MACHINE FOR MAKING PRINTED, CORRUGATED BOX BLANKS

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MACHINE FOR MAKING PRINTED, CORRUGATED BOX BLANKS

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4 Claims.

(CI: 93—36)

Figure 3 is a plan view of a section of web showing the result of the printing, creasing and cutting operations.

Figure 4 is a perspective view of one of the container blanks set up to form a container.

Figure 5 is an edge view, drawn to a scale larger than that of the other figures of the drawings, showing the corrugated material formed from the three webs.

Similar reference characters indicate similar parts or features in all of the views.

Referring first to Figures 1 and 2, the different parts or members of the machine are mounted on a suitable frame I.

A roll of paper A for supplying the face paper web B is mounted on shafts 2, journaled in frame I. The web of paper B is drawn uniformly and continuously from the said supply roll A by the action of feed rollers 3 and 4, journaled in frame 1.

Positioned between feed rollers 3 and 4 is a heating drum 5 rotatably mounted on frame 1, the web B traveling over part of the outer diameter of the heating drum 5 in passing from roller 3 to roller 4. The purpose of the heating drum 5 is to heat the web B to condition it prior to its being combined with the corrugated web D hereafter described. The heating drum may be heated by any desired means, preferably by steam or electricity. From the feed roller 4 the web is advanced by rollers 6 and 7 journaled in frame I to engage the corrugated web D.

A roll of paper C, for supplying the web D which is to form the corrugated member, is mounted on shaft 8 journaled in frame I. The web D is drawn from the supply roll by the rotation of corrugating rollers 9 and 10 which operate in the conventional manner to provide corrugations in web D. While the web D is still in contact with corrugating roller 10, suitable adhesive is applied to the crowns of the corrugations on the web D by glue wheel 11 operatively mounted in glue pot 12 secured to frame I. The further rotation of corrugating roller 10 causes the corrugated web D to engage the heated, face paper web B. The adhesive on the crowns of the corrugations on web D serves to secure the web D to web B to form a single faced corrugated web. The heating of web B helps to dry or set the adhesive on web D when the two webs are brought together.

From the corrugating roller 10 the single faced corrugated web, made up of webs B and D, is drawn between endless conveyor belts 13 and 14. Belt 13 is driven by rollers 15 and 16 rotatably mounted on frame I. Belt 14 is driven by rollers 17 and 18 rotatably mounted on frame I. From
the conveyor belts 13 and 14 the single faced corrugated web is deposited on a slow moving endless conveyor belt 15, driven by rollers 20 and 21 mounted on frame 1. The conveyor belt 15 serves as a storage medium where the single faced corrugated web is deposited, and a supply accumulated. From the belt 15 the single faced corrugated web is picked up by roller 22 journaled in frame 1. From rollers 22 the composite web is advanced to rollers 23 and 24 journaled in frame 1. From roller 24 the single faced corrugated web is drawn between roller 25 and roller 26 journaled in glue pot 27 secured to frame 1. A glue roller 28 rotating in liquid adhesive in glue pot 27 serves to deposit adhesive on glue roller 26 which in turn deposits liquid adhesive on the corrugations of the corrugations on the single faced corrugated web in preparation for adding thereto a second face web.

The second face web F is drawn from a supply roll 5 on shaft 29 mounted in frame 1. From the supply roll R the web F is advanced over rollers 30, 31 and 32 to a printing press base cylinder 33, 34 and 35 operatively mounted in printing press base 34 secured to frame 1. The said cylinder 33 carries the web F against impression cylinder 35 where the one color of printing ink is applied to the web, the web F next acted upon by impression cylinder 36 in which in turn applies a second collar of printing ink to the web F. From the impression cylinder 36 the web F advances over rollers 37, 38 and 39 all journaled in frame 1. Between rollers 38 and 39 the web F is formed to provide a loop, with a damper roller 40 positioned in the loop to keep the web F in the web taut and to take up any possible slack in the web. From roller 39 the printed web is drawn by roller 41 journaled in frame 1, whence the web F is advanced to contact the outer diameter of heated drum 42 journaled in frame 1. The drum 42 advances it into position to engage the printed web D adhesively treated by glue roller 26. The web D having previously been combined with face paper web B to form a single faced corrugated web, then as previously explained, the crown of the corrugations on the free side of the corrugated web D are treated with adhesive in preparation for receiving the printed web F which is brought into engagement with the web D and firmly pressed together by the action of endless pressure and conveyor belts 44 and 45 supported and driven by roller 46, 47, 48, 49, 50, and 51, all journaled in frame 1. While the belts 44 and 45 are advancing and pressing the web B, D and F together to form a printed, double faced corrugated web, the composite web is carried through a heating unit 52 secured to frame 1, where the web is heated to further dry the printing ink, and also to dry the adhesive and drive off any excess moisture from the web. From the heating unit the web passes through cooling units 53 secured to frame 1. The cooling units are to quickly bring the web back to normal temperature.

The double faced, printed and dried web of corrugated paper board is next advanced to a web trimming device which acts to trim the longitudinal edges of the web, if necessary, to the desired size. The trimming operation is performed in the conventional manner by cooperating rotary tools 54 and 65 journaled in frame 1. From the trimming device the web is advanced to be acted upon by creasing cylinders 66 and 67 rotatably mounted in frame 1, which serve to provide the longitudinal creases in the web.

The next operation consists in transversely creasing, cutting and severing the web to complete the production of individual container blanks.

The transverse web creasing, cutting and severing operation is effected by the rotation of cylinders 59 and 60. Secured to the outer diameter of cylinder 59 is a web severing knife 58 which operates to cut off a blank from the advancing web with each revolution of the cylinder. Also secured to the outer diameter of cylinder 60 at three points, spaced radially apart from the web severing knife 58, are creasing and cutting knives 61. The outer ends of knives 61 serving to cut the web, and the mid-portions of the knives, serving to crease the web.

The creasing and cutting cylinders 59 and 60 are operatively mounted in adjustable carrier units 59, 60 and 62 supported on horizontally rotatable roller base 62 supported on horizontally rotatable roller base 63. Positioned on bracket 64 on frame 1. The cutting and creasing unit is adjustable horizontally by the action of screws 65 supported in adjusting brackets 64 and 65 fastened to the outer end of each holding screw 65 is a crank handle 66. The screws 65 are oppositely positioned in tapped holes in brackets 64. It will be obvious that by turning the crank handles 66, the carrier units 59, 60 may be moved horizontally back or forward as desired, to the move the cutting and creasing cylinders 59 and 60 to the proper position in order that the advancing web may be creased, cut and severed in register with the printing on the web.

The adjustable feature of the carrier unit base is an important part of this invention, because in the production of articles from a web requiring cuts and creases to register with printed matter on the web, it is necessary to occasionally adjust the cutting and creasing devices in relation to the printing devices in order to correct any accumulated error results from unavoidable variations in materials and operating mechanisms. Therefore, when the machine described is in operation the operator must watch the register of the cuts and creases with the printed matter on the web. If the cuts and creases are out of register with the printed matter, the operator must move the carrier unit until the operator moves the carrier unit slowly to bring the cuts and creases into proper register. This can be done without stopping the operation of the machine.

After the completed blanks have been cut from the web, the completed blanks are delivered, by rollers 67 and 68 rotatably mounted in frame 1, to the delivery bin 10 situated adjacent to the delivery end of the machine.

Referring to Figure 3, which illustrates a section of the printed, double faced, corrugated web, the edges 11 represent the edges trimmed by rotating the cutting and creasing tools 51 and 54. The longitudinal dotted lines 12 represent the creased lines produced by creasing cylinders 56 and 57. The transverse dotted lines 13, and the transverse full lines 14, represent the creases and cuts respectively made by the action of knives 59 and 61 in cylinder 58. The full transverse lines 13, 14, 59 and 60 represent the cuts made by the web severing knife 58 which operates to cut each blank from the advancing web. The printed matter on the web is represented by the numeral 62.
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size are selected; that is, the width of the web supply rolls of paper is preferably of the required size in order to eliminate the trimming operation if possible. The crossing cylinders 56 and 57 are next adjusted to longitudinally crease the web as desired. Then the printing cylinders 35 and 56 must be prepared with the printing medium spaced so as to provide printing on panels of the container. The crossing and cutting cylinders 59 and 60 are likewise suitably changed preparatory to producing each size of container. The bracket 64 is adjustable horizontally, by means previously described, to register the cutting and creasing operations with the printing of the web. Thus, the length of web to be cut off from the advancing web to provide each box blank is determined and regulated by the horizontal position and make-up of the crossing and cutting cylinders 59 and 60.

It will be understood, without need of illustration that any suitable motor may be employed for operating the machine, and that suitable gearing is employed in practice to cause the various rolls to rotate at uniform peripheral speed to effect the travel of the webs through the machine in order that the operations of the several units therein described may be effected in the sequence described.

Having now described my invention, I claim:

1. A machine for making printed, corrugated, paper containers, comprising means for causing two webs of paper to travel; corrugating rolls for operating on one of the webs; means for applying heat to the other web and then adhesively connecting the corrugated web to the other web to provide a single faced corrugated web; a printing device for printing the corrugated web; means for conveying the corrugated web to the free side of the corrugated web, to form a printed, double faced, corrugated web; a dance roll positioner to ride in a loop in the third web, between the printing unit and the point of contact with the single faced corrugated web; an adhesive applying device for securing the printed single faced corrugated web to the free side of the corrugated web, to form a printed, double faced, corrugated web; a device for horizontally adjusting the movable base in its relation with the printing unit; and means for delivering completed blanks from the machine.

2. A machine for making printed, corrugated, paper containers, comprising means for causing two webs of paper to travel; corrugating rolls for operating on one of the webs; means for adhesively connecting the corrugated web to the other web to provide a single faced corrugated web; means for causing a third web of paper to travel; a printing device for printing the corrugated web; a hand operated device for horizontally adjusting the movable base in its relation with the printing unit; and means for delivering completed blanks from the machine.

3. A machine for making printed, corrugated, paper containers, comprising means for causing two webs of paper to travel; corrugating rolls for operating on one of the webs; means for adhesively connecting the corrugated web to the other web to provide a single faced corrugated web; means for causing a third web of paper to travel; a printing device for printing the corrugated web; a dance roll positioner to ride in a loop in the third web, between the printing unit and the point of contact with the single faced corrugated web; an adhesive applying device for securing the printed single faced corrugated web to the free side of the corrugated web, to form a printed, double faced, corrugated web; a device for horizontally adjusting the movable base in its relation with the printing unit; and means for delivering completed blanks from the machine.

4. A machine for making printed, corrugated, paper containers, comprising means for causing two webs of paper to travel; corrugating rolls for operating on one of the webs; means for adhesively connecting the corrugated web to the other web to provide a single faced corrugated web; means for causing a third web of paper to travel; a printing device for printing the corrugated web; a hand operated device for horizontally adjusting the movable base in its relation with the printing unit; and means for delivering completed blanks from the machine.

5. A machine for making printed, corrugated, paper containers, comprising means for causing two webs of paper to travel; corrugating rolls for operating on one of the webs; means for adhesively connecting the corrugated web to the other web to provide a single faced corrugated web; an adhesive applying device for securing the printed single faced corrugated web to the free side of the corrugated web, to form a printed, double faced, corrugated web; a device for horizontally adjusting the movable base in its relation with the printing unit; and means for delivering completed blanks from the machine.

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means for advancing the printed, double faced, corrugated web; means for heating and then cooling the printed, double faced, corrugated web; devices for applying longitudinal creases in the web; a cutting and creasing cylinder operatively positioned to transversely cut and crease the web; a horizontally movable base for supporting the cutting and creasing cylinder; a hand operated device for horizontally adjusting the movable base in its relation with the printing unit; and means for delivering completed blanks from the machine.