Aug. 5, 1969 W. J. GOETTSCH 3,459,080

ROTARY STRIPPING UNIT

Filed Dec. 12, 1966 3 Sheets-Sheet 1

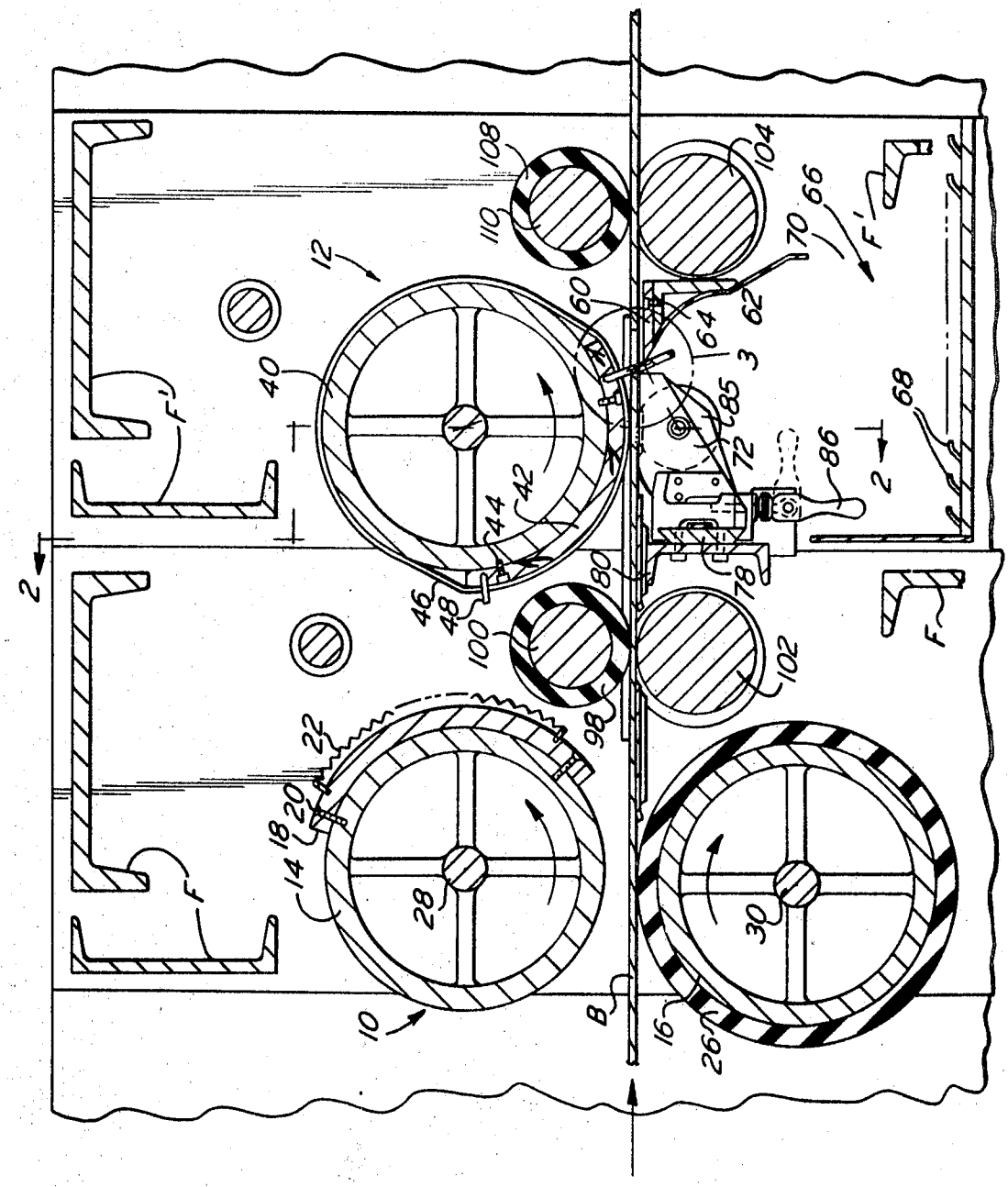


FIG. 1

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ROTARY STRIPPING UNIT

Filed Dec. 12, 1966 3 Sheets-Sheet 2

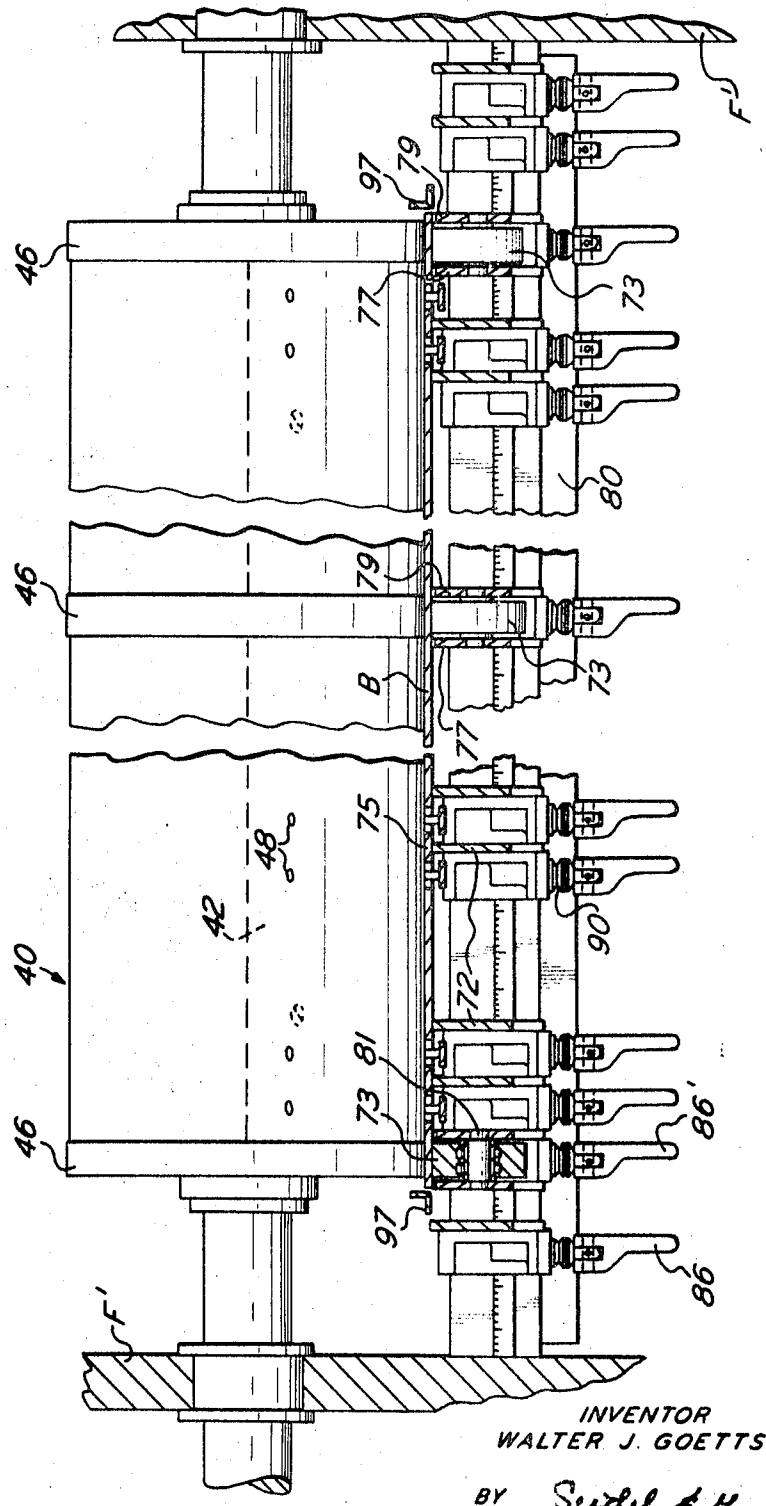


FIG. 2

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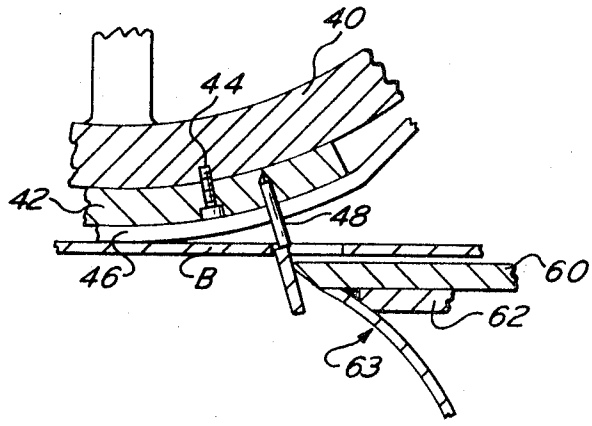
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Aug. 5, 1969 W. J. GOETTSCH 3,459,080

ROTARY STRIPPING UNIT

Filed Dec. 12, 1966 3 Sheets-Sheet 3

FIG. 3



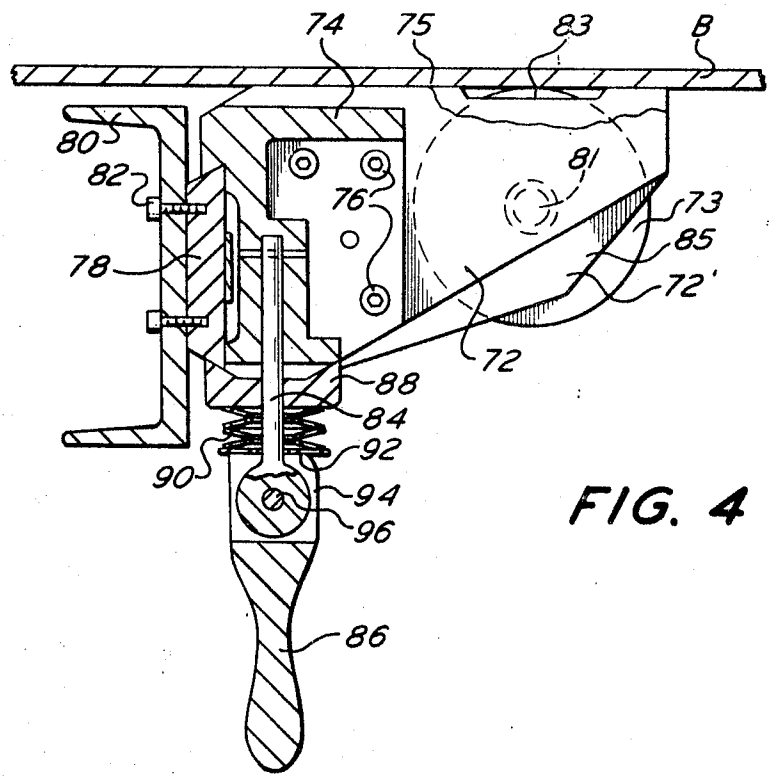


FIG. 4

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United States Patent Office

3,459,080

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3,459,080

ROTARY STRIPPING UNIT

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Int. Cl. B26d 7/18
U.S. Cl. 83—98 17 Claims

ABSTRACT OF THE DISCLOSURE

A rotary stripping unit in line with a die cutting unit for performing continuous operations on paperboard. Each unit is mounted in a separate, easily separable frame and the units are operated at the same speed. After dies have cut the blanks, stripping pins and a stripping blade cooperate to remove cutouts and trim from the blanks.

This invention relates to a rotary stripping unit and more particularly to a rotary high speed stripping unit which can be located in line with, downstream from, and synchronously driven with a high speed die cutting unit. In the preferred embodiment of this invention, the rotary stripping unit and the die cutting unit are each mounted in its respective side frames which frames are separable to provide ready access to both units.

Conventionally, blanks of paperboard, fiberboard or corrugated paperboard which may be subsequently slotted, scored, folded and/or glued are made on a combination of machines in a continuous line and emerge as flat blanks. Generally, the blanks have all sides straight, with adjacent sides 90° to each other and may have parallel score lines on their surface which may act as fold lines when the blank is utilized.

These cut and scored blanks which may have previously been fed through a printer may thereafter be fed into a hopper of a slotter machine which may slot and score the blanks in readiness for subsequent folding and/or gluing operations. The slotter may be a separate machine or may be combined with a folder-gluer. A printer may be combined with the slotter, however it is preferable to complete all printing prior to the die cutting and stripping operations so that paper dust and trim fragments cannot adversely affect the printing elements. Thereafter, the blanks emerge in complete form.

However, the blanks may be of a design that does not have all four sides straight and does not have adjacent sides 90° to each other. Furthermore, holes of various sizes and shapes may be required in the finished folded and/or glued blanks. The blanks may be box blanks or the blanks may be adapted for uses as packaging materials such as trays, various displays devices, etc., which may or may not be printed and/or folded and glued. Such blanks may or may not be scored, may have holes of various sizes and shapes, and may have irregular shapes or contours. Thus, such blanks must be die cut and then must have the cutouts and trim removed by stripping before they can be put through subsequent operations such as slotting, folding, and/or gluing.

Die cutting may be accomplished by a motor driven automatically fed rotary die cutting press. Heretofore, no satisfactory stripper means, machine, or machine units have been available which can match the speed of the rotary type die cutting presses. The die cutting presses can die cut 200 to 250 blanks per minute. After blanks have been die cut, it has generally been necessary to stack them and thereafter feed them into a stripping unit which operates at a much slower speed.

Thus, it has been exceedingly difficult to incorporate a rotary die cutting unit and stripping unit in line with a folder-gluer or a slotter-folder-gluer for performing all these operations in a continuous operation.

It is an object of this invention to provide a stripping unit for stripping cutouts and trim from blanks which have previously been die cut in a high speed rotary die cutting unit wherein the stripping unit is in line with and downstream from the die cutting unit.

Another object of this invention is to provide a stripping unit which is located in line with and downstream from a die cutting unit wherein the stripping unit and die cutting unit are mounted in their respective side frames and wherein the units may be separated to provide ready access to both the die cutting and the stripping units.

Still another object of this invention is to provide an improved stripping unit which is reliable in operation and highly effective in use.

Yet still another object of this invention is to provide a stripping unit which utilizes support arms to support and help fed blanks through a stripping unit.

Another object of this invention is to provide a stripping unit which utilizes support arms which support blanks against the downward force exerted on such blanks by stripping pins.

Another object of this invention is to provide a stripping unit which utilizes a stripping cylinder which cooperates with a stripper blade located downstream from the stripping cylinder.

A further object of this invention is to provide a stripping unit which can be positioned at the delivery end of existing rotary high speed die cutting units and which will perform a stripping operation at the same speed at which the die cutting unit operates.

A still further object of this invention is to provide a machine which includes a stripping unit in line with and down-stream from a high speed die cutting unit in a novel, useful, and non-obvious structural interrelationship.

Other objects will appear hereinafter.

The above enumerated and other objects of the present invention are accomplished by the provision of a rotary stripping unit in line with and downstream from a rotary die cutting unit. The stripping unit comprises a power driven cylinder which rotates in synchronism with the die cutting unit.

The cylinder of the stripping unit has mounted thereon a male stripping element which comprises a curved block of material and which circumscribes a portion of the male stripping cylinder. A plurality of stripping elements are embedded in the curved block of material. The stripping elements are arranged so that they are exactly aligned with the cutouts which have been die cut into the blanks by the die cutting unit.

The stripping elements are effective to knock cutouts and trim out of the blank and push them below the surface of the blank. A stripping blade is positioned downstream from the stripping cylinder beneath the surface of the blank to insure the removal of all trim and cutouts from the blank. Furthermore, means are provided for flexing the box blanks downwardly as they travel through the stripping unit so that the removal of cutouts and trim is thereby facilitated.

The die cutting unit and the stripping units are supported in separate frames and the frames are suitably locked together for and during operation. The units may be separated so that operating personnel can enter and have ready access to both the die cutting and the stripping units.

For the purpose of illustrating the invention, there

is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIGURE 1 is a longitudinal cross section showing the die cutting unit and the stripping unit of the present invention;

FIGURE 2 is a section view taken along line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged section view of the apparatus disclosed in circle 3 in FIGURE 1;

FIGURE 4 is an enlarged view partially in section of the support arms of the present invention.

Referring now to the drawings in detail, there is shown in FIGURES 1–3 a rotary die cutting unit generally indicated by the reference numeral **10**. The die cutting unit **10** is positioned upstream from a rotary stripping unit generally indicated by numeral **12**. The die cutting unit **10** is supported by frame members generally indicated as F. The stripping unit **12** is supported by frame members generally indicated as F'.

The rotary die cutting unit **10** comprises a male die cylinder **14** and an impression cylinder **16**. Dies **22** which are used for die cutting will be made in the conventional manner and will comprise metal cutting and scoring blades mounted in a curved sheet of plywood, aluminum, plastic, or other suitable material **18**. The dies **22** are chosen so that they cut through the thickness of the blanks and may extend a few thousandths of an inch through the blanks. The curved member **18** is secured to the male die cylinder **14** by means of bolts **20** or other suitable securing means. The impression cylinder **16**, identical in diameter to the die cylinder **14**, is provided with a flexible covering **26** which may be made of rubber, plastic, or other suitable material.

The axis **28** of the male die cylinder **14** is offset with respect to the axis **30** of the impression cylinder **16**. As a result of the offset relationship, a blank B will be deflected slightly downwardly as it passes between cylinders **14** and **16**. As will be hereinafter fully discussed, all other rotating members which contact the blank B are positioned to flex the blank B downwardly during its travel through the die cutting unit **10** and the stripping unit **12**. The amount of such deflection should be, for instance, in the order of one inch over a span of thirty-two inches for a machine which will accommodate a maximum size blank of fifty inches by one hundred and fifteen inches. The downward flexing of the blanks greatly facilitates the ejection of cutouts and trim which have been die cut into the blank. Furthermore, the downward flexing of the blank B will increase the traction effect exerted on the blank so that the blank may be moved through the stripping unit at a desired predetermined speed.

The die cylinder **14** and the impression cylinder **16** are mounted on conventional bearing housings. Conventional positive drive means may be secured to the male die cylinder **14** to provide for rotation thereof. The impression cylinder **16** may be driven by means of a slip clutch which will normally drive the cylinder **16** is a one-to-one relationship with the male die cylinder **14**. However, the slip clutch will permit slight changes in speed brought about by the engagement to a greater or lesser degree of the dies **22** with the yielding surface **26** of the impression cylinder **16**. By thus allowing the impression cylinder to accommodate itself to the effective speed of the dies **22**, gouging of the surface **26** of the impression cylinder **16** is avoided, and the serviceable life of the cylinder covering extended considerably.

Scoring will normally be done by the rotary scoring members of the slotting and scoring unit. However, special scoring, such as diagonal scoring, may be accomplished by mounting scoring rule either in the cutting dies **22** or by mounting flexible scoring members on the impression cylinder **16**. When scoring members are mounted on the impression cylinder **16**, the cylinder **16** must be driven at a fixed one-to-one relationship with the male die cylinder **14**. When the latter condition exists, the slip drive of the impression cylinder will be locked.

The stripping unit **12** is located in line with and downstream from the die cutting unit **10**. The stripping unit **12** comprises a stripping cylinder **40**. The stripping cylinder **40** has removably attached thereto at least one curved male stripping die **42**. The stripping die **42** is similar in shape to the curved member **18** on the male die cylinder **14**.

The stripping die **42** may be composed of plywood, aluminum, plastic, or other suitable material preferably at least ⅝ inch in thickness. The male stripping die **42** is secured to the stripping cylinder **40** by bolts **44** or by other suitable securing means. The stripping cylinder **40** is provided with rubber feed straps **46** which are also secured to the male stripping die **42**. The rubber feed straps are utilized to frictionally engage the blanks to flex them downwardly and to pull the blanks through the machine. The rubber feed straps also co-act with idling rollers carried on support arms in the stripping unit **12** as will be described in detail hereinafter. The feed straps may circumscribe the cylinder **40** or they may be only coextensive with the stripping die **42**. The straps insure positive feeding of blanks through the machine.

Stripping pins **48** are secured to the stripping die **42** and are utilized to to knock out the cutouts and trim from the blank B. The stripping pins **48** may be headless nails or screws which are precut to the desired length. The pins **48** may be driven or threaded into the curved male stripping die **42**. A fixture or gauge may be used so that the pins will project a predetermined amount beyond the outer surface of the male stripping die **42**. The amount the stripping pins **48** will project beyond the outer surface of the stripping die **42** will vary with the caliper of the blank being run through the machine. Thus, the projection should be approximately .772 inch for A flute and approximately .627 inch for E flute double faced corrugated paperboard.

In any event, the projection of the pins **48** should be equal to the thickness of the blank B plus ⅜ inch so that they will project ⅜ inch below the lower surface of the blank. The location and number of pins **48** is correlated with the die **22** and its cutting action on the blank B so that each pin **48** engages a cutout or trim on the blanks as they move through unit **12**. The pins will normally engage the cutout or trim close to the leading and trailing edges thereof so that a stripper blade **60** will remove such cutout and trim completely.

As a blank B moves through the machine, the pins **48** will force the cutouts and trim downwardly and in most cases force them out of the blank. The stripper blade **60** is provided to separate any cutouts or trim from the blank which are not completely separated by the stripping pins **48**.

The stripper blade **60** is mounted beneath the travel of the blanks through the machine. The stripper blade **60** is provided to insure complete separation of the cutout and trim from the blank. Blade **60** is provided with top and incline surfaces which are smooth and unbroken across the width of the machine. The surfaces of the stripper blade **60** may be chrome plated or may be made of stainless steel or other suitable material. The edge of the stripper blade **60** should be sharp but it is not necessary that it be knife sharp. The stripper blade **60** should be designed and constructed so that it has maximum stiffness and rigidity.

The stripper blade **60** is mounted on a blade support **62** which in turn is attached to the frame F'. The stripper blade **60** may be adjustably attached to the blade support **62** by means of bolts **64** or other suitable securing means. The support **62** may be adjusted vertically with respect to the frame F' to accommodate for different blank thicknesses. The vertical adjustment may be accomplished in any conventional manner such as by plates or rails con-

nected to the frame F' and guides connected to the support 62 which cooperate with such plates or rails.

The stripper blade 60 may be easily replaced by merely removing bolts 64 and substituting a new blade. The edge of the stripper blade 60 is positioned close to the ends of the support arms 72 which arms will be fully discussed hereinafter. The top edge of the blade is preferably approximately 3/16 inch below the top surface of support arms 72 so that the leading edges of the blanks B will not jam against the blade as they pass through the machine. The blade support 62 is contoured at 63 to facilitate smooth downward movement of the cutouts and trim which are removed from the blanks by the blade 60.

Positioned beneath the stripping cylinder 40 and the stripper blade 60 is a waste receiving box 66. An air conveying means 68 having rearwardly directed nozzles may be mounted in the bottom of the box 66 so that the cutouts and trim will not accumulate in the box. The box may be provided with an opening 70 through which cutouts and trim are adapted to be blown by means of the air conveying means 68. The scrap cutouts and trim may thereafter be collected at a central point for suitable disposition.

Support arms 72 are mounted for lateral movement beneath the plane of travel of the blanks. Two types of support arms 72 are utilized in the stripping unit. The two types of support arms are similar and therefore the structure of the first type will be set forth in detail. Thereafter, the differences of the second type from the first type will be emphasized but like structure of the two types of support arms will be indicated by like reference numerals having a prime notation.

The first type of support arm 72 comprises a single blank supporting surface 75. The upper surface 75 supports the blanks as they travel through the stripping unit 12. The support arm 72 includes a bracket 74 which is connected thereto by means of bolts 76 or other suitable securing means. The bracket 74 engages one of the bevels on a dovetail member 78. The dovetail member 78 is securely connected to a channel member 80 which is attached to the side frame F' of the stripping unit. Means are provided for vertically adjusting the channel member 80 to accommodate different thicknesses of blanks.

The dovetail member 78 may be secured to the channel member 80 by means of bolts 82 or by other suitable securing means. Each of the brackets 74 has a pin 84 mounted therein. The pin 84 is pivotably connected to the handle 86 by means of a pivot pin 96. The pin 84 also extends through a clamping member 88 which is adapted to engage the lower beveled surface of the dovetail member 78. Belleville springs 90 are positioned between the clamping member 88 and the handle 86.

The handle 86 has a top surface 92 and a side surface 94. The distance from the top surface 92 to the center of the pivot pin 96 is greater than the distance between the side surface 94 and the center of the pivot pin 96. Thus, when the handle 86 is in the full line position shown in FIGURE 1, the Belleville springs 90 are compressed and exert pressure to force the clamping member 88 into tight engagement with the dovetail member 78 so that the support arm 72 will be prevented from moving laterally. When the handle 86 is moved into phantom line position shown in FIGURE 1 the Belleville springs will be allowed to expand and the clamping member 88 will drop out of engagement with the dovetail member 78 so that the support arm 72 may be shifted laterally with respect to the dovetail member 78.

The upper surface 75 of the support arms 72 support the blanks in their travel through the stripping unit 12. The support arms may be made of 3/8 inch wide steel plate and chrome plated on the blank supporting surface 75 in order to minimize friction between the blanks and the fingers. The support arms must be prelocated laterally when the unit is set up for a production line of a particular blank so that they give maximum support to the blank

throughout its travel across the surface. Each support arm 72 must be prelocated so that the surface 75 will not interfere with the stripping pins 48. Support arms 72 which are not needed for the particular operation being performed may be removed or positioned between the blank side guides 97 and the frame F'. The blank side guides 97 may be utilized to guide the side edges of the blanks when such guides are needed.

The second type of support arm 72' is similar in most respects to the support arm above discussed. However, the second type of support arm includes two fingers 77 and 79. The fingers are spaced approximately one inch apart and support a free running approximately one inch wide roller 73. The roller 73 is positioned below the feed straps 46 which are mounted on the stripping cylinder. The roller 73 co-acts with the feed straps on the stripping cylinder to provide a positive drive for the blanks through the stripping unit 12. The support arms 72' are also laterally shiftable along the dovetail member 78. The rollers 73 may be mounted on shafts 81 which are journaled in the fingers 77 and 79 of the support arms 72'.

The fingers 77 and 79 have recesses 83 on their uppermost surface to insure constant engagement of the blanks with the rollers 73 and non-interference with the support arms 72'. The support arms 72' may also have a lower portion 85 to provide additional support and strength for the arms 72'. To insure non-interference of the blanks with the support arms 72' the rollers 73 may be mounted so that they project approximately 1/8 inch above the upper surfaces of the fingers 77 and 79. Those support arms 72' which are not needed for a particular production run may also be removed or shifted to the side storage area.

A driven shaft 100 is located at the exit end of the die cutting unit 10 and is journaled in the frame F. The driven shaft 100 has feed collars 98 thereon for frictionally engaging and facilitating movement of blanks through the die cutting unit. The shaft 100 also facilitates feeding of the blanks into the stripping unit 12. The driven shaft 100 is mounted on a fixed axis and is positioned to cooperate with a feed roll 102 to flex the blanks downwardly as they enter the stripping unit 12.

A feed roll 102 is positioned beneath the plane of travel of the blanks. The feed roll 102 is journaled in the frame F in the die cutting unit. The feed roll 102 is journaled in an eccentric bearing so that the axis of the roll may be adjusted to accommodate blanks of different thicknesses.

The roller 102 is offset with respect to roller 100 and cooperates with roller 100 to feed blanks into the stripping unit and flex the blanks downwardly.

A driven shaft 110 is located at the exit end of the stripping unit 12 and is journaled in the frame F'. The driven shaft 110 has feed collars 108 thereon for frictionally engaging and facilitating movement of blanks through and out of the stripping unit 12. The driven shaft 110 is mounted on a fixed axis and is positioned to cooperate with a feed roll 104.

A feed roll 104 is positioned beneath the plane of travel of the blanks. The feed roll 104 is journaled in the frame F' in the stripping unit. The feed roll 104 is journaled in an eccentric bearing so that the axis of the roll may be adjusted to accommodate blanks of varying thickness.

The roll 104 cooperates with the roller 110 to insure constant movement of the blanks through the stripping unit and continued flexing of the blanks downwardly as they move through the stripping unit. All rotating driven elements operate at the same surface speed. Speed of rotation of the various rotating elements will vary with the diameter of the same. Thus, the speed of rotation of the stripping pins 48 will be approximately the same as the speed of rotation of the dies 22 or will be slightly faster than the die cutters by approximately .5 percent. Means may be provided for circumferential adjustment of both the die cutting and the stripping cylinders to properly position the same. Conventional constant mesh gearing is

provided for rotating the various cylinders, feed rolls and driven shafts and need not be described in detail.

The present invention is operated in the following manner. The blank side guides **97** are adjusted laterally, with suitable clearance, to guide the blank B through the stripping unit **12**. The appropriate members **18** and **42** are attached to the male die cylinder **14** and the stripping cylinder **40** respectively. The dies **22** and stripping pins **48** are positioned in accordance with the design of the blanks to be run through the die cutting and stripping units. The member **42** will have the stripping pins **48** positioned therein with the aid of "proof" sheet which matches the die cuts to be made by the die **22**. The support arms **72** and **72'** are then adjusted laterally to support the blanks to the maximum extent possible without interfering with the stripping pins **48**. Feed straps and feed collars are adjusted laterally so that they will miss the printing on the blank. Support arms **72'** having feed rollers **73** attached thereto are positioned under the feed straps **46** on the stripping cylinder **48** to facilitate movement of the blanks through the stripping unit. Those support arms **72** which are not needed for the particular production run to be made may be removed or shifted laterally to the storage area provided between the guides **97** and the side frame members F' of the stripping unit **12**.

In the interest of safety, a lightweight readily removable guard may be provided to cover the relatively sharp stripper blade during the lateral shifting of the support arms **72** and **72'**. While the machine is being readied for the run of a particular blank, the stripping unit **12** can be physically moved away from the die cutting unit **10** thus permitting access to the support arms **72** and **72'**, the stripping cylinder **40** and other elements of the stripping unit. The provision of separate frames for the die cutting unit and stripping unit also permits easy access to both the stripping unit and the die cutting unit to clear "jam-ups" if and when they occur.

All elements below the line of travel of blanks are adjustable for different board thicknesses. All rotating elements which are mounted below the line of travel of blanks are adjustable by mounting the same in eccentric bearing housings. All non-rotating elements such as dovetail member **78** and stripper bar support **62** are provided with conventional means as hereinbefore set forth to provide for vertical adjustment of such elements.

After all elements are in operative position, the blanks B may be fed to the die cutting unit **10**. The blanks B are then die cut by the dies **22** on the male die cylinder **14**. As the blanks B pass between the male die cylinder **14** and the impression cylinder **16** they are flexed downwardly and are driven forwardly so that they are received between the driven shaft **100** and the feed roll **102**. Feed collars **98** on the driven shaft **100** flex the blanks downwardly and the driven shaft **100** and the feed roll **102** cooperate to feed the blanks into the stripping unit **12**.

The downward flexing of the blanks facilitates the ejection of the cutouts and trim from the blanks by the stripping unit. The blanks B are drawn through the stripping unit **12** as a result of frictional engagement of the blanks B with the feed straps **46** and the rollers **73**. As the blanks move through the stripping unit **12**, the stripping pins **48** cause the cutouts and trim to be pushed downwardly and ejected into the waste receiving box **66**. Any cutouts or trim which are not fully ejected from the blanks are removed by the stripper blade **60**. An exhaust system is provided whereby the scrap cutouts and trim are moved by air conveying means **68** through an opening **70** in the waste receiving box **66** to a central receiving point for suitable disposition. The blanks thereafter exit from the stripping unit **12**. Movement of the blanks out of the stripping unit is facilitated by the outfeed collars **108** on the outfeed shaft **110** which cooperate with the feed roll **104**.

Thereafter, the blanks may be fed into other operations and may be printed, slotted or may be fed into a slotter-folder-gluer.

As stated hereinbefore, it is desirable to complete all printing on the blanks prior to the die cutting and stripping operation. A slotter or a slotter-folder-gluer may be in line with the die cutting and stripping units and may be adapted to function at the same speed as the die cutting and stripping units. Thus, the blanks B may be produced in a single continuous operation wherein no delays are encountered.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

I claim:

1. Apparatus comprising a first frame supporting a stripping unit including a stripping cylinder, said stripping cylinder being supported for rotation by said frame, means supported by said first frame for moving blanks through said stripping unit at a speed corresponding to the surface speed of said stripping cylinder, projections on the periphery of said stripping cylinder for separating scrap from blanks cut by a die cutting unit, a plurality of support arms supported by said frame below said stripping cylinder, means for laterally adjusting said support arms for laterally spacing the same and preventing interference of said support arms with said projections, and stripping means located beneath the plane of the upper surface of said support arms for insuring removal of all scrap from blanks.

2. Apparatus as claimed in claim **1** including a second frame supporting a die cutting unit including a die cylinder, said second frame being in line with and positioned upstream from said first frame, said first and second frames being readily separable to permit ready access to each frame, a feed roll supported by said second frame, the axis of rotation of said feed roll being parallel to the axis of rotation of said die cutting cylinder and said stripping cylinder, said feed roll being adapted to frictionally engage blanks and positively move blanks from said die cutting unit into said stripping unit.

3. Apparatus as set forth in claim **1** including a waste receiving box positioned beneath said stripping cylinder, said waste receiving box having air conveying means therein for transporting scrap from box blanks ejected by said stripping unit through an opening in said waste receiving box to a central accumulation area.

4. Apparatus as set forth in claim **1** including means for locking said support arms in a desired lateral position, said locking means including a clamping member adapted to selectively engage a dovetail member.

5. Apparatus as set forth in claim **1** wherein said means for moving blanks through said stripping unit includes feed collar mounted on said stripping cylinder, said means for moving blanks through said stripping unit also including freely rotatable rollers supported by some of said plurality of support arms for cooperation with said feed collars.

6. Apparatus as set forth in claim **1** wherein said further stripping means includes a stripping blade supported by said first frame, the edge of said stripping blade being parallel to the axis of said stripping cylinder.

7. Apparatus as set forth in claim **1** wherein said means for moving blanks through said stripping unit includes feed straps attached to said stripping cylinder for rotation therewith, said feed straps being adapted to frictionally engage blanks to thereby facilitate the movement of blanks through the stripping unit.

8. Apparatus as set forth in claim **1** including a second frame supporting a die cutting unit, being in line with said stripping unit and including a male die cylinder which cooperates with an impression cylinder, the axis of said male die cylinder being offset with respect to the axis of said impression cylinder to downwardly bias blanks passing therebetween, a driven shaft supported by said second frame, said driven shaft having feed collars

thereon, said feed collars adapted to frictionally engage and move blanks from said die cutting unit to said stripping unit.

9. Apparatus as set forth in claim 8 including a driven shaft supported by said first frame, said driven shaft having feed collars mounted thereon, and feed collars adapted to facilitate movement of blanks through and out of said stripping unit.

10. Apparatus as set forth in claim 9 including a feed roll mounted in said second frame adapted to cooperate with said driven shaft supported by said second frame, said feed roll and said driven shaft cooperating to flex blanks downwardly and feed the same into said stripping unit.

11. Apparatus as set forth in claim 10 including a feed roll supported by said first frame and cooperating with said driven shaft supported by said first frame to move blanks through and out of said stripping unit.

12. A rotary stripping unit supported by a first frame, a die cutting unit supported by a second frame, said rotary stripping unit being in line with said die cutting unit for performing continuous operations on paperboard, said stripping unit being operated at substantially the same speed as said die cutting unit, said stripping unit comprising means for forcing cutouts and trim beneath the surface of the paperboard, said stripping unit further including a stripping element located beneath the surface of travel of the paperboard for removing cutouts and trim from the paperboard, said first and second frames being aligned during performance of continuous operations on paperboard and being readily separable to permit ready access to each of said frames.

13. A stripping unit as set forth in claim 12 wherein said stripping unit further includes a driven cylinder which rotates in synchronism with the die cutting unit, said means for forcing cutouts and trim beneath the surface of the paperboard comprising a male stripping die mounted on a driven stripping cylinder, said male stripping die comprising a curved block of material which circumscribes a portion of said stripping cylinder, a plurality of stripping elements, said stripping elements being attached to said curved material, and said stripping elements being positioned to exert a downward force on die cutouts and trim to force such cutouts and trim below the surface of the paperboard.

14. The stripping unit as set forth in claim 12 further comprising a plurality of laterally adjustable support means in said stripping unit beneath said driven cylinder, said support means supporting paperboard for travel through the stripping unit.

15. The stripping unit as set forth in claim 14 wherein said support means includes a plurality of support arms, some of said support arms having idling rollers attached thereto for facilitating movement of paperboard through said stripping unit.

16. A stripping unit as set forth in claim 13 wherein said stripping elements extend approximately 3/8 inch below the bottom surface of paperboard when forcing cutouts and trim below the surface of paperboard.

17. The stripping unit as set forth in claim 15 wherein some of said support rollers each include a pair of fingers which support said idling roller therebetween, said fingers having relieved uppermost surfaces at the location where the support rollers cooperate to advance the blank through the stripping unit section, said relieved uppermost surfaces cooperating to insure non-interference between said fingers and the paperboard.

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WILLIAM S. LAWSON, Primary Examiner.

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