A printer for printing a color bar code is described. The printer includes a medium and a print location for printing a particular color bar code. The medium can be left blank when a particular color bar code is not being printed.

The printer includes a print station with printing elements. The print station includes a rack for printing a particular color bar code. Each rack includes a printing element, a solenoid actuated pawl, and a spring. The printing elements are moved to a position where the print location is aligned with the rack. The solenoid actuated pawls are used to release selected racks at a first position, enabling them to slide to a second position under the influence of springs. The associated print surfaces are aligned with the second print station. The first and second print stations are provided with first and second color ribbon modules, respectively. A platen at each print station is used to impact the medium and the ribbon against the print surfaces located at the respective print station. A modification of the printer apparatus provides for moving the racks to an intermediate position where the print surfaces of the affected racks are located between the first and second positions so that the affected print location on the medium can be left blank when a particular color bar code is not being printed.

10 Claims, 9 Drawing Figures
PRINTER FOR PRINTING A COLOR BAR CODE

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for printing color bar codes on a record medium.

In recent years there has been an effort to utilize semi-automatic, mark-sensing systems for check-out counter applications in super-markets and retail stores, and in credit card and inventory control applications and the like. Generally, a coded tag or “label” is secured to an item to be sold, and the label contains coded data, like price, size, etc., about that item. One such system utilizes a hand held probe or optical scanner which is “scribed” or glide across the coded label to read the coded data on the label. The data just read is then processed by optical and electronic means to translate the coded data into usable signals and data. One such mark sensing system is shown in U.S. Pat. No. 3,584,779 which issued to Kessler et al. on June 15, 1971.

The present invention provides an apparatus for producing low-cost, color bar codes for use with the systems described above. In one embodiment, the apparatus produces a label having two different color bars printed in spaced parallel arrangement on the background of a label. In another embodiment, the apparatus produces a label in which two different color bars may be printed in contacting parallel relationship on the background of the label, which background is used as a third color. This latter label utilizes color transitions from one color band to the next to define binary states “1” and “0,” and the transitions obviate the need for a separate clocking pulse. Additional details of this transition-type color bar code may be found in U.S. Pat. application Ser. No. 837,850 filed by John B. Christie on June 30, 1969, said application being assigned to the assignee of the present invention.

SUMMARY OF THE INVENTION

The present invention relates to a printing apparatus for printing first and second coded indicia on a record medium having a plurality of print locations thereon. The apparatus includes first and second print stations and feed means for feeding the medium, successively from the first to the second print station. A plurality of printing elements moveable between first and second positions is provided, with each printing element having a print surface thereon. Actuating means are used for moving the printing elements to the first and second positions in response to a control means to enable the print surfaces of the printing elements to be selectively located at the first and second print stations. First and second supply means for supplying first and second indicia carrying ribbons to the first and second print stations, respectively, are also provided. A first platen means is used to urge the medium and the first ribbon against the print surfaces of the printing elements located at the first print station to print the first indicia on the medium, and a second platen means is similarly employed at the second print station to print the second indicia on the record medium.

Another embodiment of the invention utilizes a plurality of printing elements which are moveable to first and second positions and to an intermediate position therebetween. When neither one of first and second indicia is to be printed on a particular print location on the record medium, the associated printing member is moved to the intermediate position enabling the associated print surface to lie between the first and second print stations, thereby leaving the print location blank.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view, in elevation, of the printer apparatus of this invention showing first and second print stations having platen means thereat and means for feeding a record medium thereto; means for feeding first and second indicia-carrying ribbons to said stations; printing elements moveable, between first and second positions relative to said print stations; and actuating means for moving the printing elements to said first and second positions.

FIG. 2 is a general, perspective view of one of the printing elements located at the first position enabling a print surface thereon to be positioned at the first print station.

FIG. 3 is a view similar to FIG. 2 showing the same printing element in the second position, enabling the print surface thereon to be positioned at the second print station.

FIG. 4 is a general, perspective view of a portion of the record medium showing two labels thereof with the code thereon as printed at the two print stations.

FIG. 5 is a cross-sectional view of a support member for the printing elements and is taken along the line 5—5 of FIG. 1.

FIG. 6 is a general block diagram of the control means used with this invention.

FIG. 7 is a side view in elevation of a portion of a second embodiment of the invention showing the print stations and racks.

FIG. 8 is a cross-sectional view of a support member for supporting the racks and is taken along the line 8—8 of FIG. 7.

FIG. 9 is a view similar to FIG. 4 showing two labels as printed by the embodiment shown in FIG. 7.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a side view, in elevation, of a first embodiment of the printer apparatus of this invention showing the general arrangement thereof. The printer, which is designated generally as 10, is supported on a base 12 and front and rear vertical panels 14 upstanding therefrom; only the rear panel 14 is shown, the front panel being removed to facilitate a showing of the invention. The basic elements of the printer 10 shown in FIG. 1 include first and second print stations 16 and 18; a record medium 20; feed means 22 for feeding the record medium 20 to the print stations; first platen means 24 and second platen means 26 located at the first and second print stations, respectively; first supply means 28 for supplying a first indicia carrying ribbon 30 to the first print station 16; second supply means 32 for supplying a second indicia carrying ribbon 34 to the second print station 18; a plurality of printing elements 36 moveable between first and second positions relative to the print stations; and actuating means 38 for moving the printing elements 36 between first and second positions.

The record medium is fed successively to the first and second print stations 16 and 18 by the feed means 22 (FIG. 1) which may be conventional. In the embodiment shown, the record medium 20 consists of a plurality of individual labels 40 and 42 which are delineated by the notches 41 and perforation line 44 (FIG. 4) to
facilitate the separation of individual labels. Label 40 has a portion of a color bar code printed thereon at the first print station 16, and label 42 has the remaining portion of the color bar code printed thereon at the second print station 18. Label 42 is a completed label as far as the coding is concerned, as it has the color bars 46 printed thereon by the first ribbon 30 (FIG. 1) at the first print station 16 and the color bars 48 printed thereon by the second ribbon 34 at the second print station 18. The labels move under the print stations 16 and 18 in the direction of arrow 50 shown in FIGS. 1 and 4.

The feed means 22 (FIG. 1) for feeding the record medium 20 is conventional and need not be described in detail. It includes a supply reel with a slip clutch (not shown) and a spring-loaded follower arm 52 and roller 54 around which the record medium 20 passes on its way to a capstan 56 and its associated spring-urged pinch roller 58 which resiliently urges the medium 20 against the capstan 56. The capstan 56 is intermittently driven by control means (to be later described herein) to feed the medium 20 to the print stations 16 and 18. Another pinch roller 60 resiliently urges the medium 20 to instill a roller 62 which is driven (in a counterclockwise direction as viewed in FIG. 1) by a conventional slip clutch drive means (not shown) to maintain a constant tension on the medium 20, downstream of the print stations 16 and 18. Whenever the capstan 56 is driven, the medium 20 will be "pushed" to the print stations, and rollers 62 and 60 will pull the medium 20 to take up the resulting slack therein. After the constant tension on the medium is achieved, the slip clutch driving the roller 62 will "slip" resulting in rollers 60 and 62 maintaining a constant tension on the medium 20 to aid in the positioning of the individual labels like 40 and 42 under the print stations 16 and 18. The amount of feed and the indexing of the medium to the print stations is controlled by the capstan 56; however, a conventional edge detector is used to insure accurate registration of the individual labels under the print stations. The edge detector includes a source 64 of light and a photoelectric detector 66 placed on opposite sides of the medium 20 to coact with the notches 41 on the sides of the medium. When the detector 66 is energized by the light passing through a notch 41, the labels are accurately registered at the print stations 16 and 18.

The first supply means 28 (FIG. 1) for feeding the first ribbon 30 to the first print station 16 is conventional, and need not be described in detail. Because the second supply means 32 for feeding the second ribbon 34 to the second print station 18 is identical to the first supply means 28, only this latter supply means will be described. The supply means 28 and 30 are actually located above the top edge of vertical panel 14; however, they are shown lower in FIG. 1 to make the drawing more compact.

The first supply means 28 (FIG. 1) includes a supply reel 68 from which a supply of ribbon 30 is unwound. From the reel 68, the ribbon passes around two idler rollers (not shown) to enable the ribbon to pass under the medium 20 along a direction which is perpendicular to the medium 20, accordingly, the ribbon is shown in cross-section in FIG. 2 at print station 16. From these idler rollers, the ribbon is advanced by a capstan and pinch roller arrangement (not shown but similar to 56 and 58) which arrangement advances the ribbon a predetermined amount for each label to be printed so as to present an unused portion of the ribbon for each label. The feeding of the ribbon is controlled by control means to be later described. In the embodiment shown, ribbon 30 produces a black color bar and ribbon 34 (shown as 34-1 at print station 18) produces a red color bar on a white background of medium 20. Naturally, the colors selected or the particular varieties of indicia means, like infra-red or phosphorescent materials, selected for the printing of the labels are dependent upon the particular application in which the labels are to be used.

The plurality of printing elements 36 shown principally in FIG. 1 includes a plurality of racks and mounting means for slidably mounting the racks for parallel movement relative to one another. Each of the racks, like 70 and 72, is mounted in the mounting means which include three support members 74, 76 and 78. Each of the support members like 74 (shown in cross-section in FIG. 5) has a plurality of spaced, parallel grooves therein in which the individual racks are mounted. The lower support members 76 and 78 are positioned apart a predetermined distance to enable support members 70 and 72, on rack 74, in the position of support members 76 and 78, respectively, and thereby provide limiting stops for the first and second positions between which each of the racks may be moved. The number of racks utilized is, of course, dependent upon the number of print locations on the label to be printed upon.

Each of the racks, like 70 and 72, is pulled to the second position (to the right as viewed in FIG. 1) by a separate tension-type spring like 84 and 86 respectively; each spring is connected to a finger-like end of the associated rack and a post like 88, which is secured to the panel 14. The finger-like ends like 90 and 92 of racks 70 and 72, respectively, are staggered to provide a compactness of construction as is known in the art.

Each of the racks like 70 and 72 has a print surface extending from the lower side thereof as viewed in FIG. 1. When a rack like 70 is in the first position, its associated print surface 94 is located at the first print station 16, and when a rack like 72 is in the second position, its associated print surface like 96 is located at the second print station 18. The print surfaces of all the racks are identical in shape, lie in a common plane, and are aligned in a direction perpendicular to the direction of travel of the medium 20 when at the first and second print stations. In the embodiment shown, the print surfaces like 94, 96 are about 0.015 inch wide and 0.312 inches long.

The actuating means 38 for moving the racks like 70, 72 between the first and second positions to enable the print surfaces thereof to be located at the first and second print stations 16 and 18, respectively, is shown in FIG. 1. It includes a pawl member 98 for each rack, like 70, to hold the rack in the first position in which the print surface 94 is located at the first print station 16 as shown in FIGS. 1 and 2. The pawl member 98 is formed on one end of a bell crank lever 100 which is pivotally mounted on a shaft 102 which is fixed to the panel 14. The bell crank lever 100 is biased to rotate in a clockwise direction (as viewed in FIG. 1) by a tension spring 104, and its clockwise rotation is limited by a stop 106 secured to panel 14. When the pawl member 98 engages a shoulder 108 to hold the associated rack in the first
The free end of the bell crank lever 100 is pivotally joined to one end of a link 110 whose remaining end is pivotally joined to one end of a link 112. The remaining end of link 112 is pivotally joined to a fixed support 114 to which solenoids are secured with one such solenoid (like 116, 118) and the associated linkage just described being provided for each rack 70, 72 etc. When it is desired to release a particular rack, like 70, from the first position, the associated solenoid, like 114, is energized by the control means to be later described, and like 112 is attracted to the solenoid to thereby rotate the associated bell crank lever 100 in a counterclockwise direction as viewed in FIG. 1, releasing the rack. When released, rack 70 will be pulled by its associated spring 84, causing its shoulder 82 to abut against the support member 78, thereby positioning the associated print surface 94 at the second print station 18 (FIG. 3). Those racks which are not released to travel to the second position will have their associated print surfaces located at the first print station 16.

The print stations 16 and 18 are identical in construction; therefore, only print station 16 will be described in detail. In order to print all the color bars of the first color at the first print station 16, it is necessary to have a platen 120 of sufficient size to impact against all print surfaces located thereat as shown in FIG. 2. The platen 120 has a layer 122 of resilient material on the surface which impacts against the print surfaces, and the platen is secured to one end of a lever 124 which is pivotally mounted between its ends on a pin 126 secured to panel 14. A compression-type spring 128 is used to resiliently urge the lever 124 in a clockwise direction (as viewed in FIG. 1) against a roller 130 mounted on the output end of a solenoid 132 which is secured to the panel 14. When the solenoid 132 is energized by the control means, the output end thereof advances to rotate the lever 124 in a counterclockwise direction causing the platen 120 to impact the first ribbon (shown in cross-section as 30–1 in FIG. 1) and the medium 20 against the print surfaces (like 94) of the racks located at the first position thereby printing all the color bars like 46 of the first color as shown on label 40 in FIG. 4. The ribbons 30–1 and 34–1 would have to be positioned between the media 20 and the print surfaces like 94, 96 in order to obtain the printing on the side of the label shown in FIG. 4. When the solenoid 134 of the second platen means 26 is energized by the control means, the associated platen 136 will similarly impact the second ribbon (shown in cross-section as 34–1 in FIG. 1) and the medium 20 against the print surfaces (like 96) of the racks (like 72) located at the second position thereby printing all the color bars 48, of the second color on label 42 (FIG. 4) to produce a complete color coded label at the second print station 18. The feed means 22 will incrementally feed the medium 20 to the first and second print stations until a desired number of completed labels is obtained, and all the labels 40, 42 so produced will be identical. When the desired number of copies of the labels is produced, the feeding of the medium will be stopped by the control means, and all the racks like 70, 72 will be restored to the first position by the actuating means 38 where the racks may be reset in preparation for printing another quantity of labels with new coded data thereon.

The actuating means 38 for moving the racks between first and second positions is shown in FIG. 1. It includes a restoring bar 138 which passes through an elongated slot 140 in each rack, and the slot is aligned with the direction of travel of the rack between the first and second positions. A lever 142 has an elongated slot 144 in one end thereof to receive the bar 138 as shown, and the remaining end of the lever is fixed to rotate with a shaft 146 rotatably supported between the panels 14. There are actually two such levers 142 used, and they are positioned alongside the outermost racks so as to sandwich the racks therebetween. An actuating lever 148 has one end fixed to shaft 146 to rotate it, and the remaining end is biased in a counterclockwise direction (as viewed in FIG. 1) by a spring 150. When so biased, lever 148 keeps the restoring bar 138 in the position shown in solid lines in FIG. 1 to enable the racks to move freely to the second position when released. To restore all the racks to the first position, a solenoid 152 is momentarily energized by the control means to pull lever 148 and thereby rotate shaft 146 and lever 142 in a clockwise direction (to the position shown in dashed lines) to push all the racks to the left (as viewed in FIG. 1) where for each rack, the associated pawl 98 will ride on a camming surface 154 of the associated rack and drop into engagement with the shoulder 108 on the rack to hold the rack in the first position. Because the solenoid 152 is energized only momentarily, spring 150 will rotate the lever in a counter-clockwise direction to the position shown in solid lines to enable the racks which are later released to advance to the second position.

The control means alluded to previously in this application is shown in FIG. 6. Because the individual components of the control means may be conventional, they are shown only in block form. The data to be encoded like price, article, description, quantity of labels, etc., for a label to be used in a retail store, for example, may be entered on a keyboard which is part of an input data means 156 shown in FIG. 6. This data is then fed into logic circuits 158 which control the printer 10. The logic circuits 158 have one input data into which is needed to position the racks (like 70, 72 of FIG. 1) to obtain the finished label 42 shown in FIG. 4. One output from the logic circuits 158 is routed to a release rack solenoids circuit 160 which selectively energizes the particular solenoids like 116, 118 to release the racks for those print locations at which color bars 48 are to be printed in the color of the second ribbon 34 at the second print station 18. Those print locations of the label 40 (FIG. 4) which are to be printed in color bars 46 of the first ribbon 30 would require that the corresponding racks remain in the first position; therefore, the associated solenoids for those racks would not be energized by the circuit 160. The logic circuits 158 receive an input signal from the edge detector 162 (comprising the light source 64 and detector 66) which indicates that the medium 20 is in proper registration with the first and second print stations. If no such signal is received, the medium 20 would have to be adjusted to obtain a proper registration before printing can proceed.

The logic circuits 158 (FIG. 6) also control the operation of the first and second platens 120 and 136 respectively, via a platen driver circuit 164. These platens may be actuated simultaneously to print the first and second color bars (FIG. 4), as previously explained, by energizing their associated solenoids 152 and 134 respectively. After the first and second platens are actuated, the logic circuits 158 control the energization of
the capstan 56 to advance the medium one label position (to the right as viewed in FIG. 1). At the same time, the logic circuits 158 energize the first and second supply means 28 and 32, respectively, to advance the first and second ribbons 30 and 34 as previously explained. After the medium 20 and both of the ribbons are advanced, the first and second platens 120 and 136 are again energized to repeat the printing process, which is repeated until the desired quantity of completed labels is obtained. Upon reaching the desired quantity, the logic circuits 158 will energize the actuating means 38 to restore the racks (like 70, 72) to the first position as previously explained. The data for the next quantity of labels to be printed is fed into the keyboard of the input data means 156, (FIG. 6) and the printing process described is repeated. If necessary or desirable, the printer 10 may include a digit printer 166 (FIGS. 186) which reads the bar code printed on the individual labels and prints thereon the corresponding data in human readable language.

FIG. 7 shows a second embodiment of this invention which is especially adaptable for printing a transition type code of the variety disclosed in said Christie application mentioned earlier in the Background of the Invention. Because this second embodiment designated generally as 168, is substantially the same as the first embodiment 10 already described, only that portion of the printer 168 which is different will be described in detail.

Before discussing the portion of the printer 168 shown in FIG. 7, it seems appropriate to discuss the transition code mentioned in the previous paragraph as it is this particular code which requires a change in the construction of the printer 10. The transition-type coded label requires that the particular printing apparatus used to print it, be capable of printing any one of three color bars in each print location, like locations A, B, C and D shown on label 170 in FIG. 9. The background of the label may be white, and the first and second color bars are printed on this white background. Whenever a white color bar is to be "printed," it is necessary to avoid printing in either of the first and second colors for that location. Also, each color bar must be different from the preceding and succeeding color bars. For example, if the background 172 of label 170 is white, and the particular requirements of the data require a color bar of the first color at print location A, a color bar of the second color at location B, a color bar of the third color (white background) at location C, and a color bar of the first color at print location D, the resulting completed label (for the portion described) would look like label 174 in FIG. 9.

Labels 170 and 174 of FIG. 9 are printed by the printer 168 shown in FIG. 7. Wherever possible, the same reference numerals are used to identify parts which are identical to parts of the embodiment shown in FIG. 1. The racks like 176 and 178 are generally similar to racks 70 and 72 of FIG. 1, however there are some differences. Racks 176 and 178 each have two shoulders 180 and 182 thereon as shown. A pawl 184 engages the shoulders 180 to hold the racks in the first position; rack 176 is shown in this position. Platen 120 is shown at the first print station 186 and platen 136 is shown at the second print station 188. The print surface 190 of rack 176 is located at the first print station 186 and the print surface 192 of rack 178 is located at the second print station 188. The racks (like 176) whose print surfaces 190 are located at the first print station 186 will print color bars of the first color from ribbon 30, and similarly, those racks (like 178) whose print surfaces 192 are located at the second print station will print color bars of the second color from ribbon 34. The print stations 186 and 188 (FIG. 7) are spaced apart farther than the stations 16 and 18 of FIG. 1. This is done to enable the print surface of a rack which is to "print" in the third color, i.e., the background of the label, to be positioned at an intermediate position between the first and second print stations 186 and 188. Print surface 194, which is shown in dashed outline, is located at the intermediate position. When so positioned, a print location like C of FIG. 9 will have only the background color of the label present on the completed label 174.

The method of releasing the racks like 176, 178 is generally similar to that already described in conjunction with the embodiment shown in FIG. 1. When the print surface of a particular rack is to remain in the first position for printing a first color bar, the associated rack is held in the first position by the associated pawl member 184 which holds the first shoulder 180 of the rack. When a particular print location like C of FIG. 9, is to be "printed" in the background color of the label, the associated rack is released by momentarily energizing the associated solenoid, like 116 of FIG. 1, enabling the associated pawl member to clear the first shoulder 180 and to engage the second shoulder 182 (FIG. 7) of the rack; the release rack solenoid circuit 160 of FIG. 6 is used for this purpose. When a particular print location, like B of FIG. 9, is to be printed by the second ribbon 34 to produce a color bar of the second color, the associated rack like 178 (FIG. 7) must be released twice to enable the print surface 192 of the rack to be positioned at the second print station 188. At the first release of this rack, its associated pawl member like 184 catches the shoulder 182, and upon the second release of the rack (by momentarily energizing its associated solenoid like 116 of FIG. 1) the pawl member is rotated out of engagement with the second shoulder 182 permitting the associated spring (like 86 FIG. 7) to pull the rack to the second position. The racks have shoulders like 196 which abut against a support member 198 when in the second position, and other shoulders like 197 which abut against a support member 200 when the racks are moved to the first position by the lever 142 as previously explained with the printer 10 shown in FIG. 1. The support members 198, 200 and 202 have the cross-sectional shape shown in FIG. 8, and the racks like 176, 178 are placed in contacting parallel relationship as shown. Because the racks like 176 and 178 are in contact in parallel relationship with one another, it is convenient to conventionally "fan out" the ends of the racks on which the shoulders 180 and 182 are located. This fanning out will provide more clearance for the individual shoulders and pawl members of the racks.

What is claimed is:

1. An apparatus for printing first and second coded indicia on a medium having a plurality of print locations thereon comprising:
   first and second print sections;
   feed means for feeding said medium successively from said first to said second print stations;
   a plurality of printing elements moveable between first and second positions with one printing ele-
3,738,263

ment being provided for each print location on the medium and with each printing element having a print surface thereon; actuating means for selectively moving said printing elements to said first or second positions in response to a control means, to enable each said print surface to be selectively located at said first or second print station, respectively; first and second supply means for supplying first and second ribbons to said first and second print stations respectively; first platen means to urge the medium and the first ribbon against the print surfaces of the printing elements located at the first print station so as to print said first indicia on said medium; and second platen means to urge the medium and the second ribbon against the print surfaces of the printing elements located at the second print station so as to print said second indicia on said record medium.

2. The apparatus as claimed in claim 1 in which said actuating means comprises:

first means for holding said plurality of printing elements at said first position enabling the print surfaces thereof to be positioned at said first print station;

release means for selectively releasing said printing elements from said first position in response to said control means;

second means for urging the released printing elements to said second position so as to position the print surfaces thereof at said second print station; and

restoring means for restoring the released printing elements to said first position.

3. The apparatus as claimed in claim 2 in which each said printing element is a rack having one of said print surfaces thereon, and further including mounting means for slidably mounting said racks in parallel relationship with one another enabling the print surfaces thereof to lie in an imaginary common plane extending between said first and second print stations.

4. The apparatus as claimed in claim 3 in which each said print surface is generally rectangular in shape with the long dimension thereof being aligned parallel to a line between said first and second print stations along which line said media is fed, and with said pring surfaces also being aligned along a direction perpendicular to said line when located at said first and second print stations.

5. The apparatus as claimed in claim 4 in which each said rack has a shoulder thereon and in which said first means comprises for each said rack:

a pawl member releasably engaging the associated shoulder on the associated rack; and

link means for maintaining the associated pawl member in engagement with the corresponding shoulder to hold the rack at said first position until the pawl member is moved out of engagement with the shoulder by said release means.

6. The apparatus as claimed in claim 4 in which said mounting means locate said racks in spaced parallel relationship with one another.

7. The apparatus as claimed in claim 1 in which said actuating means comprises:

first means for holding said plurality of printing elements at said first position enabling the print surfaces thereof to be positioned at said print station; release means for selectively releasing said printing elements from said first position to an intermediate position, and for selectively releasing said printing elements from said intermediate position to said second position in response to said control means; second means for urging the released printing elements to said intermediate and second positions; and restoring means for restoring the released printing elements to said first position;

said first and second print stations being spaced apart to enable said print surfaces to lie therebetween when the associated printing elements are positioned at said intermediate position.

8. The apparatus as claimed in claim 7 further comprising mounting means for slidably mounting said printing elements in parallel relationship with one another enabling the print surfaces thereof to lie in an imaginary plane extending between said first and second print stations.

9. The apparatus as claimed in claim 8 in which each said printing element is a rack having one of said print surfaces thereon, and also having first and second shoulders thereon, and in which said first means comprises for each said rack:

a pawl member to releasably engage said first shoulder to hold the associated rack at said first position until released by said release means, and to releasably engage said second shoulder after said associated rack is released from said first position to hold said rack at said intermediate position until released by said release means; and

link means for maintaining the associated pawl member in engagement with said first and second shoulders until the pawl member is moved out of engagement with the first and second shoulders by said release means.

10. The apparatus as claimed in claim 9 in which each said print surface is rectangular in shape with the long dimension thereof being aligned parallel to a line between said first and second print stations, along which line said media is fed, and with said print surfaces also being aligned along a direction perpendicular to said line when located at said first and second print stations and said intermediate position.

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