

- [54] **MARKING APPARATUS FOR MULTI-LANE WEB MATERIAL**
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- [58] **Field of Search** 101/9-11, 18, 21, 27, 57, 78, 193, 196, 198, 287, 292, 288 197/20, 52, 56, 63, 6, 6.2-6.7

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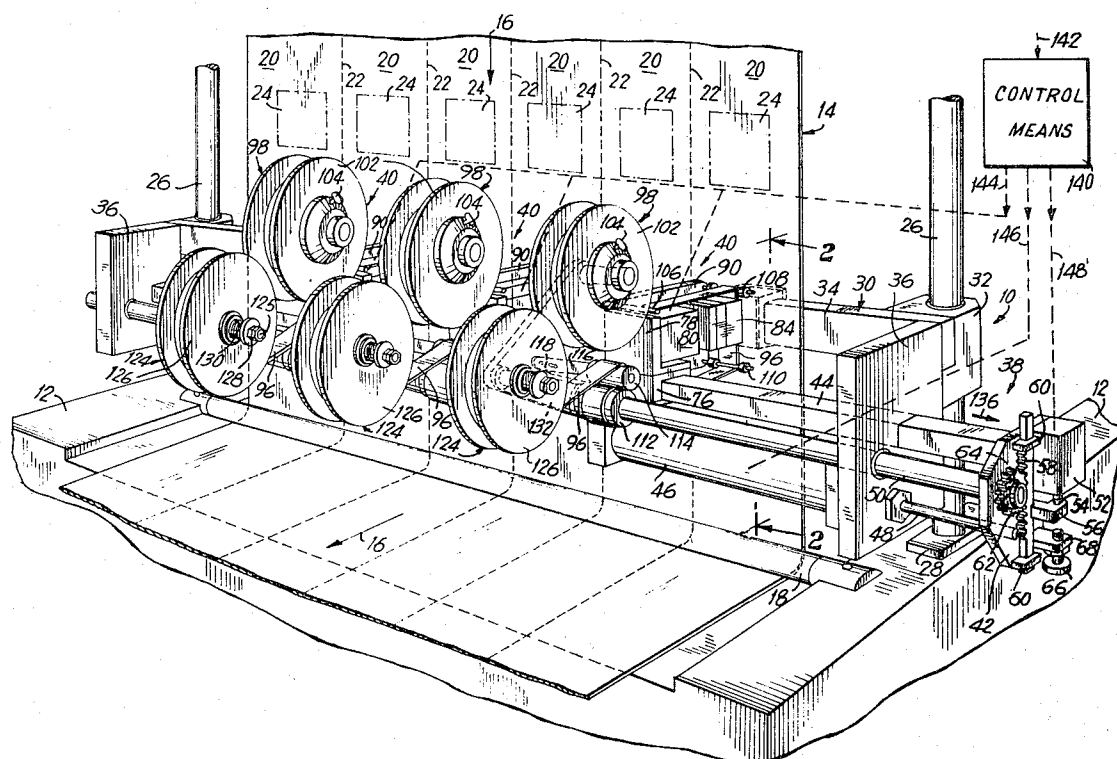
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[57] ABSTRACT

A device for imprinting on multi-lane web material which is intermittently advanced therepassed including a carriage mounted for lateral displacement relative to the web on a frame fixed relative to said web. One or more printing apparatus are mounted on the carriage for imprinting when the web movement is interrupted, said carriage being displaced between at least two positions, each printing means being in registration with one of said lanes at each position.

12 Claims, 3 Drawing Figures



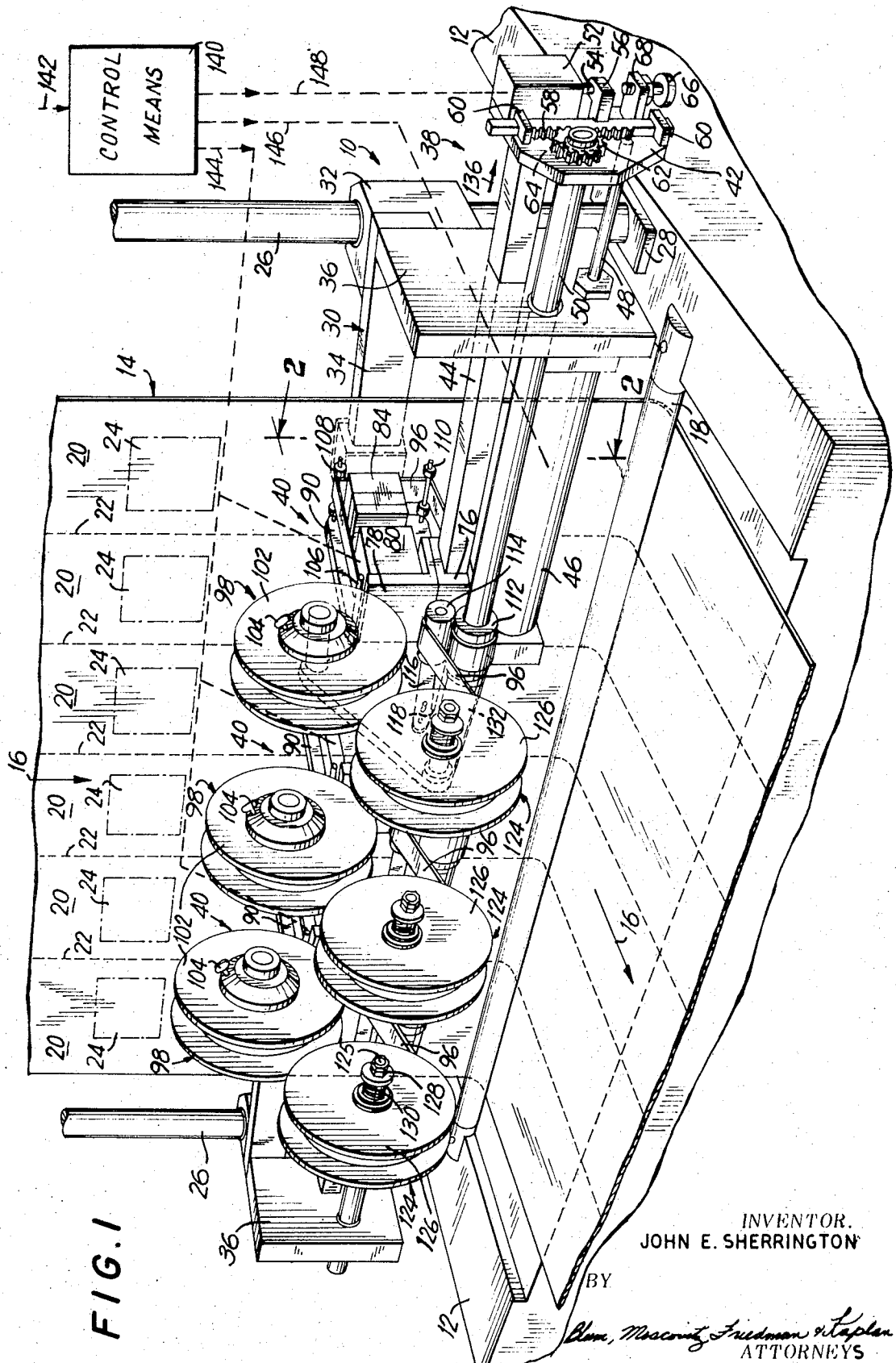


FIG. 3

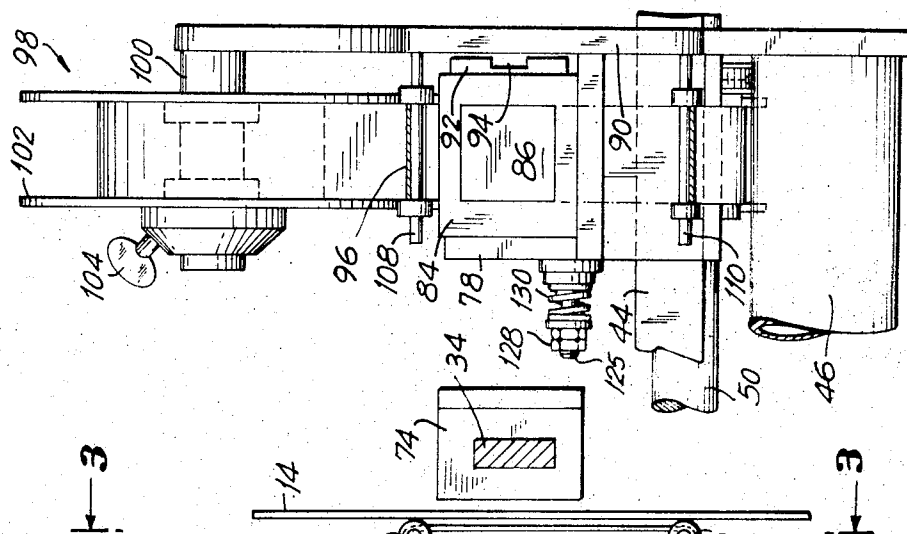
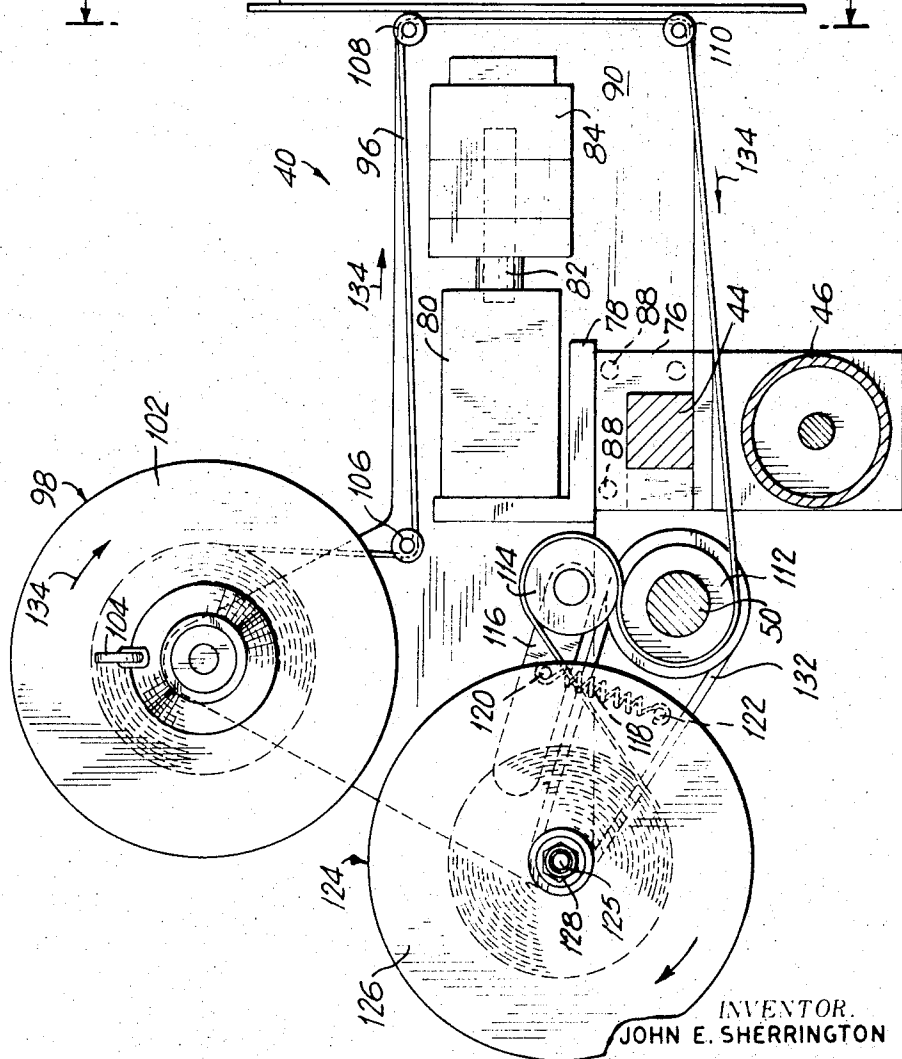


FIG. 2



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MARKING APPARATUS FOR MULTI-LANE WEB MATERIAL

BACKGROUND OF THE INVENTION

This invention relates generally to imprinting devices for applying markings such as dates, codes or other indicia to intermittently advanced webs such as packaging material. Such devices are generally mounted on associated packaging machines which intermittently draw the webs to be imprinted past the imprinting device and thence into the packaging machine which can perform any one of a number of well known operations.

In some cases, the web is divided into a plurality of parallel lanes, each lane generally representing a separate series of packages in the final product. In such cases, it is desirable to imprint each separate package with the date, code or other indicia.

In the art, in order to apply markings to a multi-lane web of packaging material to be processed by a multi-packaging machine, it is necessary to provide a separate imprinting unit for each lane, thereby increasing the cost of such multi-lane imprinting devices. By utilizing the same imprinting unit for imprinting two or more lanes by automatically displacing said single unit between positions opposite said lanes, the foregoing disadvantages can be avoided.

SUMMARY OF THE INVENTION

Generally speaking, in accordance with the invention, a multi-lane imprinting device for webs intermittently advanced therepassed is provided having a frame fixedly mounted relative to the web, carriage means mounted on the frame for lateral displacement relative to the web, printing means mounted on the carriage means for imprinting the web when the advancement of the web is interrupted, and displacement means for displacing the carriage between at least said first and second positions at which the printing means is in registration with at least first and second lanes respectively on said web for imprinting thereat.

Control means may be provided for actuating the printing means in response to the stopping of the web to effect imprinting at a first of said first and second positions, then actuating the displacement means to displace the carriage to the other of said first and second positions, and then actuating the printing means to effect imprinting at said other position. The control means may also be adapted to actuate the displacement means for return of the carriage to the initial of said first and second positions after imprinting at the other of said positions.

The printing means may utilize strip means adapted to release a pigment upon application of heat and include heated die means mounted on the carriage and adapted for reciprocal displacement relative to the carriage into and out of operative position at which the heated die means engages the strip means for release of the pigment onto the web to effect imprinting thereof and support means mounted on said carriage for displacement therewith for intermittently advancing incremental lengths of the strip means to a position adjacent to and spaced from the heated die means when the heated die means is out of said operative position. A backup plate means may be fixedly mounted on the frame and positioned so that the heated die means

pinches the web and strip means thereagainst at the operative position of said heated die means.

The support means may include roller means engaging the strip means to effect the advancement thereof upon rotation of said roller means, linearly displaceable drive means, and coupling means interconnecting the linearly displaceable drive means and the roller means for rotation of the roller means in response to the linear displacement of the drive means. The coupling means may include a rack and pinion means for translating the linear displacement of the drive means to the rotational displacement of the drive roller means, as well as one way clutch means intermediate the pinion means and roller means for the rotation of the drive roller means in response to the rotation of the pinion means in only one direction.

Means may be provided for displacing the frame supporting the mechanism longitudinally relative to the web for achieving registration of the imprinting. Two or more printing means may be mounted on said carriage, and the carriage may be sequentially displaced in a plurality of positions, said printing means being in registration with a lane at each of said positions. Means may also be provided for adjustably positioning the printing means longitudinally and laterally relative to the web for registration with the predetermined positions on said web at which imprinting is to be effected.

Accordingly, it is an object of this invention to provide a device capable of imprinting on a plurality of lanes of a multi-lane web utilizing fewer printing units than the number of lanes.

Another object of the invention is to provide a device for imprinting a multi-lane web which automatically operates to effect imprinting on all of said lanes during a single cycle thereof.

A further object of the invention is to provide a device for imprinting a multi-lane web wherein a printing means is automatically displaced between positions in registration with at least two different lanes for the successive imprinting of each lane during each cycle of operation.

Still another object of the invention is to provide a web printing device wherein the printing means is selectively adjustable relative to said web for registration with predetermined locations thereon.

A further object of the invention is to provide a device for imprinting multi-laned webs which is readily disposed in registration with said lanes and with the position on said web to be imprinted.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification and drawings.

The invention accordingly comprises the features of construction, combinations of elements, and arrangements of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a partly schematic perspective view of the imprinting device according to the invention;

FIG. 2 is a sectional view taken through lines 2 — 2 of FIG. 2 showing a printing means according to the invention; and

FIG. 3 is a sectional view taken along lines 3 — 3 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, the imprinting apparatus 10 according to the invention is shown mounted on the bed 12 of a conventional packaging machine. A web 14 is carried in the direction of arrows 16 past the imprinting apparatus 10. The web is guided around a guide roller 18 mounted on bed 12 of the packaging machine and passes into the packaging machine. Said package machine can perform a number of known operations including cutting the web, sealing the web to a second web or the like.

The web is divided into a plurality of lanes 20. During later processing, the web will be divided both laterally and longitudinally to a plurality of packages, each lane representing a series of such packages. For example, the square areas 24 on web 14 outlined by phantom lines may each represent one wall of a package to be formed and/or filled by the packaging machine. Such areas would be spaced longitudinally along the web and, in the usual case, it is desired to imprint a date, code or other indicia at a particular location in each of said areas.

Web 14 is advanced intermittently past imprinting device 10 so that each lateral line of areas 24 is sequentially presented for imprinting during successive periods that the web is stopped.

Imprinting device 10 is mounted on bed 12 by means of a pair of upstanding posts 26 secured to bed 12 by means of plates 28 and appropriate fastening means (not shown). Imprinting device 10 includes a frame 30 mounted by means of a pair of brackets 32 on posts 26. Said posts are journaled through an aperture in brackets 32 and locking means (not shown) are provided on brackets 32 for locking said brackets to their respective posts at the desired vertical position along said post. In this manner, imprinting apparatus 10 may be displaced vertically for positioning in registration longitudinally along the web with the areas to be imprinted, such as areas 24.

Frame 30 consists of a rear cross-beam 34 and a pair of spaced support plates 36. Mounted on plates 26 of frame 30 is a carriage 38 supporting three printing units 40 for lateral displacement relative to frame 30 and web 14. Carriage 38 includes an end plate 42 mounted on the end of a support crossbar 44 which is journaled through plates 36 of frame 30. Carriage 38 is displaced by means of a cylinder 46 fixedly mounted on the inner surface of the plate 36 adjacent to end plate 42. Cylinder 46 may be operated by hydraulic or pneumatic means for displacing a plunger 48 journaled through said plate 36 and fixedly secured to end plate 42. The longitudinal displacement of piston 48 carries with it carriage 38 and the printing units 40 mounted thereon.

Also mounted for displacement with carriage 38 is drive shaft 50, which is journaled through plate 36 of frame 30 for lateral displacement therethrough and journaled through end plate 42 for rotational displacement therein.

However, drive shaft 50 is coupled to end plate 42 for displacement therewith. Also mounted on end plate 42 is a linear displacement device 52 which may take the form of a pneumatic or hydraulic cylinder adapted to reciprocally displace plunger 54 between two positions. Mounted on plunger 54 by means of bracket 56 is a rack gear 58. Said rack gear is provided with smooth portions at the end thereof adapted to be received within guide 60 which are in turn mounted on end plate 42. Thus, the activation of linear displacement device 52 serves to reciprocally and longitudinally displace rack 58. A pinion gear 62 is mounted on drive shaft 50 by means of a one way clutch mechanism 64 of conventional construction whereby the rotation of pinion gear 62 in one direction rotates drive shaft 50 corresponding amounts, while the rotation of said pinion gear in the other direction results in no rotation of said drive shaft. Pinion gear 62 is positioned in mating cooperation with rack 58 for the rotation thereof in response to the longitudinal displacement of said rack in response to the displacement of plunger 54. A further bracket 68 is mounted on end plate 42 for supporting an adjustable stop screw 66 which serves to limit the displacement of plunger 54. The purpose of the foregoing construction will be more particularly understood in connection with the description of the printing unit 40 below.

One of said printing units is more particularly shown in FIGS. 2 and 3, the remaining printing units being substantially identical with the printing unit shown in said figures. Accordingly, like reference numerals have been used to identify like parts in the various printing units 40. The embodiment of the arrangement according to the invention incorporates a printing unit which utilizes a pigmented strip adapted to release a pigment retained therein upon application of heat and pressure as the printing medium. Such pigmented strip is known in the art as hot leaf, pigmented roll leaf, ribbon or pigmented hot stamping tape. Such printing apparatus utilizes a displaceable heated die which is brought into engagement with an anvil with the web to be imprinted and the pigmented strip therebetween. This engagement is maintained for a period of time sufficient to permit the pigment in the strip to be released onto the web in the pattern defined by the date, code or other indicia formed in the heated die. The die is then retracted and the web and pigmented strip are both advanced for the next printing operation.

In the embodiment shown in the drawings, the anvil is defined by a back-up plate 74 mounted on cross-beam 34 of frame 32. The remaining portions of the printing unit are mounted for displacement with carriage 38 by means of mounting fixture 76, which is mounted on support crossbar 44. Secured to the top of mounting fixture 76 is an -L-shaped bracket 78 supporting a cylinder 80 operable by hydraulic or pneumatic means to reciprocally displace a plunger 82. Mounted on the end of plunger 82 is the heated die means 84, which is of conventional construction incorporating a heated die-holder 86 for receiving the dies defining the date, code or indicia to be imprinted on web 14.

Mounted on the side of mounting fixture 76 by means of bolts 88 is a print support plate 90. As shown in FIG. 3, a grooved guide plate 92 is mounted on the

side of heated die means 84 adjacent said print support plate for cooperation with a track 94 projecting from said plate to guide and support heated die means 84 during the displacement thereof. Heated die means 84 includes a heating means (not shown) of conventional design which maintains die holder 86 and the die contained therein at an elevated temperature sufficient to release the pigment in the pigmented strip 96 when brought into its operative position. In said operative position, web 14 and pigmented strip 96 are pinched between the dies of heated die means 84 and back-up plate 74.

Pigmented strip 96 is supplied from a supply roller 98 having a reel of said pigmented strip mounted thereon. Supply roller 98 is rotatably mounted on shaft 100, which in turn is secured to print support plate 90. The outer flange 102 of supply roller 98 is removable from said shaft by releasing lock screw 104 to permit the insertion of a fresh reel of said pigmented strip. The pigmented strip is guided by guide rollers 106, 108 and 110 past the imprinting station which is intermediate heated die means 84 and back-up plate 74. Each of said guide rollers is rotatably mounted on print support plate 90.

From guide roller 110, pigmented strip 96 passes around drive roller 112, which is mounted on drive shaft 50 for rotation therewith. From drive roller 112, pigmented strip 96 is passed about nip roller 114 so that a portion of said strip is engaged between said nip and drive rollers. Nip roller 114 is mounted for rotation on one end of arm 116 which, in turn, is pivotally mounted at its other end to print support plate 90. Spring 118 interconnects a pin 120 on arm 116 and a pin 122 on print support plate 90 to bias said nip roller into engagement with drive roller 112.

From nip roller 114, the pigmented strip passes to take-up roller 124 rotatably mounted on a shaft 125, which in turn is mounted on print support plate 90. The outer flange 126 of take-up roller 124 is removably mounted on said shaft and is retained in position by nuts 128 and spring 130 (FIG. 3).

Take-up roller 125 and drive roller 112 are operatively connected by endless belt 132, which serves to rotate take-up roller 124 in response to the rotation of said drive roller and drive shaft 50.

Thus, the rotation of drive shaft 50 an incremental distance serves to advance pigmented strip 96 a like distance in the direction of arrows 134 (FIG. 2). Since the displacement of the pigmented strip in the opposite direction is not desired, one-way clutch 62 (FIG. 1) is provided to ensure the rotation of drive shaft 50, drive roller 112 and take-up roller 124 in that one direction. Thus, the incremental advancement of pigmented strip 96 is achieved in response to the actuation of linear displacement device 52 (FIG. 1) and the mechanism associated therewith. Since the drive rollers of each of the three printing units 40 are all mounted on drive shaft 50, the incremental advancement of their respective pigmented strips 96 is achieved simultaneously by a single operation of linear displacement device 52.

In order to ensure proper lateral registration of the date, code or other indicia to be imprinted on the web, the printing units may each be laterally displaced along said carriage for proper positioning by slideably displacing back-up plates 74 along cross-beam 34, mount-

ing fixtures 76 along support crossbar 44, and drive rollers 112 along drive shaft 50. Locking means (not shown) would preferably be provided to secure each of these elements at a predetermined position on the carriage to avoid inadvertent misalignment during operation of the machine.

While the embodiment shown in the drawings incorporates a printing mechanism utilizing the above-described impregnated strip, other types of printing mechanisms, well-known in the art, could equally be adapted for application to the arrangement according to the invention so long as the printing mechanism is mounted on carriage 38 for displacement therewith. A rotational force which must be applied to such printing mechanisms for inking thereof could be obtained from independent sources of power, or from the rotation of drive shaft 50, as in the embodiment shown in the drawings.

In the embodiment of the arrangement shown in the drawings, three separate printing units are shown, adapted for displacement as a unit between two positions, one of said printing units 40 being in registration with one of the lanes 20 at each of said positions. Thus, referring to FIG. 1, in a typical cycle, web 14 would come to a stop, the cylinders 80 of each printing unit 40 would be simultaneously activated to imprint the date, code or other indicia on the first, third and fifth lanes 20 of web 14; cylinder 46 would be actuated to displace carriage 38 in the direction of arrow 136 to a second position, at which printing units 40 are in registration with the second, fourth and sixth lanes of web 14; at the same time, linear displacement device 52 would be actuated to displace rack 58 for the advancement of pigmented strips 96; and cylinders 80 would once again be actuated to effect imprinting on said second, fourth and sixth lanes. If desired, cylinder 46 could be actuated once again to return the carriage 38 to its original position. In the alternative, after the next advance of web 14, the first imprinting would be in said second, fourth and sixth lanes, while the second imprinting in the cycle would be in the first, third and fifth lanes of said web.

The above-described sequential operation may be controlled by a control means 140 shown schematically in FIG. 1. This control means, which may take the form of a conventional relay-and-timer control, is preferably operable in response to an input signal shown schematically by arrow 142 received from a microswitch (not shown) tripped by the stopping of web 14. Control means 140 would be coupled, as shown schematically by lines 144, 146 and 148 to control respectively sequential activation of cylinders 80 of printing means 40, cylinder 46 controlling the displacement of carriage 38, and linear displacement device 52 controlling the rotation drive shaft 50.

While the embodiment of the arrangement according to the invention shown in the drawings is provided with a carriage adapted for displacement between two positions, cylinder 46 may be adapted for displacement between more than two positions, in which case, each printing unit may be utilized to imprint more than two lanes, depending on the duration of the period of time during which web 14 remains stopped.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained, and since certain

changes may be made in the above constructions without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A device for imprinting at a plurality of longitudinally spaced locations along each of a plurality of lanes in web material intermittently advanced therepassed comprising, a fixed base; a frame mounted on said base adjacent the path of said web; carriage means mounted on said frame for lateral displacement relative to said web; printing means mounted on said carriage means for imprinting said web when said web advance is interrupted, said frame including means coupling said frame to said base for the selective displacing of said frame along said base in the longitudinal direction of said web to longitudinally register said printing means relative to said locations and for selectively fixing said frame relative to said base when said printing means is in longitudinal registration; displacement means coupling said carriage means and frame for displacing said carriage means along said frame between at least first and second positions at which said printing means is in registration with at least first and second lanes respectively on said web for imprinting thereat and control means operatively coupled to said imprinting means and displacement means for actuating said imprinting means in response to the stopping of said web to effect imprinting at a first of said first and second positions, then actuating said displacement means to displace said carriage to the other of said first and second positions, and then actuating said printing means to effect imprinting at said other position.

2. The combination of claim 1, and wherein said control means is adapted to actuate said displacement means for returning said carriage means to said one of said first and second positions after imprinting at said other position.

3. The combination of claim 1, and wherein said printing means is adapted for use with strip means which releases a pigment upon application of heat and includes heated die means mounted on said carriage for displacement therewith and for reciprocal displacement relative to said carriage into and out of an operative position at which said heated die means engages said strip means for the release of said pigment onto said web to effect imprinting at said operative position and support means mounted on said carriage for displacement therewith for intermittently advancing incremental lengths of said strip means to a position adjacent to and spaced from said heated die means when

said heated die means is out of said operative position.

4. The combination of claim 3, and including backup plate means fixedly mounted on said frame and positioned so that said heated die means pinches said web and strip means thereagainst at the operative position of said heated die means.

5. The combination of claim 3, and wherein said support means includes roller means engaging said strip means to effect the advancement thereof upon rotation of said roller means, linearly displaceable drive means, and coupling means interconnecting said linearly displaceable drive means and said roller means for the rotation of said roller means in response to the linear displacement of said drive means.

6. The combination of claim 5, and wherein said coupling means includes rack means coupled to said linearly displaceable drive means and pinion means in mesh with said rack means and coupled with said roller means.

7. The combination of claim 6, and wherein said linearly displaceable drive means is reciprocally displaced between at least first and second positions, said coupling means including one way clutch means intermediate said pinion means and said roller means for the rotation of said roller means in response to the rotation of said pinion means in only one direction.

8. The combination of claim 6, and wherein said support means includes feed roller means for supplying said strip means; takeup roller means for receiving said strip means after imprinting; guide roller means for guiding said strip means along a path extending from said feed roller means, to said heated die means operative position and thence to said takeup roller means; said drive roller means engaging said strip means in said path.

9. The combination of claim 1 and including at least two printing means mounted on said carriage means for the imprinting of at least two lanes on said web at each position of said carriage.

10. The combination of claim 1 and wherein said displacement means is adapted to sequentially displace said carriage means between a plurality of positions; said printing means being in registration with a lane at each of said positions.

11. The combination of claim 1, and including first adjusting means coupling said printing means and carriage means for the selective positioning of said printing means laterally relative to said web and carriage means for initial registration of said printing means with the lanes of the web material to be imprinted.

12. The combination of claim 11, wherein said first adjusting means includes rail means mounted on said carriage means and extending laterally relative to said web, said printing means being mounted on said rail means for selective displacement therealong, and means coupling said printing means and rail means for fixing the position of said printing means along said rail means.

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