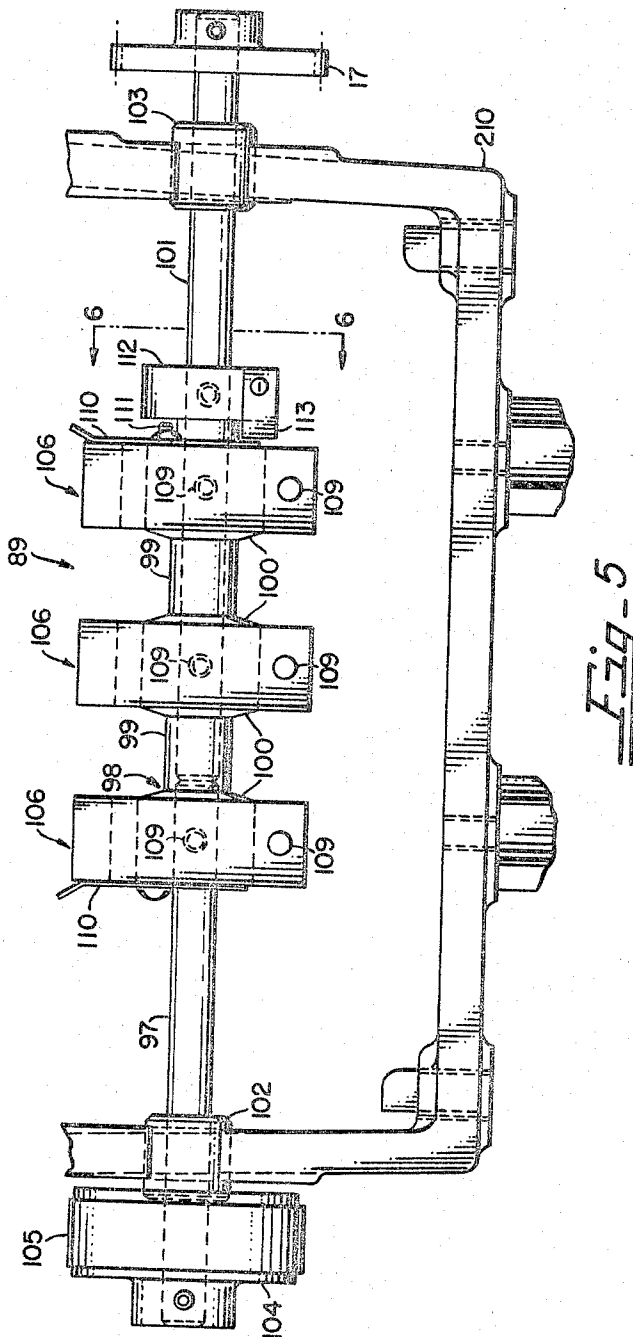


Fig-5

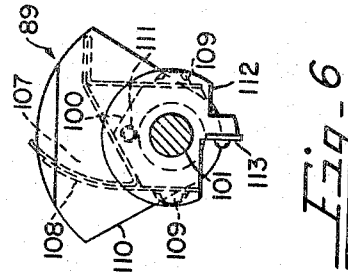


Fig. 6

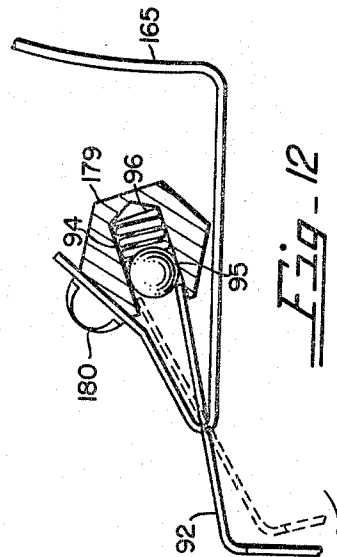


Fig. 12

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TICKET PRINTING AND ISSUING MACHINE

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8 Sheets-Sheet 5

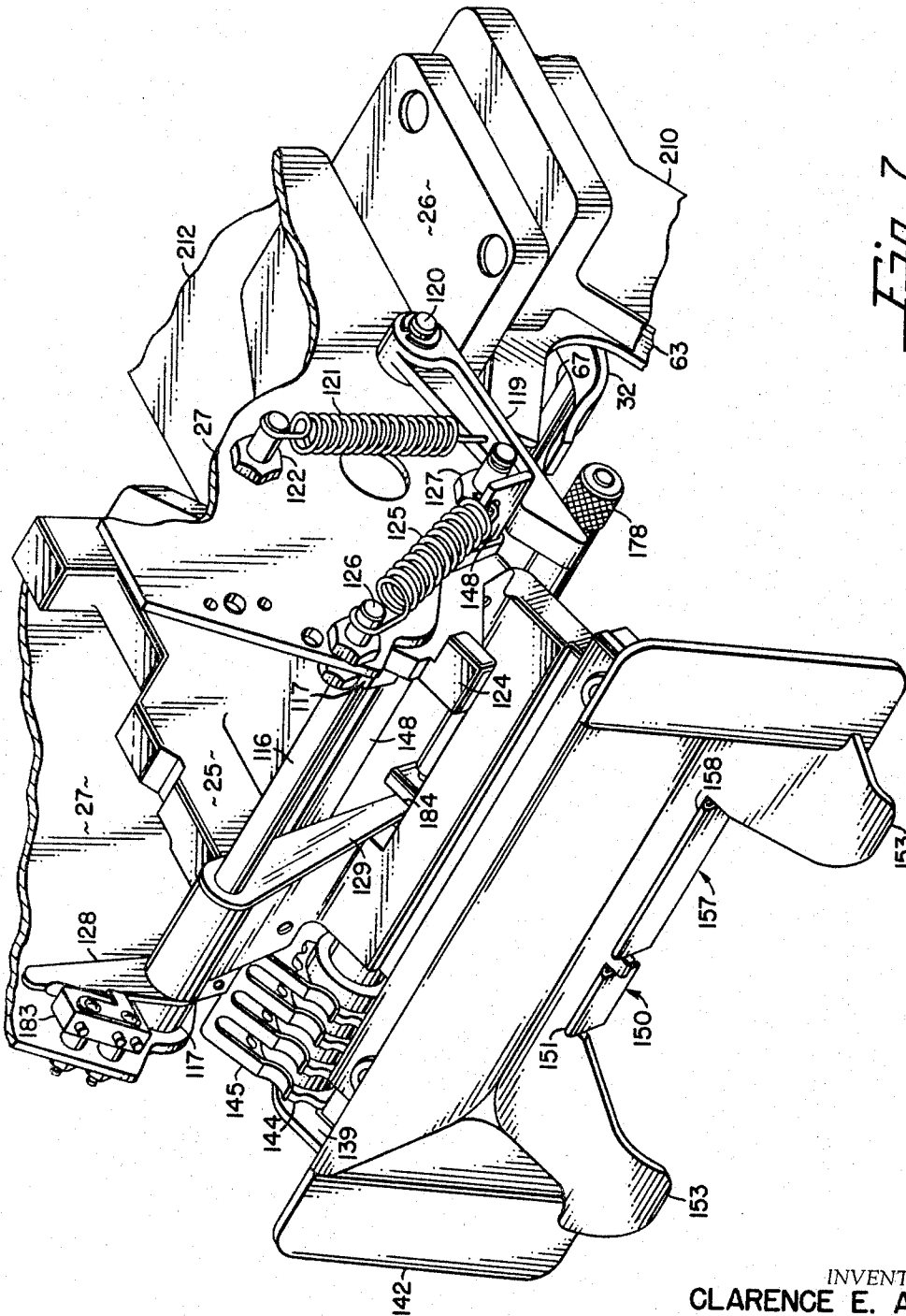


Fig-7

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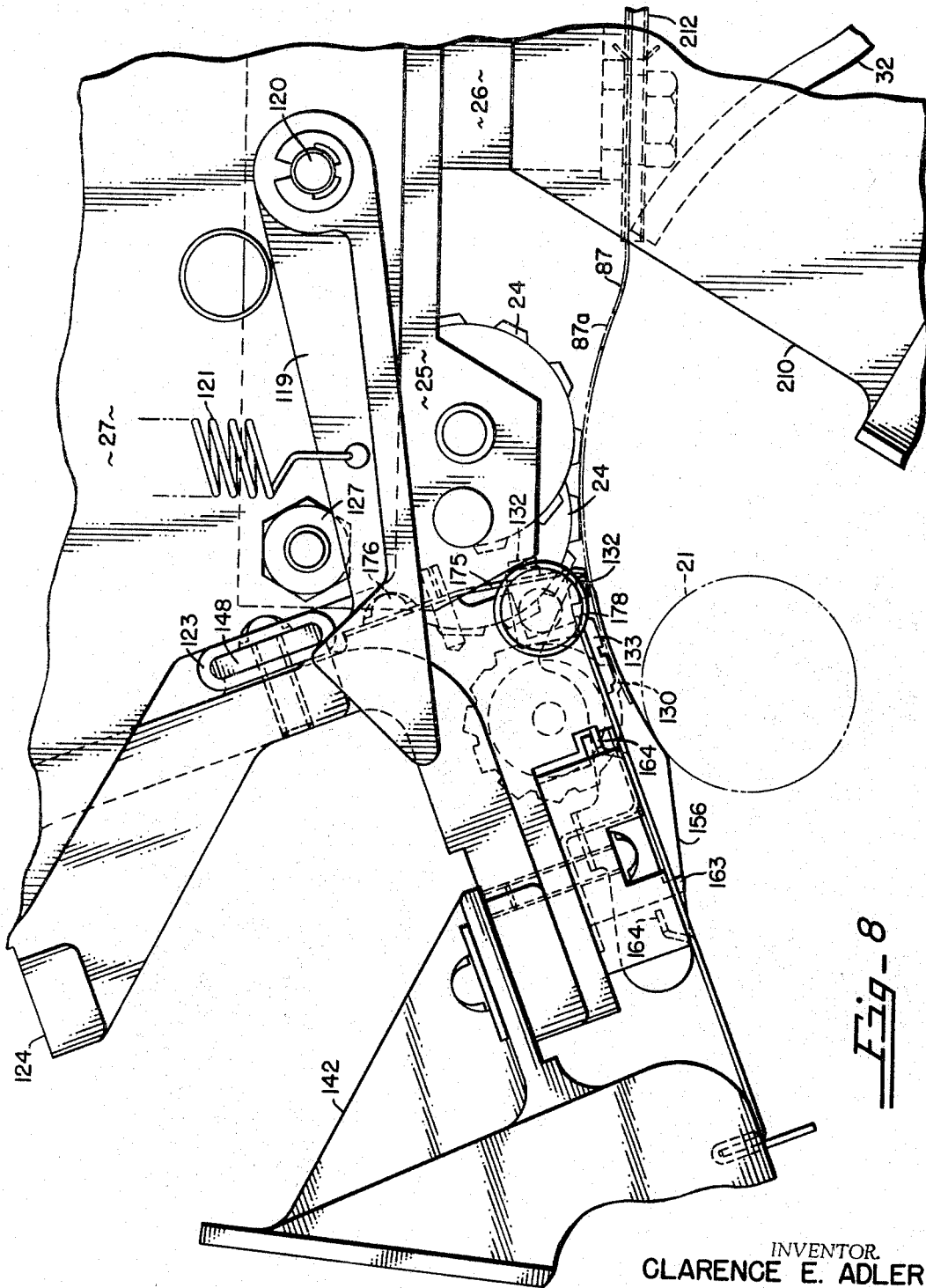
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TICKET PRINTING AND ISSUING MACHINE

Filed Aug. 9, 1965

8 Sheets-Sheet 6



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TICKET PRINTING AND ISSUING MACHINE

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8 Sheets-Sheet 7

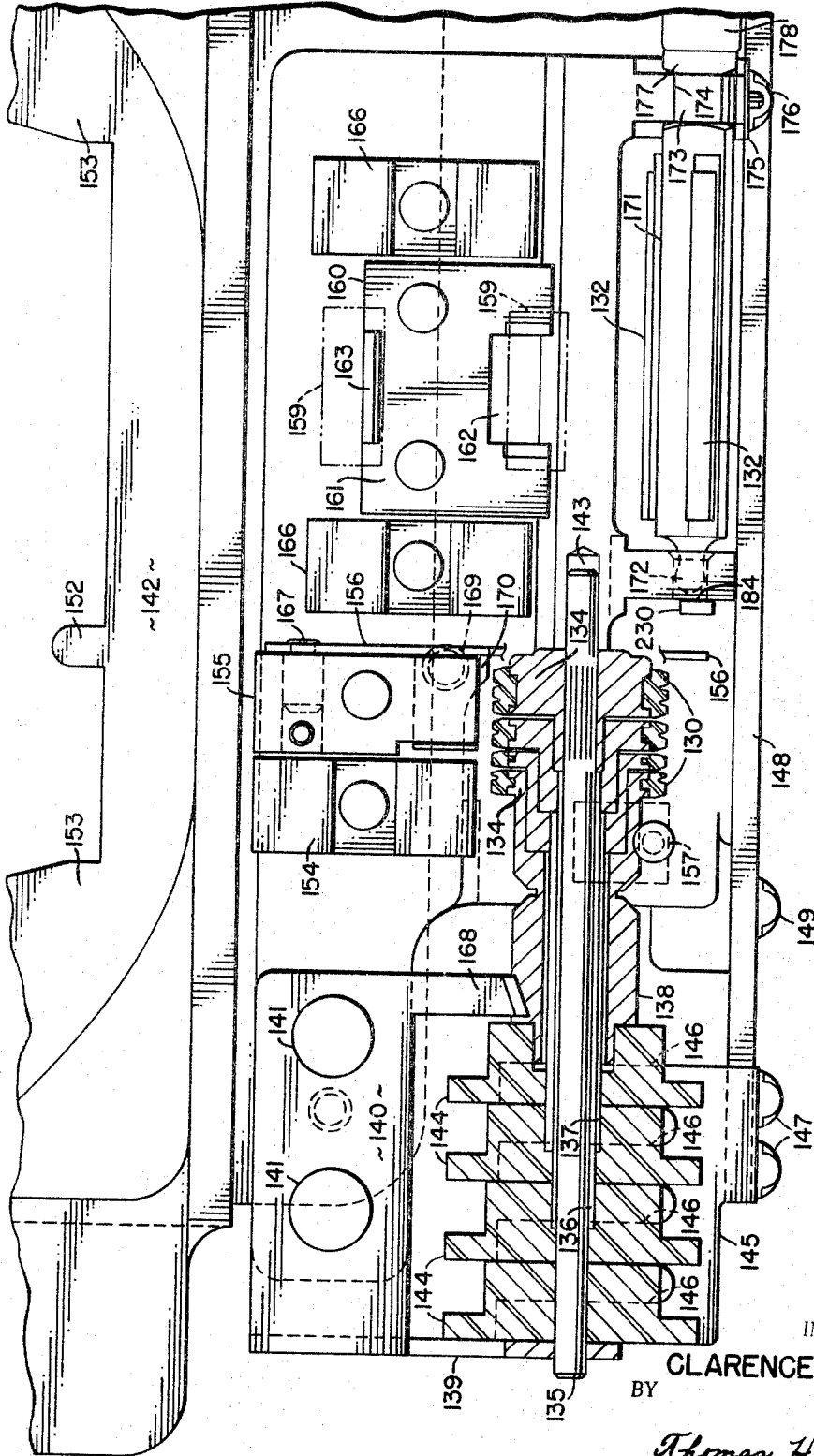


Fig. 9

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TICKET PRINTING AND ISSUING MACHINE

Filed Aug. 9, 1965

8 Sheets-Sheet 8

Fig. 10

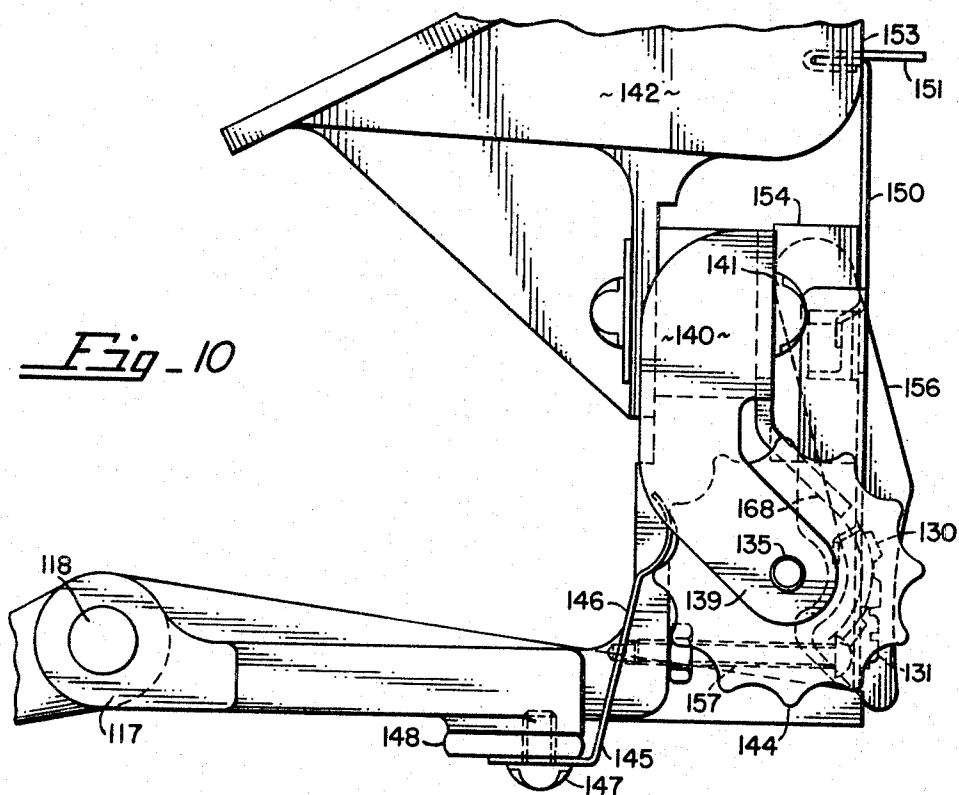
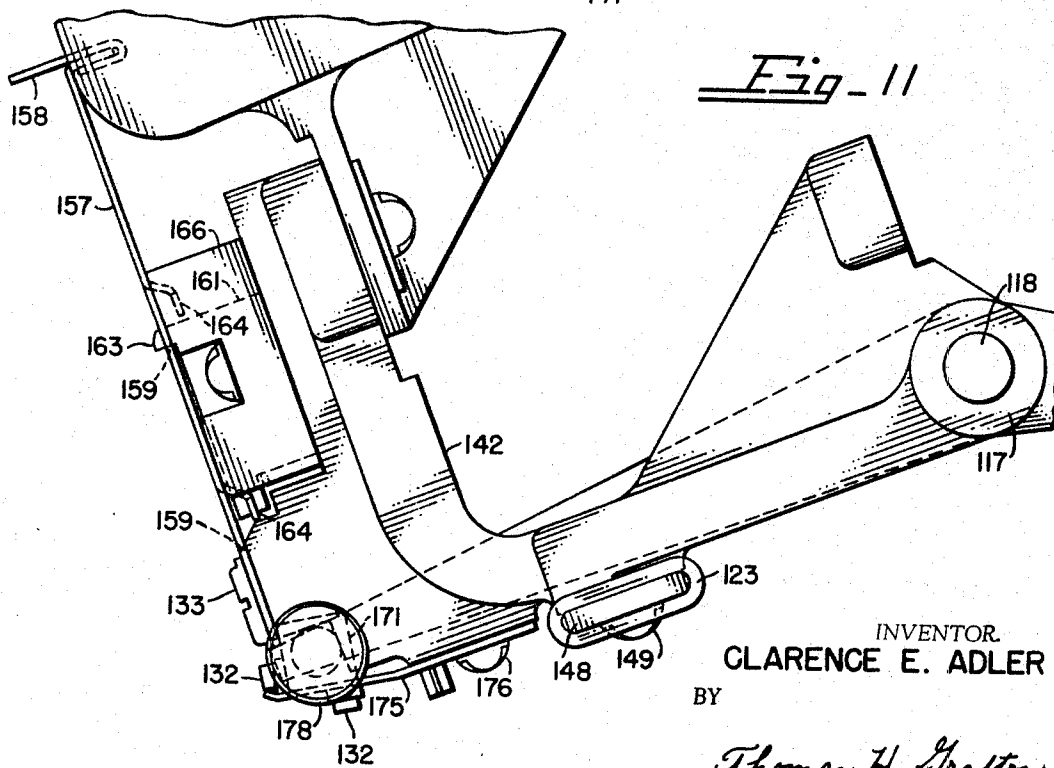


Fig. 11



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3,334,583

TICKET PRINTING AND ISSUING MACHINE
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Scale Corporation, Toledo, Ohio, a corporation of Ohio
Filed Aug. 9, 1965, Ser. No. 478,201
32 Claims. (Cl. 101-66)

This invention relates generally to printing apparatus, and more particularly to a printer which is adapted to print and issue tickets, labels or the like.

The printer is described, for the purpose of illustration, in connection with a computing weighing scale, the scale and the printer weighing commodities and issuing printed tickets each bearing the net weight, price per pound, and computed value of a weighed commodity together with such variable data as the date code, store or operator's code, commodity name, and commodity grade.

The printer is of the type shown in United States Patents 3,122,995 issued Mar. 3, 1964 to Clarence E. Adler and Frederick C. Carroll and 3,119,326 issued Jan. 28, 1964 to Robert E. Bell which intermittently advances, prints, and cuts off successive tickets, labels, or the like from a strip. Heretofore, many printers of this type had reciprocable carriages for inking, printing and cutting off tickets or labels, ticket handling apparatus including flipper bars for delivering printed labels or tickets to a delivery station, and printing devices for printing the date code, store or operator's code, commodity name and commodity grade the control portions of which were inconveniently located in widely separated positions on the printer. The printer of the invention has no reciprocable carriage or flipper bar and therefore is simpler, faster and more compact than the prior printer disclosed in the above patents and includes all of the printing devices, together with their control portions, for printing the date code, store or operator's code, commodity name and commodity grade in one compact pivotable frame which is easily operated to swing all of such printing devices into view for resetting such devices and therefore is more convenient to set up than such prior printer.

The objects of this invention are to provide a compact, yet rugged, printing mechanism of the rotary type which is operable at very high speeds, to provide an improved printer for printing and issuing tickets, labels or the like, to provide an improved rotary printer, to simplify the construction of rotary printers, to improve the handling mechanism for tickets, labels or the like in a printer, and to provide means in a printer for mounting devices for printing such data as the date code, store or operator's code, commodity name, and commodity grade in one small and easily accessible area.

One embodiment of this invention enabling the realization of these objects is a printer which includes a shaft which is turned one revolution per cycle and that carries two hubs one on either end of the shaft. The hubs carry an ink roller and a print roller, each extending laterally across the printer between the hubs, and two knife stops, the rollers and stops being spaced circumferentially about the hubs to perform the inking, printing and cut-off operations in proper sequence. The hubs function as cams for driving a ticket deflector which positions the tickets prior to cutoff with the working parts and carry second cams. A knife also is carried by the shaft independently of the hubs, the knife being urged by means of torsion springs toward the knife stops which are rotatable with the hubs. A cutter blade on a pair of bell cranks is juxtaposed to the path in which the ink and print rollers and knife move and is operated by the second cams to move in and out of the path of the knife at the proper time. In operation, the type in the printing station are set up and the shaft is turned through one revolution causing the ink roller to ink the type, a ticket on a ticket strip is fed under the

inked type, the print roller presses the ticket against the inked type, and the cutter blade is moved into the path of the rotating knife which is stopped momentarily in opposition to the torsion springs and cuts off the ticket, the knife stops continuing to move on and the cutter blade being moved out of the path of the knife after an instant, whereupon the torsion springs move the knife into engagement with the knife stops again, i.e., the knife after the cut-off catches up with the knife stops as they rotate about the axis of the shaft.

In accordance with the above, one feature of this invention resides in the action of the knife catching up with its stops to eject the cut-off ticket out of the printer.

Another feature resides in the rotary arrangement of the printing parts and ticket handling mechanism all in one compact structure.

Still another feature resides in the ticket handling mechanism itself which never permits the tickets to become air-borne or disarranged, i.e., the tickets are moved positively through the printer quickly and consistently.

A further feature resides in means for mounting devices for printing the date code, store or operator's code, commodity name, and commodity grade in one small and easily accessible area on the printer.

The above and other objects and features of this invention will be appreciated more fully from the following detailed description when read with reference to the accompanying drawings wherein:

FIG. 1 is a fragmentary elevational view of the rotary printer according to this invention showing the principal working parts;

FIG. 2 is a fragmentary elevational view as seen from the line 2-2 of FIG. 1 looking in the direction indicated by the arrows;

FIG. 3 is a fragmentary isometric view showing the working parts illustrated in FIG. 1 rotated to their home positions;

FIG. 4 is a fragmentary isometric view showing the working parts illustrated in FIG. 1 combined with the drive mechanism therefor and in conjunction with ticket handling mechanism which is synchronized therewith;

FIG. 5 is an enlarged, front elevational view of part of the ticket handling mechanism shown in FIG. 4;

FIG. 6 is a vertical sectional view taken along the line 6-6 of FIG. 5;

FIG. 7 is an isometric view of the upper portion of the printer as seen from the front showing a pivotable frame in its operative position which mounts devices for printing the date code, store or operator's code, commodity name, and commodity grade in one area;

FIG. 8 is an elevational view of the upper portion of the printer as seen looking toward the right hand side of the mechanism as shown in FIG. 7;

FIG. 9 is an enlarged elevational view of the pivotable frame shown in FIG. 7 tilted upwardly to reveal its underneath side, parts being shown in section for clarity of illustration;

FIG. 10 is an elevational view of the pivotable frame as shown in FIG. 9 as seen from a position to the left of FIG. 9 looking toward the pivotable frame;

FIG. 11 is an elevational view of the pivotable frame as shown in FIG. 9 as seen from a position to the right of FIG. 9 looking toward the pivotable frame, the pivotable frame being rotated counterclockwise a small amount; and

FIG. 12 is an enlarged, fragmentary vertical sectional view taken substantially along the line 12-12 of FIG. 4.

Referring to the drawings, the printer includes a frame 210 which carries a subframe 211 and a ticket chute 212 (FIG. 1) and serves to mount the working parts including a gear 13 (FIG. 4) which drives a gear 14 in the direction indicated by the curved arrow in FIG. 4, a gear 15 which

meshes with the gear 14, a pinion 16 which turns together as one with the gear 15, and a gear 17 which meshes with the pinion 16. There is a 1:1 ratio between the gears 14 and 17 and both gears 14 and 17 turn in the same direction. Gear 13 corresponds to gear 130 shown in FIG. 11 in the above U.S. Patent No. 3,122,995 and serves both to drive the gear 14 which corresponds to gear 131 shown in such patent and to drive a ticket strip feed mechanism as shown in such patent. Only the subframe 211 which corresponds to frame 81 shown in such patent and ticket chute 212 which corresponding to chute 40 shown in such patent of the ticket strip feed mechanism is shown, it being sufficient for an understanding of the operation of the printer to know that the gear 13 is turned one revolution per cycle and it drives the ticket strip feed mechanism shown in the patent to advance a ticket out of the end of the chute 212 (FIG. 1) into the printing station after the type in the printing station have been inked in the same manner as such ticket strip feed mechanism shown in the patent is driven to advance a ticket into the printing station after the type in the printing station have been inked. The ticket strip feed mechanism shown in the patent starts to advance the ticket into the printing station after the type in the printing station have been completely inked. This wait is necessary because the prior inking mechanism moves transversely to the direction of movement of the tickets. In contrast, this same ticket strip feed mechanism when incorporated in the present printer starts to feed a ticket into the printing station when the type only are about one-half inked so that there is simultaneous inking and ticket feeding to speed up the overall cycle.

The one revolution turn of the gear 13 which feeds the ticket strip out of the ticket chute 212 also causes the gear 14, meshed with the gear 13, to turn one revolution in the direction indicated by the arrow in FIG. 4. The gear 14 is mounted on an end of a shaft 18 which is journaled in bushings 19 that are supported in the frame 210, the gear 14 and the shaft 18 turning together as one. The shaft 18, which is turned counterclockwise as viewed in FIG. 1 one revolution per cycle, carries two hubs 20 one on either end of the shaft. The hubs 20 carry a print roller 21 and an ink roller 22 (internally inked type), each extending laterally across the printer between the hubs, and a pair of knife stops 23, the rollers 21 and 22 and knife stops 23 being spaced circumferentially about the hubs 20 to perform the inking, printing and cut-off operations in proper sequence. The hubs also each carry a cam 30. Two screws 33 hold each cam 30 to the respective hub 20. The ink and print rollers 22 and 21 cooperate with printing type 130-133 which are carried in a pivotable frame 142 shown in FIGS. 7-11 and hereinafter described and with the type on type wheels 24 (FIG. 1) which print computed value, unit price and weight and which are part of a readout device 25 (FIG. 4) having a base 26 mounted atop the frame 210 and two vertical side plates 27 and that is disclosed in detail in United States application Ser. No. 416,526 filed Dec. 7, 1964 in the name of Clarence E. Adler.

The ink roller 22 is shown in FIGS. 1-4 and is rotatably mounted in arms 28 extending from radial grooves 115 (FIG. 3) in the hubs 20, there being screws 29, one for each arm 28, extending through the cams 30 and hubs 20 and holding the arms 28 in the hub grooves. The ink roller 22 has wheel portions 31 one at each of its ends which roll along cam tracks 32 carried by the subframe 211, to start the ink roller 22 turning before it reaches the printing type.

The print roller 21 is shown in FIGS. 1, 3 and 4 (omitted from FIG. 2 for clarity of illustration) and is rotatably mounted in arms 34 extending from radial grooves (not shown but which are like grooves 115) in the hubs 20, there being screws 35 one for each arm 34 extending through the cams 30 and hubs 20 and holding the arms 34 in the hub grooves. The print roller 21 has

wheel portions 36 one at each of its ends which roll along the cam tracks 32 to start the print roller 21 turning before it reaches the printing type.

The knife stops 23 extend one from each of the hubs 20, the stops 23 being held in grooves in such hubs. Screws 37, one for each of the stops 23, hold the knife stops 23 in the hub grooves.

A knife 38 also is carried by the shaft 18 but independently of the hubs 20, the knife being urged by means of torsion springs 39 toward the knife stops 23. The knife 38 has a slanted cutting edge 40 (see FIG. 2) which produces a scissors-like action and two knife-stopping ears 41 and is attached as shown in FIG. 2 by means of two screws 42 to the front side of the upper ends of two arms 43 loosely mounted on the shaft 18. The two screws 42 and two additional screws 44 hold a plate 45 to the rear side of the upper ends of the two arms 43, there being a washer plate 46 juxtaposed to the plate 45. Also attached to the front side of the upper ends of the two arms 43 is a tray 47, having legs 48 bent out of the plane of the tray attached to the arms 43 by means of the screws 44 and two additional screws 49, and two flexures 50 which are held juxtaposed to the legs 48 of the tray 47 by means of the screws 44 and 49. The tray legs 48 space the flexures 50 from the arms 43 to produce spaces 51 (FIG. 1) between the upper ends of the flexures 50 and the knife 38. The tray 47 includes a flat-bottom portion 52 which receives tickets as hereinafter described and side portions 53 bent out of the plane of the bottom portion which are provided with fingers 54 and which together with the flat-bottomed portion 52 define spaces for receiving and confining edge portions of the tickets, such spaces being open at the front 55 and rear 56 of the tray 47 to permit passage of tickets there-through.

The torsion springs 39 are coiled around flanged collars 57 fixed to the shaft 18 between the arms 43 and collars 58 fixed to the shaft 18 and extending from the hubs 20. The collars 57 and 58 confine the torsion springs 39 within restricted areas and the collars 57 also function to locate the loosely mounted arms 43 between them and collars 59 fixed to the shaft 18. The torsion springs have one of their ends 60 bearing against the screws 33 and their other ends 61 bearing against the plate 45 and urge the loosely mounted arms 43 to which the plate 45 is attached toward the knife stops 23. In the positions of the working parts shown in FIGS. 1-3 the plate 45 is held against the knife stops 23 by means of the torsion springs 39.

A cutter blade 62 extending between two bell cranks 63 and attached to the bell cranks 63 by means of two screws 64 is juxtaposed to the path in which the ink and print rollers 22 and 21 and knife 38 move and is operated by the cams 30 to move into and out of the path of the knife 38 at the proper time. The bell cranks 63 are pivoted at 65 on a boss 66 (FIG. 3) of the frame 210, are strengthened to move rigidly as a unit by means of two laterally extending rods 67, and are provided with cam-following rollers 68 which are held on the cams 30 by means of springs 69 extending between pins 70 carried by the bell cranks 63 and studs 71 extending from the frame 210.

In simplified operation, the shaft 18 is turned through one revolution counterclockwise as viewed in FIG. 1 causing the ink roller 22 to ink the type, a ticket on a ticket strip is fed out of the chute 212 under the inked type, the print roller 21 presses the ticket against the inked type, and the cutter blade 62 is moved into the path of the rotating knife 38 (position as shown in FIGS. 1 and 2) which is stopped momentarily by engagement of its ears 41 (FIG. 2) with the cutter blade 62 in opposition to the torsion springs 39 and cuts off the ticket, the knife stops 23 continuing to move on the cutter blade 62 being moved out of the path of the knife 38 after an instant whereupon the torsion springs 39 move the knife 38 into engage-

ment with the knife stops 23 again, i.e., the knife 38 after the cut-off catches up with the knife stops 23. One of the features of the invention resides in the action of the knife 38 catching up with its stops 23 to eject the cut-off ticket out of the printer. When the rotating knife 38 is stopped by engagement with the cutter blade 62, the shaft 18 continues to rotate carrying the ink and print rollers 22 and 21 and the knife stops 23 toward their initial or home positions shown in FIG. 3, while the cutter blade 62 moves downwardly under the action of the bell cranks 63 as viewed in FIG. 2 to cut off a ticket caught between the cutter blade 62 and the slanted cutting edge 40 of the knife 38 with a scissors-like action. As soon as the cutter blade 62 moves upwardly under the action of the bell crank 63 out of the rotary path of the two ears 41 on the knife 38, the torsion springs 39 snap the plate 45 into engagement with the knife stops 23 and, thus, the knife 38 from its FIGS. 1 and 2 position into its FIG. 3 position. When the cutter blade 62 moves downwardly to cut off a ticket it moves into the spaces 51 (FIG. 1) between the flexures 50 and the knife 38, the flexures 50 functioning to press the cutter blade 62 against the knife 38. As the printer rotates from its home position shown in FIG. 3 to its cut-off position shown in FIGS. 1 and 2, the wheel portions 31 and 36 of the rollers 22 and 21 roll on the stationary cams 32 to start the rollers rotating before they reach the printing type.

Also pivoted at 65 on studs 72 extending from the bosses 66, is a bail 73 which includes two cam-following arms 74, adjacent the bell cranks 63 and separated from the bell cranks 63 by means of washers 75, that follow cam portions 76 of the hubs 20 and that are connected by means of a cross bar 77 carrying a ticket deflector 78. Coil springs 79 extending from depressions 80 in the readout base 26 embrace integrally formed pins 81 extending from the cam-following arms 74 and maintain the arms 74 and the cams 76 engaged.

In operation, the home position of the printer is shown in FIG. 3 with the ink roller 22 ready to engage the stationary cams with its wheel portions 31. In such home position, the cam rollers 68 rest at 82 on low portions 84 (FIG. 1) of the cams 30 and the cam-following arms 74 rest on high portions 83 (FIG. 1) of the cams 76. Counterclockwise rotation of the shaft 18 causes the ink roller 22 to roll across the printing type and ink them. During this time, the cam rollers 68 follow the low portions 84 of the cams 30 which are concentric with the axis of the shaft 18 until they start rising onto the high parts 85 of the cam 30. While the cam rollers 68 follow the low portions 84 of the cams 30, the bell cranks 63 are so located that the cutter blade 62 is held up out of the path of all of the rotating parts. Also during this time, the cam-following arms 74 follow the high portions 83 of the cams 76 which are concentric with the axis of the shaft 18 until they start falling into the low parts 86 of the cams 76. While the cam-following arms 74 follow the high portions 83 of the cams 76, the arms 74 are so located that the ticket deflector 78 is held up out of the path of all of the rotating parts. At this point in the cycle, the ink roller 22 has just passed the printing type and the cutter blade 62 and the ticket deflector 78 are up out of the way of the rotating parts.

The ticket strip feed mechanism referred to above as being disclosed in United States Patent No. 3,122,995 starts to feed the ticket strip 87 (FIG. 8) out of the end of the chute 212 when the ink roller 22 has reached the middle of the type, the ticket strip feed mechanism and the working parts shown in FIGS. 1 and 2 being synchronized through the meshed gears 13 and 14 (FIG. 4) as described above, i.e., there is simultaneous inking and ticket feeding. The print roller 21 then presses the ticket strip 87 against the inked type so that the ticket strip assumes its arcuate shape shown in FIG. 8. At this point in the cycle, the print roller 21 has just passed the printing type and the cutter blade 62 and the ticket deflector 78 still are up out of the way of the rotating parts. Since

the low portions 84 of the cams 30 and the high portions 83 of the cams 76 are concentric with the axis of the shaft 18, the cutter blade 62 and the ticket deflector 78 are held in their inoperative positions throughout most of the cycle.

As shown in the above United States Patent No. 3,119,326, the ticket strip 87 is provided along its edges with notches 87a which are located in pairs accurately spaced relation lengthwise of the strip. The lengthwise distance between any two of the notches is equal to the desired dimension of an individual ticket. As shown in FIG. 8 after the ticket strip 87 has been fed out of the chute 212, a length of ticket strip equal to about one and one-half tickets projects from the end of the chute 212. As the ticket strip is fed into the printing station, a spring-biased arm 156 (FIGS. 8, 9, and 10) hereinafter described holds the tickets as they are fed into the printing station away from the type to prevent smearing of the tickets and is depressed during printing cycles as shown in FIG. 8 by the print roller 21 to permit the tickets to engage the inked type. When the print roller 21 releases the arm 156, it returns to its position shown in FIG. 11 as hereinafter described and helps eject the ticket by stripping it off the type.

The tray 47 follows closely behind the print roller 21 and its fingers 54 are received in the ticket notches of the printed ticket, such notches being positively aligned to receive such tray fingers 54 by means of the ticket deflector 78 which moves down to engage the ticket strip just before the tray fingers 54 thread into the notches. The ticket deflector 78 moves down when the cam-following arms 74 moves into the low portions 86 of the cams 76. As shown in FIG. 1, the cam-following arms 74 are just about to move out of the low portions 86 of the cams 76 onto the high parts 83 of the cam 76. Thus, the ticket deflector 78 is held up out of the way of the rotating parts throughout most of the cycle and comes into play only momentarily once in the cycle by moving down to position the ticket strip relative to the tray fingers 54 and then up out of the way. This causes the ticket strip to be threaded through the tray 47 and completely stripped from the type, the tray 47 being open at its front 55 and rear 56 as hereinbefore described.

As shown in FIG. 1, when the tray 47 is under the type wheels 24, the cam rollers 68 have started following the high parts 85 of the cams 30. This drives the cutter blade 62 down into its position shown in FIGS. 1 and 2 with the ticket strip caught between the cutter blade 62 and the slanted cutting edge 40 of the rotating knife 38 and the knife 38 is stopped momentarily by engagement of its ears 41 (FIG. 2) with the cutter blade 52 in opposition to the torsion springs 39. As the rollers 68 continue to follow the high parts 85 of the cams 30, the cutter blade 62 continues to move downwardly and cuts off the ticket and then, as the rollers 68 follow the cams 30 around and stop at 82 on the low parts 84 of the cams 30 when the cams 30 stop in their home position, the cutter blade 62 moves upwardly and releases the knife 38. Thus, the cutter blade 62 is held up out of the way of the rotating parts throughout the cycle except during cutoff when it moves downwardly to stop the rotating knife 38 and cut off the ticket, and then moves upwardly and releases the knife 38.

When the cutter blade 62 stops the knife 38 and the tray 47 containing the printed ticket, the knife 38 and the tray 47 moving together as one through their attachment to the loosely mounted arms 43, the knife stops 23 continue to move ahead toward their home position as shown in FIG. 4. After the cutter blade 62 releases the knife 38, the torsion springs 39 move the loosely mounted arms 43 ahead until the plate 45 reengages the knife stops 23 as shown in FIG. 3. Rapid movement of the tray 47 from the cutoff position to the home position ejects the ticket which follows underneath the curved stationary deflector 165 (FIGS. 4 and 12).

The deflector 165 is attached to a bar 179 extending

cross the front of the frame 210 by means of two screws 80, the deflector 165 being bent at 181 down and underneath the bar 179 and then being formed with a smooth curved guiding arcuate portion 182. The ejected tickets are aided by the stationary deflector 165 into a rotatable shuttle 89 (FIGS. 4-6) which dumps them onto a flat chute 90 down which they slide onto a delivery station or label activator 91 which is attached to the bottom of the frame 210 and which is disclosed in detail in United States Patent No. 2,954,455 issued Sept. 27, 1960 in the name of Robert A. Bell.

The tickets are delivered to the delivery station of label activator 91 in a printed-face-up or a printed-face-down position. Selective face-up or face-down delivery is accomplished by means of a manually operable deflector 92 having a U-shaped upper portion 93 which fits around the bent portion 181 of the deflector 165, the legs of the U being received in a groove 94 in the bar 179, the top and bottoms of the groove 94 acting as stops for limiting movement of the deflector 92. In the up position of the deflector 92 which is shown in FIG. 4 and in solid lines in FIG. 12, detent balls 95 are pressed by means of springs 96 within openings in the bar 179 against the upper edges of the deflector legs to hold the deflector 92 in its up adjusted position. In the down position of the deflector 92 shown in broken lines in FIG. 12, the detent balls 95 are pressed by means of the springs 96 against the lower edges of the deflector legs to hold the deflector 92 in its down adjusted position. In the up position of the deflector 92, it is inoperative, the tickets with their printed face up being ejected from the tray 47 and following the curved guide 165 into the shuttle 89 which as it rotates counterclockwise as viewed in FIG. 4 inverts the tickets and delivers them with their printed face down onto the flat chute 90. In the down position of the deflector 92, as the shuttle 89 rotates counterclockwise to deliver the tickets, the upper edges of the tickets strike the deflector 92 and, instead of being inverted, move with their printed faces up onto the flat chute 90. This action is the same as that accomplished by the label turnover plate 123 disclosed in the above United States Patent No. 3,119,326.

The shuttle 89 includes a shaft 97 having an enlarged hollow end portion 98 which has two round parts 99 separating three hexagonal parts 100. The enlarged hollow end portion 98 of the shaft 97 so receives a shaft 101 that the shafts 97 and 101 are independently rotatable in their respective bushings 102 and 103 which are carried by the frame 210. The shaft 97 is driven by means of a pulley 104 which is driven in turn by means of a continuously movable belt 105. The shaft 101 is driven by means of the gear 17 which as shown in FIG. 4 is driven in the same direction as the gear 14 and as described above has a 1:1 ratio therewith. The shaft 97 carries three receptacles 106 each including a mouth 107 (FIGS. 4 and 6) formed by means of sheet metal 108 formed as shown in FIG. 6 and attached to a hexagonal shaft part 100 by means of two screws 109. The outer two of the three receptacles 106 are provided with side plates 110 and the right hand one of the three receptacles 106 carries a stop pin 111. The shaft 101 carries a collar 112 which in turn carries a stop 113. The flat chute 90 is provided with two extensions 114 (FIG. 4) having ends not shown which are loosely wrapped around the round parts 99 (FIG. 5) of the shaft 97 as a means of mounting the flat chute 90 which has its lower end as shown in FIG. 4 resting on the label activator 91.

In the operation of the shuttle 89, at the beginning of a printing cycle, the stop pin 111 is in engagement with the stop 113 and the continuously moving belt 105 slips on its pulley 104. This provides timing so that the receptacles 106 are oriented to receive a ticket at the proper time. As the gear 14 drives the rotary printer through one revolution, the gear 17 drives the stop 113 from its position shown in FIGS. 4-6 through one revolution permitting the belt 105 to drive the shuttle receptacles 106 through

one revolution until the stop pin 111 reengages the stop 113. The stop 113 moves faster than the stop pin 111 so that it moves apart from it after the initiation of a cycle. Accordingly, after the rotary printer has completed its cycle and has ejected the ticket into the shuttle receptacle 106, the receptacles 106 which are moving when they receive the ticket continue to move counterclockwise as viewed in FIG. 4 until they are stopped by the stop 113 and dump the ticket onto the flat chute 90.

One of the features of the printer resides in the ticket handling mechanism which never permits the ticket to become air-borne or disarranged. The tray 47 and the arm 156 strip the ticket from the type and the tray 47 holds it accurately and surely while it is cut off. When the tray 47 snaps forwardly under the action of the torsion springs 39, the guide 165 makes sure the ticket is guided positively into the moving shuttle receptacles 106 therebelow which dump it onto the flat chute 90 in a consistently repeatable pattern. Furthermore, the ticket handling mechanism ejects the tickets quickly permitting a fast rotary printing cycle and is of rugged and simple structure giving no trouble in use.

Another one of the features of the printer resides in the pivotable frame 142 which mounts devices hereinafter described including the printing type 130-133 for printing the date code, store or operator's code, commodity name, and commodity grade in one small and easily accessible area on the printer. The pivotable frame 142 is pivoted on a stationary rod 116 extending between the plates 27 by means of two ears 117 each having a hole 118 receiving the rod 116. The pivotable frame 142 is shown in operative position in FIGS. 7 and 8 which is reached by pushing downwardly on handles 153 until a plate 148 carried by the pivotable frame 142 cams a latch 119, which is pivoted on a pin 120 extending from one of the vertical plates 27, in opposition to a spring 121 extending between the latch 119 and a screw 122 extending from the vertical plate 27, out of its way and a resilient bumper 123 carried by the plate 148 engages the front edge of the vertical plate 127 as shown in FIG. 8. In such operative position, the latch 119 is pulled upwardly by the spring 121 to cooperate with the plate 148 as shown in FIGS. 7 and 8 holding the pivotable frame 142 in its operative position wherein the printing type 130-133 are positioned as shown in FIG. 8, juxtaposed to the readout printing type 24. The pivotable frame 142 is rotated upwardly to present printing type identifying indicia on wheels 144, printing plate handles 151 and 158, and handle 178 (hereinafter described) to the operator's view by pulling upwardly on the handles 153 until the plate 148 carried by the pivotable frame 142 cams the latch 119 in opposition to the spring 121 out of its way and a bumper 124 on the pivotable frame engages the front edge of the vertical plate 27, an over-center toggle spring 125 extending between the plate 148 and a screw 126 extending from the plate 27 holding the pivotable frame 142 in its up position. In the up position of the pivotable frame 142, a stop pin 127 carried by the vertical plate 27 limits upward movement of the latch 119. Hence, no release or lock need be operated prior or after movement of the pivotable frame 142 by the operator. The operator simply grasps the handles 153 and pulls upwardly to move the pivotable frame 142 from its operative position shown in FIGS. 7 and 8 until the over-center toggle spring 125 takes over and urges the bumper stop 124 against the front edge of the vertical plate 27 and simply grasps the handles 153 and pushes downwardly to return the pivotable frame 142, whereupon the latch 119 is moved by its spring 121 into its FIGS. 7 and 8 position.

The date code, store or operator's code, commodity grade, and commodity name are printed by means of the printing type 130, 131, 132, and 133, respectively.

The date code type 130 are carried on the four type wheels 134 which are carried in turn on four rotatable shafts 135, 136, 137 and 138. As shown in FIG. 9, shaft

135 is journaled at one end in an ear 139 of a bracket 140, which is attached by means of screws 141 to the pivotable frame 142, and at the other end in a hole 143 in the pivotable frame 142. Shaft 136 is hollow and is sleeved over shaft 135; shaft 137 is hollow and is sleeved over shaft 136; and shaft 138 is hollow and is sleeved over shaft 137. The shafts 135-138 carry on their one ends the type wheels 134 which are formed with hubs as shown in FIG. 9 nested together so that the printing type on the wheels are closely adjacent each other. The shafts 135-138 on their other ends carry the indicia-bearing detent wheels 144 which are turned to set the respective date code type wheels 134 in printing position. A spring comb 145, having a spring tooth 146 for each detent wheel, engages the detent wheels 144 to retain them in their adjusted positions, the spring comb 145 being attached by means of two screws 147 to a plate 148 which is attached in turn by means of two screws 149 to the pivotable frame 142.

The store or operator's code type 131 are carried on a printing plate 150 which is shown in operative position in FIG. 10, being removed from the pivotable frame 142 in FIG. 9 for clarity of illustration. The printing plate 150 carries the type 131 at one end and has a flat handle 151 at its other end which is received between a finger 152 on the pivotable frame 142 and one of the handles 153 of the pivotable frame 142 to locate the printing plate 150, a second ear 168 on the bracket 140 also serving to locate and keep the printing plate 150 stable. The end of the printing plate 150 at the type 131 rests against the head of a screw 157 extending from the pivotable frame 142. A magnet 154 carried by the pivotable frame 142 holds the printing plate 150 in place, the magnet 154 being juxtaposed to a block 155 attached to the pivotable frame 142 which functions as a base upon which part of the printing plate 150 bears and as a mounting for the spring-biased arm 156 which is pivoted at 167 to the block 155 and holds the tickets as they are fed into the printing station away from the type to prevent smearing of the tickets and that is depressed during the printing cycles by the print roller 21 to permit the tickets to engage the inked type. When the print roller 21 releases the arm 156 it is urged to its FIG. 11 position and helps eject the ticket by stripping it off the type. The arm 156 is urged to its FIG. 11 position by means of a coil spring 169 (FIG. 9) which drives a finger 170 on the arm 156 against the underneath side of the block 155 as viewed in FIG. 9, engagement of the finger 170 with the block 155 serving to limit movement of the arm 156. The printing plate 150 is grasped by the handle 151 and moved away from the magnet 154 to remove the plate and is placed against the magnet 154 with the handle 151 against the pivotable frame 142 and between the handle 153 on the frame 142 and the finger 152 on the frame 142 to replace the plate.

The commodity name type 133 are carried on a printing plate 157 which is shown in operative position in FIG. 11, being removed from the pivotable frame 142 in FIG. 9 for clarity of illustration. The printing plate 157 carries the type 133 at one end and has a flat handle 158 at its other end which is received between the finger 152 of the pivotable frame 142 and one of the handles 153 of the pivotable frame 142 to locate the printing plate 157 and is provided with two holes 159 which are shown in FIG. 11 and are indicated as the broken line rectangles 159 in FIG. 9, such holes 159 being formed in part by bending in tabs 164 one of which abuts a face 160 of a block 161 attached to the pivotable frame 142 and one of which is received in a hole 162 in the block 161 to aid in locating the printing plate 157 and keeping it stable. One of the holes 159 in the printing plate 157 receives a projection 163 of the block 161 which in conjunction with a ticket guide 165 (FIG. 4) as hereinafter described prevents removal of the printing plate 157 when the pivotable frame 142 is in operative position. A magnet 166 attached to the pivotable frame 142 one on either side of the block 161

hold the printing plate 157 in place, the block 161 serving as a base upon which part of the printing plate 150 bears. The printing plate 157 is grasped by the handle 158 and moved away from the magnets 166 to remove the plate and is placed against the magnets 166 with its handle 158 between the handle 153 on the frame 142 and the finger 152 on the frame 142 to replace the plate.

The commodity grade type 132 are carried on a square bar 171 having a round end 172 journaled in the pivotable frame 142 and a round portion 173 which turns on a surface 174 of the pivotable frame 142, the round portion 173 being held against the surface 174 by means of a flexure spring 175 which is attached to the frame 142 by means of a screw 176 and bears against flat portions 177 of the square bar 171 to produce a detent action. The type 132 are set up by turning a handle 178 on the end of the square bar 171, the flexure spring 175 holding the square bar 171 in its adjusted position.

When the pivotable frame 142 is in its operative position shown in FIGS. 7 and 8, the printing type 130-133 are in the printing station together with the type on the readout wheels 24. In such position, the indicia-bearing printing plate handles 151 and 158 are not squarely in view from a standing position in front of the printer and the indicia-bearing wheels 144 and the indicia-bearing handle 178 are hidden from view. When it is desired to change one or more of the type 130-133, the operator tilts the pivotable frame 142 upwardly as described above. The wheels 144 then are clearly visible and can be easily turned to set up the type wheels 134, the printing plates 150 and 157 can be readily replaced, and the handle 178 is clearly visible and can be easily turned to set up the type 132. The indicia-bearing wheels 144 and indicia-bearing handle 178 are not apt to be inadvertently turned when the pivotable frame 142 is in operative position because they are not visible. The printing plate 150 can be removed inadvertently when the pivotable frame 142 is in operative position. However, such removal of the printing plate 150 is not significant because the printing of the store or operator's code is relatively unimportant. The printing plate 157 which prints the commodity name, however, cannot be removed when the pivotable frame 142 is in its operative position because the printing plate 157 then bears against the ticket guide 165 (FIG. 4) and one cannot move the printing plate enough to remove the hole 159 in the printing plate out of its engagement with the projection 163 (FIG. 9) on the block 161. After setting the type 130-133, the operator simply pushes down on the pivotable frame 142 to position it in its FIGS. 7 and 8 position to accurately locate such type in the printing station as described above.

The printer will not operate when either the commodity name printing plate 157 is not properly positioned in the pivotable frame 142 or when the pivotable frame 142 is not in its operative position. These interlocks are accomplished by means of a switch operator 128 (FIG. 7) which is loosely pivoted on the rod 116 and which carries an arm 129 having an end 230 (FIG. 9) engageable by the commodity name printing plate 157. When the printing plate 157 is in place and the pivotable frame 142 is in operative position, the printing plate 157 bears against the end 230 of the arm 129 and the switch operator 128 is forced against a safety switch 183 in opposition to the spring in the switch to close the switch and complete a circuit to the motor which drives the gear 13 (FIG. 4). Rearward movement of the arm 129 is limited by plate 148, movement of the arm 129 to the right as viewed in FIG. 7 is limited by the pivotable frame 142 at 184, and movement of the arm 129 to the left is limited by engagement of the switch operator 128 with one of the ears 117 of the pivotable frame 142. When the pivotable frame 142 is tilted upwardly out of its operative position, the switch operator 128 moves clockwise as viewed in FIG. 7 about the axis of the rod 116 and the spring-biased switch 183 opens, or when the commodity name printing plate

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57 is not in the pivotable frame 142 when the frame 142 is in its operative position, there is nothing to prevent movement of the end 230 of the arm 129 and the spring force of the switch 183 pushes the switch operator 128 and the switch 183 automatically opens.

In overall operation, the operator pulls upwardly on the pivotal frame 142 until the over-center toggle spring 125 takes over and urges the bumper stop 124 against the front edge of the vertical plate 27. He then sets up the type 130-133 and then pushes downwardly to return the pivotable frame 142, whereupon the latch 119 is moved by its spring 121 into its FIGS. 7 and 8 position. The type wheels 24 are set up automatically by the readout device 25 as described in the above United States application Ser. No. 416,526. The continuously moving belt 105 slips on its pulley 104 while the stop pin 111 is in engagement with the stop 113 and the shaft 18 is turned one revolution causing the ink roller 22 to roll across the type 24 and 130-133 and ink them. The ticket feed mechanism referred to above as being disclosed in United States Patent No. 3,122,995 starts feeding the ticket strip 87 out of the end of the chute 212 when the ink roller 22 reaches the middle of the type. As soon as the shaft 18 starts turning, the gear 117 drives the stop 113 from its position shown in FIGS. 4-6 through one revolution permitting the belt 105 to drive the shuttle receptacles 106 through one revolution until the stop pin 111 reengages the stop 113.

The print roller 21 then presses the ticket strip 87 against the inked type as shown in FIG. 8. As the ticket strip is fed into the printing station, the spring-biased arm 156 holds the strip away from the type to prevent smearing of the tickets and is depressed to its position shown in FIG. 8 during the printing cycle by the print roller 21 to permit the tickets to engage the inked type. When the print roller 21 releases the arm 156, it returns to its position shown in FIG. 11 and helps eject the printed ticket by stripping it off the type. The tray 47 follows closely behind the print roller 21 and its fingers 54 are received in the ticket notches of the printed ticket, such notches being positively aligned to receive such tray fingers by means of the ticket deflector 78 which moves down to engage the ticket strip just before the tray fingers thread into the notches. This causes the ticket strip to be threaded through the tray 47 and completely stripped from the type. The cutter blade 62 then is driven downwardly into its position shown in FIGS. 1 and 2 with the ticket strip caught between the cutter blade 62 and the slanted cutting edge 40 of the rotating knife 38 and the knife 38 is stopped momentarily by engagement of its ears 41 with the cutter blade 62. The cutter blade 62 continues to move downwardly and cuts off the ticket and then moves upwardly to release the knife 38, the knife stops 23 continuing to move ahead toward their home position as shown in FIG. 4. After the cutter blade 62 releases the knife 38, the torsion springs 39 move the loosely mounted arms 43 ahead until the plate 45 reengages the knife stops 23 as shown in FIG. 3. Rapid movement of the tray 47 from the cutoff position to the home position ejects the ticket which follows underneath the curved deflector 165 into the rotating shuttle receptacles 106 which dump the ticket onto the flat chute 90. The receptacles 106 continue to rotate until they are stopped by the stop 113.

It is to be understood that the above description is illustrative of this invention and that various modifications thereof can be utilized without departing from its spirit and scope.

Having described the invention, I claim:

1. In a printer, in combination, a printing station, an ink roller, a print roller, a knife, said rollers and knife being mounted to rotate about a common axis, the ink roller during part of a rotary printing cycle contacting and inking type in the printing station and the print roller during a following part of the rotary printing cycle pressing an element to be printed in the printing station against the

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inked type, and means synchronized with said rollers and knife and engageable with the knife for cutting off the element from a strip of said elements after it has been pressed by the print roller against the inked type.

2. A printer according to claim 1 having a tray mounted to rotate about said common axis for stripping the printed element from the type and holding the element ready to be cut from a strip of said elements, and wherein said means synchronized with said rollers and knife is engageable with the knife for cutting off the element held in the tray.

3. A printer according to claim 2 wherein deflector means are provided which are synchronized with the rollers, tray and knife and which is engageable with the element strip just before the tray strips the printed element from the type to position the element strip relative to the tray.

4. A printer according to claim 2 wherein the tray includes a bottom portion and side portions which are provided with fingers and which together with the bottom portion define spaces for receiving and confining edge portions of the elements and wherein the element strip is provided along its edges with notches which are located in pairs lengthwise of the strip to define individual elements, the tray fingers being received in the element notches to thread the strip through the tray.

5. A printer according to claim 2 wherein spring-biased means holds the element strip away from the type to prevent smearing of the elements as they are fed into the printing station, the print roller depressing the spring-biased means to permit the elements to engage the inked type.

6. In a printer, in combination, a printing station, an ink roller element, a print roller element, a tray element, a stop element, a knife element movable as one with the tray element, the elements being mounted to rotate about a common axis, resilient means also mounted to rotate about said axis and urging the knife element and the tray element toward the stop element, the ink roller element during part of a rotary printing cycle contacting and inking type in the printing station, the print roller element during a following part of the rotary printing cycle pressing a ticket, label or the like to be printed in the printing station against the inked type, and the tray element stripping the printed ticket, label or the like from the type and holding it ready to be cut off from a strip, and means synchronized with said elements and engageable with the knife element to stop rotation of the knife element and the tray element momentarily in opposition to the resilient means while the stop element continues to move together with the roller elements for cutting off the ticket, label or the like held in the tray, release of the knife element by said synchronized means permitting the knife element and the tray element to move rapidly as driven by the resilient means toward the stop element to eject the cut off ticket, label or the like from the printer.

7. In a printer, in combination, a printing station, rotary inking and printing means rotatable about an axis for inking type in the printing station and pressing an element to be printed in the printing station against the inked type, a tray and a knife movable together as one about said axis, a stop movable together as one with said inking and printing means about said axis, resilient means urging the tray and the knife toward the stop, the tray stripping the printed element from the type and holding it ready to be cut from a strip of said elements, and means synchronized with said rotary inking and printing means and operable to stop the knife and the tray in opposition to the resilient means while the stop continues to rotate about the axis for cutting off the element held in the tray, release of the knife and tray permitting them to move rapidly toward the stop as driven by the resilient means to eject the cut-off element from the printer.

8. A printer according to claim 7 wherein deflector

means are provided which positions the element strip relative to the tray.

9. A printer according to claim 7 wherein the tray includes a bottom portion and side portions which are provided with fingers and which together with the bottom portion define spaces for receiving and confining edge portions of the elements and wherein the element strip is provided along its edges with notches which are located in pairs lengthwise of the strip to define individual elements, the tray fingers being received in element notches to thread the strip through the tray.

10. A printer according to claim 7 wherein spring-biased means holds the element strip away from the type before printing takes place to prevent smearing, the printing means moving the spring-biased means to permit the element to engage the inked type.

11. In a printer, in combination, a printing station, rotary inking and printing means rotatable about an axis for inking type in the printing station and pressing an element to be printed in the printing station against the inked type, a tray and a knife movable together as one about said axis, resilient means urging the tray and the knife about said axis toward the printing means, the printed element being received in the tray wherein it is held ready to be cut from a strip of said elements, and cutting means synchronized with the rotary inking and printing means and engageable with the knife to stop the knife and tray while the inking and printing means continue to rotate about the axis and to cut off the element held in the tray.

12. A printer according to claim 11 wherein the knife has a slanted cutting edge which produces a scissors-like action when the cutting means is moved relative thereto and in engagement therewith.

13. A printer according to claim 11 wherein flexure means are carried by the tray for pressing the cutting means against the knife.

14. In a printer, in combination, a printing station, an ink roller, a print roller, a knife, said rollers and knife being mounted to rotate about a common axis, the ink roller during part of a rotary printing cycle contacting and inking type in the printing station and the print roller during a following part of the rotary printing cycle pressing an element to be printed in the printing station against the inked type, means synchronized with said rollers and knife and engageable with the knife for cutting off the element from a strip of said elements after it has been pressed by the print roller against the inked type, and means rotatable as one with the knife for receiving and supporting the printed element prior to cut off and for ejecting said cut-off element from the printer.

15. In a rotary printer, in combination, a printing station, printing means rotatable about an axis for pressing an element to be printed in the printing station against type in the printing station, and means rotatable about said axis for receiving and supporting the element after it has been printed ready to be cut from a strip of said elements and for ejecting said element after it is cut off from the printer.

16. In a rotary printer, in combination, a printing station, printing means rotatable about an axis for pressing an element to be printed in the printing station against type in the printing station, means for cutting the printed element from a strip of such elements including knife means rotatable about said axis, and ejection means rotatable about said axis for ejecting the cut-off element from the printer.

17. A printer according to claim 16 wherein the ejection means includes resilient means operable after cut-off occurs for driving the ejection means.

18. In a rotary printer, in combination, rotatable means for receiving and supporting a printed element to be cut from a strip of said elements and for ejecting said element after it is cut off from the printer, and rotatably mounted means rotatable in synchronism with said means for receiving said ejected element and directing it toward

a delivery station, said rotatable means for receiving and supporting the printed element including a tray having a bottom portion and side portions which are provided with fingers and which together with the bottom portion define spaces for receiving and confining edge portions of the elements and wherein the element strip is provided along its edges with notches which are located in pairs lengthwise of the strip to define individual elements, the tray fingers being received in the element notches to thread the strip through the tray.

19. In a printer for tickets, labels or the like, in combination, a printing station partly defined by first printing type which are set up by hand and partly defined by second printing type which are not set up by hand, a pivotably mounted frame carrying said first printing type, manually operable means carried by said frame for setting up said first type, the frame being pivotable from an operative position wherein the first type are located in said printing station and held stationary during printing to an inoperative position wherein the manually operable means are presented to view, and movable printing means for pressing said tickets, labels or the like against the type in the printing station.

20. A printer according to claim 19 having means including an over-center toggle spring for keeping the pivotable frame in one or the other of said positions.

21. A printer according to claim 19 wherein part of the first printing type are carried by rotatably mounted members having indicia-bearing handles operatively connected thereto.

22. A printer according to claim 19 wherein part of the first printing type are carried by a readily removable plate.

23. A printer according to claim 22 wherein the pivotably mounted frame carries magnet means for holding the plate in place.

24. In a printer for tickets, labels or the like, in combination, a printing station at least partly defined by printing type which are set up by hand and which partly are carried by a readily removable printing plate, a pivotably mounted frame carrying said printing type, manually operable means carried by said frame for setting up said type, the frame being pivotable from an operative position wherein the type are located in said printing station to an inoperative position wherein the manually operable means are presented to view, and mechanical means for preventing removal of the printing plate from the printer when the pivotably mounted frame is in its operative position.

25. In a printer for tickets, labels or the like, in combination, a printing station at least partly defined by printing type which are set up by hand and which partly are carried by a readily removable printing plate, a pivotably mounted frame carrying said printing type, manually operable means carried by said frame for setting up said type, the frame being pivotable from an operative position wherein the type are located in said printing station to an inoperative position wherein the manually operable means are presented to view, and interlock means for preventing electrical operation of the printer when the printing plate is not properly positioned in the pivotable frame even though the pivotable frame is in its operative position.

26. In a printer for tickets, labels or the like, in combination, a printing station at least partly defined by printing type which are set up by hand, a pivotably mounted frame carrying said printing type, manually operable means carried by said frame for setting up said type, the frame being pivotable from an operative position wherein the type are located in said printing station to an inoperative position wherein the manually operable means are presented to view, and interlock means for preventing electrical operation of the printer when the pivotable frame is not in its operative position.

27. A rotary printer according to claim 15 having rotat-

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bly mounted and intermittently driven means for receiving said ejected element and directing it toward a delivery station.

28. A rotary printer according to claim 15 having shuttle means rotatable and intermittently driven in synchronism with said printing means for receiving, while said shuttle means is in motion, said ejected element and directing it toward a delivery station.

29. A rotary printer according to claim 15 having shuttle means rotatable in synchronism with said printing means and including receptacle means having mouth means for receiving said ejected element and dumping it onto a receiving surface.

30. A rotary printer according to claim 16 having rotatably mounted and intermittently driven means for receiving said ejected element and directing it toward a delivery station.

31. A rotary printer according to claim 16 having shuttle means rotatable and intermittently driven in synchronism with said printing means for receiving, while said shuttle means is in motion, said ejected element and directing it toward a delivery station.

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32. A rotary printer according to claim 16 having shuttle means rotatable in synchronism with said printing means and including receptacle means having mouth means for receiving said ejected element and dumping it onto a receiving surface.

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