Sept. 20, 1966 E. K. MULLEN ETAL 3,273,913

BOOK COVER BOARDS AND BOARD STRUCTURES AND APPARATUS AND METHOD FOR MAKING THE SAME

Filed May 27, 1965 4 Sheets-Sheet 1

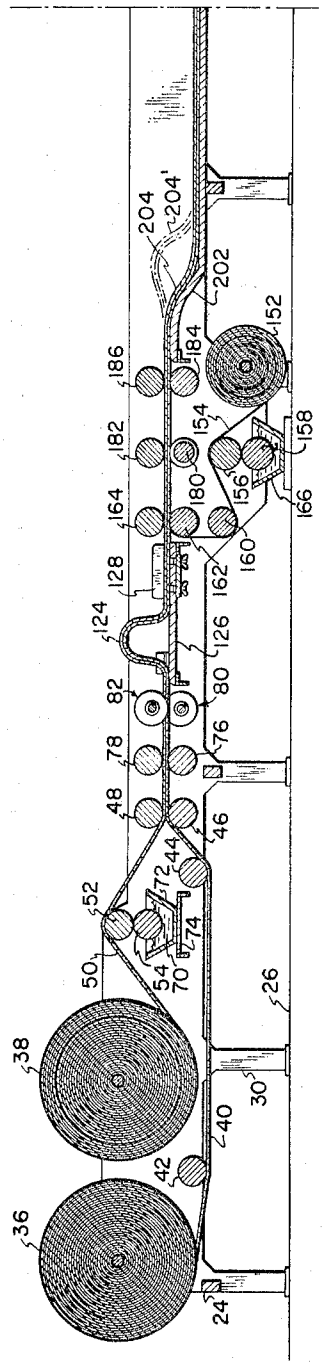


FIG. 1

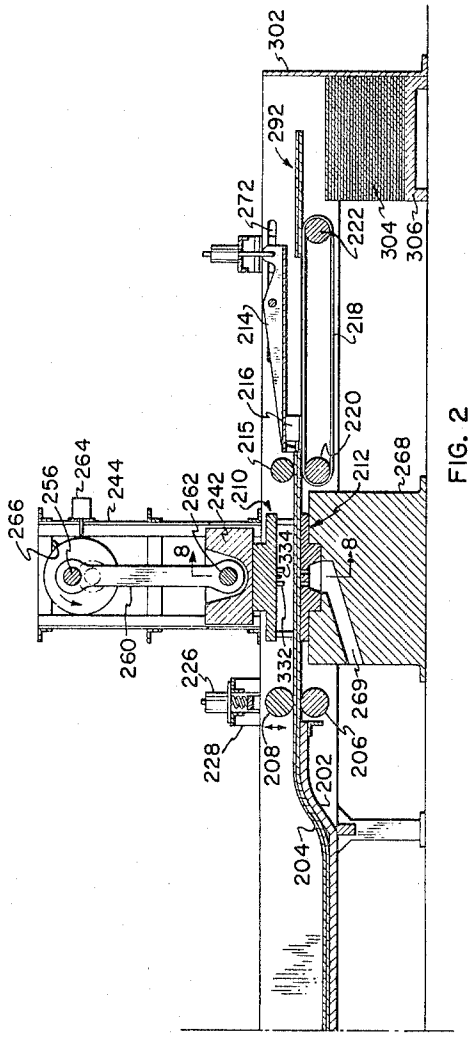


FIG. 2

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BOOK COVER BOARDS AND BOARD STRUCTURES AND APPARATUS AND METHOD FOR MAKING THE SAME

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Fig. 5

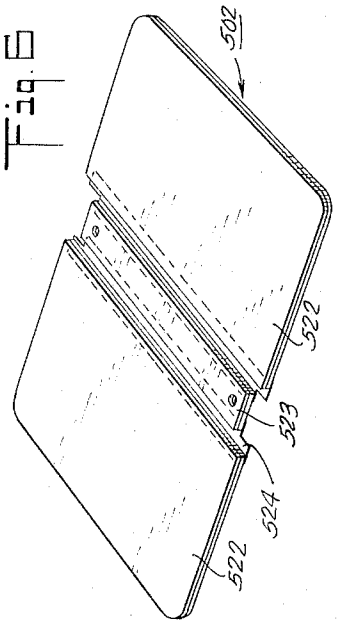


Fig. 3

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BOOK COVER BOARDS AND BOARD STRUCTURES AND APPARATUS AND METHOD FOR MAKING THE SAME

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Fig. 4

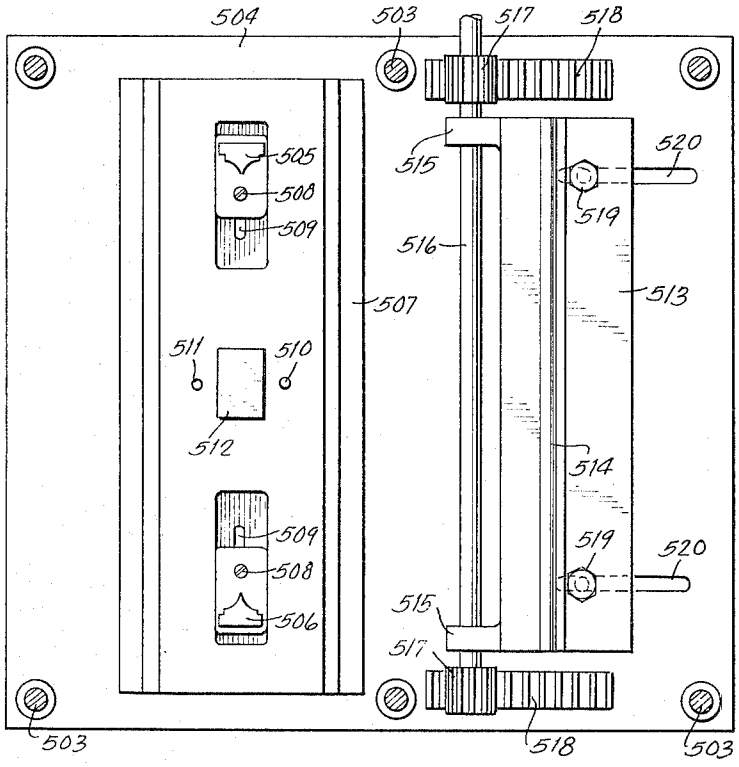
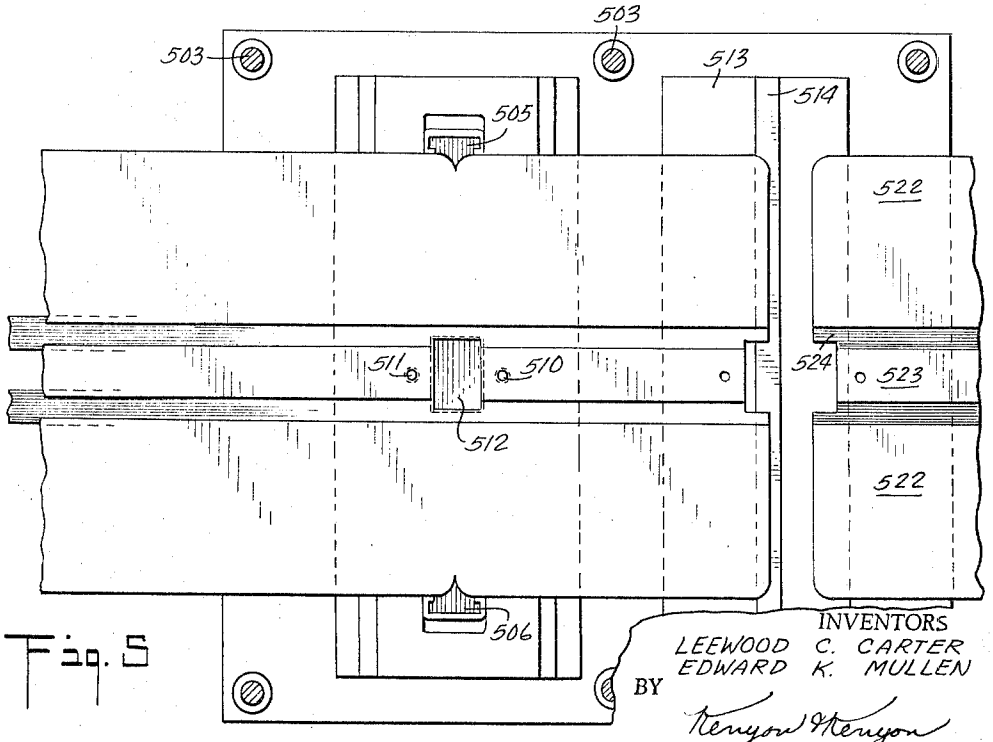


Fig. 5



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BOOK COVER BOARDS AND BOARD STRUCTURES AND APPARATUS AND METHOD FOR MAKING THE SAME

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Fig. 7

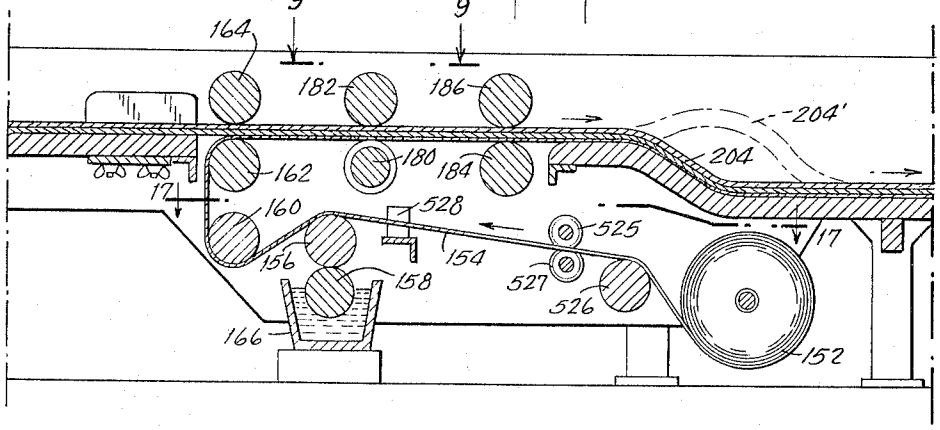
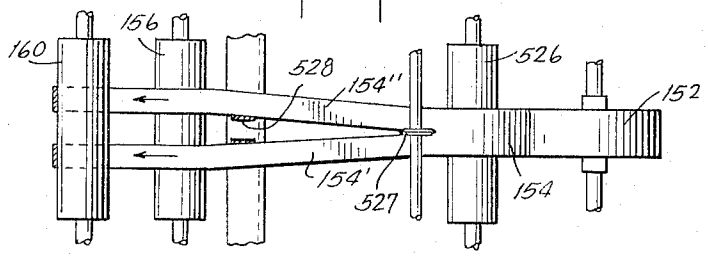


Fig. 8



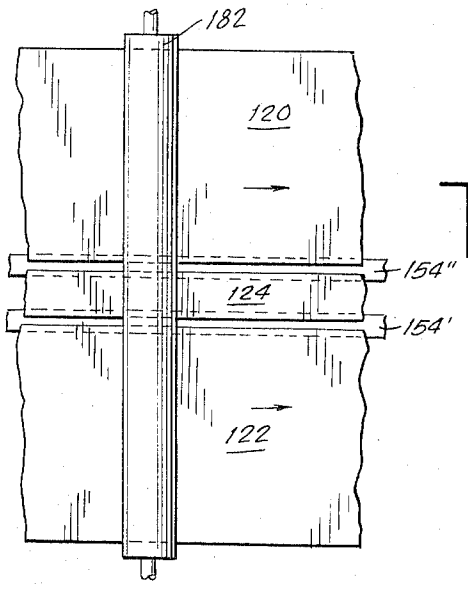


Fig. 9

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United States Patent Office 3,273,913 Patented Sept. 20, 1966

3,273,913

BOOK COVER BOARDS AND BOARD STRUCTURES AND APPARATUS AND METHOD FOR MAKING THE SAME

Edward K. Mullen and Leewood C. Carter, Union County, N.J., assignors to Book Covers, Inc., Newark, N.J., a corporation of New Jersey

Filed May 27, 1965, Ser. No. 459,397
10 Claims. (Cl. 281—29)

This application is a continuation-in-part of copending Serial No. 246,966, filed December 26, 1962, now Patent No. 3,195,924, dated July 20, 1965.

This invention relates to book cover boards, loose leaf cover boards, ring binder cover boards, and album or catalogue cover boards, and to an apparatus and method for making the same. It relates particularly to a cover board structure having leaf boards and a spine board of multi-layer construction, and to an apparatus and method for making the same. It relates more particularly to a cover board structure having leaf boards hinged in spaced relation to a spine board, and to an apparatus and method for making the same.

It is an object of this invention to provide a cover board structure comprising a spine board, two leaf boards each in spaced relation to the spine board, and a strip of hinge material joining the leaf and spine boards, the hinge material being of such a nature that both inside and outside cover jackets of vinyl sheet material may be sealed to it by heat, and themselves perform a hinging function to give a very strong three-layer hinge structure. This object is achieved by making the hinge strip of such material as polyvinylacetate coated paper, open weave cloth, vinyl impregnated cloth, or pure vinyl film.

It is another object of this invention to provide a cover board structure comprising a spine board, two leaf boards each in spaced relation to the spine board, and two strips of hinge material each joining a leaf board with the spine board.

It is another object of this invention to provide a cover board structure making apparatus with a slitting means therein to sever a single stream of hinge material into two narrower streams.

It is another object of this invention to provide a cover board structure making apparatus wherein there are the aforesaid cutoff, bending, and perforating means combined in a reciprocating type punch and die mechanism.

It is another object of this invention to provide a cover board apparatus wherein the aforesaid perforating and cutoff means are separated.

These and other objects of this invention as well as its nature and substance will be more clearly perceived and fully understood by referring to the following description and claims taken in connection with the accompanying drawings in which:

FIG. 1 represents a view in longitudinal sectional elevation of the cover board structure making apparatus of this invention from its loading end up to and somewhat beyond the pull rolls following the hinge paper indenting rolls taken along line 1—1 in FIG. 5 looking in the direction of the arrows;

FIG. 2 represents a view in longitudinal sectional elevation of the cover board structure making apparatus of this invention in a continuation of the view of FIG. 1 through the discharge end of the apparatus taken along line 2—2 in FIG. 6 looking in the direction of the arrows;

FIG. 3 represents a modification of the discharge end of the cover board structure making apparatus;

FIG. 4 represents a view taken at line 4—4 in FIG. 4;

FIG. 5 represents a view taken at line 5—5 in FIG. 3;

FIG. 6 represents an isometric view of a cover board structure made with the apparatus of FIG. 3;

FIG. 7 represents a modification of the apparatus wherein the hinge material is split into two streams;

FIG. 8 represents a view taken at lines 8—8 in FIG. 7; and

FIG. 9 represents a view taken at lines 9—9 in FIG. 7.

Referring now to the darwings in detail, especially to FIG. 1 the apparatus of the invention comprises two side plate assemblies 20 and 22 which are maintained in spaced, and substantially parallel relation by means of a plurality of cross bars or cross ties such as cross tie 24, and which are supported above the level of floor 26 by means of a plurality of leg members such as leg members 28 and 30. In their upper edges near their left hand ends, side plates 20 and 22 are notched to provide bearing and retaining surfaces for shafts 32 and 34 which extend through and beyond chipboard rolls 36 and 38 respectively. The chipboard in strip form which is wound into these rolls is a material suitable to form both the spine and the leaves of a book cover. It has a thickness usually lying in the range of 0.030 in. to 0.060 in. leaving it sufficient flexibility for winding, and, as used in the present invention, it has a width at least somewhat greater than the combined widths of the spine board and the two leaf boards of a cover board structure intended to be produced by the illustrated apparatus.

Chipboard strip 40 extending from roll 36 passes beneath idler rolls 42 and 44, and above lower roll 46 of a pair of press rolls 46 and 48. Chipboard strip 50 extending from roll 38 passes above upper roll 52 of a pair of glue rolls 52 and 54, and below upper press roll 48. Rolls 42, 44, 46, 48, 52, and 54 are all supported rotatably between side plates 20 and 22. Lower glue roll 54 is partially immersed in a body of liquid glue 70 of any suitable kind contained in a trough 72 which is supported between side plates 20 and 22 on a bracket 74.

To the right of and at essentially the same level as the pair of press rolls 46 and 48 are a pair of press rolls 76 and 78 and a pair of slitter rolls 80 and 82, all four of which rolls are supported rotatably between side plates 20 and 22. Each of the slitter rolls comprises a shaft and four slitter devices mounted upon it, for example, shaft 84 and slitter devices 86, 88, 90 and 92 of upper slitter roll 82. Between the upper and lower slitter rolls, the slitter devices which they comprise are paired in shearing alignment.

As the glue rolls are rotated, lower roll 54 picks up a layer of liquid adhesive material from the body of glue within trough 70. Glue rolls 52 and 54 have at least a slight separation which is desirably subject to some adjustment through vertically shiftable mountings of one of the rolls in side plates 20 and 22. At least some of the layer of glue on lower roll 54 is transferred onto upper roll 52 in the course of the rolls' rotation. The greater the separation of the glue rolls, up to a point, the greater is the amount of glue transferred from the lower onto the upper roll. As chipboard strip 50 passes over upper glue roll 52 there is a further transfer of glue from this roll onto the underside of this strip.

The glue-coated underside of chipboard strip 50 comes into contact with the upper side of strip 40 as the two strips pass between press rolls 46 and 48, and a bond begins to be formed between the strips. At this point in their travel, strips 40 and 50 which are desirably although not absolutely necessarily of the same width are assumed to have fairly good but not necessarily substantially perfect edgewise alignment from side to side. From press rolls 46 and 48 the incipiently bonded strips pass between press rolls 76 and 78, and by the time they leave the latter pair of rolls the bond between them has been essentially fully made. Of each of the pairs of press rolls so far described at least one roll, for example, rolls 48 and 78, is on shiftable and adjustably spring-loadable

mountings in side plates **20** and **22** so that the compression exerted on chips **40** and **50** as they pass through the pairs of rolls may be set properly for various thicknesses of strip materials.

After leaving press rolls **76** and **78**, bonded strips **40** and **50** forming a stream of material sufficiently thick for use in a book cover pass into the bites of the slitter devices of slitter rolls **80** and **82**. At their bites, upper slitter device **86** and the lower slitter device in shearing alignment with it are spaced from upper slitter device **92** and the lower slitter device in shearing alignment with that device by a distance equal to the combined widths of the spine board and the two leaf boards of the cover board structure intended to be produced. Upper slitter devices **88** and **90** as a pair are centered on shaft **84** with respect to upper slitter devices **86** and **92**. At their bites, upper slitter device **88** and the lower slitter device in shearing alignment with it are spaced from upper slitter device **90** and the lower slitter device in shearing alignment with that device by a distance equal to the width of the spine board of the cover board structure desired to be produced.

It is realized that the desired separations of the leaf boards from the spine board will not necessarily be the same for all production runs of the illustrated apparatus. One way in which account may be taken of this is by having a series of guide plates **128** and **130** of varying thicknesses. Another way is by using a pair of relatively thin guide plates in place of each of guide plates **128** and **130**, and spreading the plates of each such pair on platform **126** as necessary to obtain the desired separations.

A pair of opposite legs of side plates **20** and **22** are notched to provide bearing and retaining surfaces for shaft **150** which extends through and beyond hinge paper roll **152** which is in essentially transverse alignment with spine board stream **124**. The hinge paper in strip or ribbon form which is wound into this roll is a material which is suitable to join the leaf and spine boards of a cover board structure. It is relatively quite thin compared to these boards. Hinge paper strip **154** extending from roll **152** passes over upper roll **156** of a pair of glue rolls **156** and **158**, then under and up past idler roll **160**, and then over lower roll **162** of a pair of hinge paper press rolls **162** and **164** which are at essentially the same level as the pair of slitter rolls **80** and **82**.

Rolls **156**, **158**, **160**, **162** and **164** are all supported rotatably between side plates **20** and **22**. Lower glue roll **158** is partially immersed in a body of liquid glue of any suitable kind contained in a trough **166** which is supported from the floor **26**.

To the right of and at essentially the same level as the pair of hinge paper press rolls **162** and **164** are a pair of hinge paper indenting rolls **180** and **182** and a pair of pull rolls **184** and **186**, all four of which rolls are supported rotatably between side plates **20** and **22**.

As glue rolls **156** and **158** are rotated, lower roll **158** picks up a layer of liquid adhesive material from the body of glue within through **166**, and transfers at least some of this layer onto upper glue roll **156**. There is then a further transfer of glue from roll **156** onto hinge paper strip **154** which has a width at least somewhat greater than the combined widths of spine board strip **124** and the two separations between the spine board strip and the adjacent leaf board strips **120** and **122**. As the hinge paper strip is passed over lower press roll **162**, its glue-bearing upper surface is presented toward and in contact with the under sides of the leaf and spine board strips which also pass between hinge paper press rolls **162** and **164**, and a bond begins to be formed between the hinge paper strip on the one hand and the leaf and spine board strips on the other.

From hinge paper press rolls **162** and **164** the incipiently bonded leaf board, spine board, and hinge paper strips pass between hinge paper indenting rolls **180** and **182**. Upper hinge paper indenting roll **182** has a uniform diameter. Lower hinge paper indenting roll **180**, however, has a portion of relatively large diameter in its middle, that is, in alignment with hinge paper strip **154**, which has a length that is essentially equal to the width of the hinge paper strip. The diameter of this portion of relatively enlarged diameter is the same as the diameter of the upper hinge paper indenting roll. In other words, it may be said that on either side of its central portion lower hinge paper indenting roll **180** is cut down to a diameter at least somewhat smaller than the diameter of upper hinge paper indenting roll **182**.

As the leaf board, spine board, and hinge paper streams pass between the indenting rolls, and particularly as the hinge paper stream passes over the central portion of lower indenting roll **180**, the latter stream or strip is depressed into two streams of leaf board material and the spine board strip or stream is compressed so as to render the edges of the underside of the hinge paper strip essentially flush with the undersides of the leaf board strips, and further render the combined thickness of the hinge paper and spine board strips essentially equal to the normal thickness of either of the leaf board strips or streams.

The lower indenting roll portion of enlarged diameter may be in the form of a keyed sleeve which is removable for installation and reinstallation in various lengths to conform with various widths of hinge paper strip **154**.

By the time that the leaf board, spine board, and hinge paper streams issue from between hinge paper indenting rolls **180** and **182**, the bond between the hinge paper streams on the one hand and the leaf board and spine board streams on the other is essentially fully set. After leaving the hinge paper indenting rolls, these bonded streams pass between upper and lower pull rolls **184** and **186**, and after leaving the pull rolls they pass onto a generally depressed, longitudinally extensive pan or platform **202** supported between side plates **20** and **22**. As they run along this platform the bonded leaf board, spine board, and hinge paper streams may simply be regarded as a stream or strip of cover board structure material **204**.

Referring next to FIG 2, the stream of cover board structure material **204** is shown continuing all the way across platform **202**, which platform rises at its right hand end to the same level at at its left hand end. After leaving platform **202**, cover board structure material stream or strip **204** passes between pull rolls **206** and **208**. Upon issuing from between these rolls, the stream of cover board structure material passes between punch and die assemblies **210** and **212**, and finally terminates against a downwardly extending lip or flange on the left hand side of discharge gate **214** after passing below discharge idler pressure roll **215**. On its under side, gate **214** carries an electric switch **216** of which the operating button or plunger normally extends leftwardly through an aperture in the gate lip, and so has been somewhat depressed by the right hand end of cover board structure material strip **204** bearing against it to achieve an effect described hereinafter. At its extreme right hand end as shown in FIG. 2, cover board structure material strip **204** has just come onto the upper, rightwardly running surface of discharge conveyor belt **218** which passes around discharge belt rolls **220** and **222**, and against which belt strip **204** is held under at least some pressure by the action of idler pressure roll **215**.

Lower pull roll **206** is supported rotatably between side plates **20** and **22**. Upper pull roll **208** is located between side plates **20** and **22**, but is actually rotatably supported between the legs of a yoke **224** which is in turn suspended from the downwardly extending plunger of an electric solenoid **226** mounted on a hanger frame **228** supported on the side plates. A compression spring **229** surrounds the plunger of solenoid **226** and tends to urge yoke **224** and upper pull roll **208** downwardly. Normally, that is, when solenoid **226** is deenergized, the solenoid plunger is lowered. The stroke of the solenoid is just enough that when its plunger is raised the pressure exerted

on book cover material stream or strip 204 by pull rolls 206 and 208 falls to an essentially zero value, and so, accordingly, does the pulling effect exerted on this strip by these rolls.

Punch assembly 210 is supported from the lower side of piston or ram 242 which is capable of guided, vertical motion within a framework 244 supported on side plates 20 and 22 and foundation block 268. Mounted in the upper part of this framwork there is an electric motor 246 having suitable gear head speed reducing means 248 through which it provides immediate drive for a shaft 250 supported in appropriate bearings. At its inner end, shaft 250 carries a flywheel 252. A second flywheel, flywheel 254, is connected to flywheel 252 by means of crank pin 256, and is carried on the inner end of a shaft 258 supported in appropriate bearings on framework 244. A connecting rod 260 extends from crank pin 256 to wrist pin 262 in ram 242. The actuating lever of an electric switch 264 mounted on framework 244 is in position to be tripped by cam or tripping finger 266 on flywheel 254 in the course of rotation of this flywheel. Tripping of the actuating lever of switch 264 achieves an effect described hereinafter.

When motor 246 is running it causes counterclockwise rotation of the flywheels as seen in FIG. 2. Ram 242 moves up and down in framework 244, and punch assembly 210 follows the motion of the ram, alternately moving toward and withdrawing from die assembly 212 which is supported from the floor by foundation block 268.

Dicharge gate 214 is rotatably mounted on pivot rod 270. This rod is threaded at each end, and extends through horizontal slots 272 and 274 in side plates 20 and 22. At its right hand end, discharge gate 214 is pivotably connected to the lower end of the downwardly extending plunger of an electric solenoid 280. This solenoid is mounted on a frame 282 which straddles and is slidably supported on side plates 20 and 22.

The stroke of the plunger of electric solenoid 280 is quite short, being just enough that when the plunger goes down to depress the right hand end of discharge gate 214 the left hand end of the gate will, as the gate pivots about rod 270, rise sufficiently to permit the passage of a cover board structure such as cover board structure 292 under the lip or flange at the gate's left end, and also under switch 216 mounted on the gate. The discharge gate is unbalanced about pivot rod 270 in such direction that the left end of the gate tends to go down. This tendency is harmonious with the normal, that is, deenergized, condition of electric solenoid 280 in which the solenoid plunger is raised.

Discharge belt rolls 220 and 222 are supported rotatably between side plates 20 and 22.

While the material whereby the leaf and spine board portions of a cover board structure made according to the present invention are joined or hinged has been referred to generally as a "paper" throughout this specification, it is to be understood that this expression has been used generically and for convenience and example, and not by way of limitation. Said in other words, the material in strip or ribbon form wound into and unwound from roll 152 certainly may be one which is ordinarily considered a paper, but it may also be one which is not ordinarily so considered. Specifically within the scope of the intended generic use of the word "paper," it may be polyvinylacetate coated paper, vinyl saturated paper, vinyl impregnated cloth, pure vinyl film, open weave cloth or indeed any flexible material to which vinyl sheets may be heat sealed.

Referring to FIGS. 3 to 5, wherein a modification of the discharge end of the apparatus is illustrated and wherein like reference characters are used for like parts, the punching and severing operation may be performed in separate stages. As shown, the punch assembly 500 is supported from the lower side of the ram 242 in any suitable manner for vertical movement within the framework 244 with respect to the die assembly 501. The punch assembly 500 comprises two stages; one for punching and rounding, the other for severing cover board structures 502 from the stream of cover board material.

The punch assembly 500 is guided by a plurality of guide posts 503 with respect to the die assembly 501 and comprises a base plate 504 having a pair of adjustable corner rounding punches 505, 506 removably secured in a suitable mounting block 507 therein. As shown, the rounding punches are held by suitable headed screws 508 within slots 509 in the mounting block 507. The mounting block also mounts a pair of suitable perforating punches 510, 511 and a punch 512 thereon in symmetric relationship to the corner rounding punches 505, 506. The corner rounding punches are movable with respect to each other and are adjusted to correspond with the width of the cover board material stream being used.

Spaced from the mounting block 507 is a cutter mounting block 513 which is adjustable longitudinally with respect to the mounting block 507 and which carries a cutting rule 514 thereon. The mounting block 513 is carried on the base plate 504 in any suitable adjustable manner. For example, the mounting block 513 carries a pair of lugs 515, one at each end, through which a shaft 516 passes, each end of the shaft 516 has a gear 517 fixedly mounted thereon which cooperates with a fixed track 518 on the base plate 504. The shaft 516 extends outwardly of the base plate 504 and is attached to any suitable actuating means for rotating the shaft and moving the cutting rule 514 longitudinally. As shown, the mounting block 513 is held by suitable headed screw 519 within slots 520 in the base plate 504.

As shown in FIG. 5, the corner rounding punches 505, 506 form a pair of rounded corners on the trailing edge of the foremost cover board and a pair of rounded corners on the leading edge of the next cover board substantially in the manner above described. A rivet hole is also formed in the respective cover boards by the hole punches 510, 511. In addition, punch 512 removes a rectangular segment from the stream of cover board material which includes an entire width of spine board as well as some of the hinge material. The cutting rule 514 severs the cover board stream along a plane which bisects the rounded portions of the stream. By providing the punch 512 in this modification it is possible to cut out an undesirable end section from the spine boards, especially where a metal strip is used in the spine, before severing of the stream into cover boards.

The die assembly 501 is made in a similar manner to the above described die assembly and need not be further described except to point out that it is complementary to the punch assembly 500 and provides suitable waste passageways 521 for the material punches from the cover board stream.

It is to be noted that the punches located in the mounting block 507 have been described as illustrative only and that any combination of these punches or other type punches may be used.

Referring to FIG. 6, a cover board structure 502 made in accordance with the above modification possesses a pair of multi-layer leaf board sections 522, an interposed multi-layer spine board section 523 of a length shorter than the leaf board sections 522 and having a pair of rivet holes therein, and a hinge material section 524 pressed flush into the leaf board sections 522. The cover board is of any desired length within the adjustable limits of the cutting rule 514 and the discharge gate 214.

The operation of the two-stage cut-off assembly is similar to the described operation in our above mentioned patent in regard to the remainder of the apparatus. However, the manner of executing the operation may also include a modification which utilizes microswitches and air cylinders. For example, the cover board stream is pushed into the punch and die assembly by means of the

pinch rolls **206**, **208** which open when the punch **500** comes to the bottom of its stroke. A cam on a central shaft in the ram assembly operates a micro-switch which opens the pinch rolls **206**, **208** through an air cylinder means thereby allowing the stream to pause and buckle, as pointed out above, while punching and cutting is taking place. Prior to the opening of the pinch rolls, the gate **214** is pivoted to stop the stream at the point for severing a desired length of cover board material by actuation of a cam on the central shaft by means of a micro-switch and air cylinder arrangement. After the punching and severing operation is completed, another micro-switch operates an air-cylinder to pivot the gate **214** to an open position to allow the higher speed belt **218** to carry off the severed board structures **502** while the pinch rolls **206**, **208** are being closed.

The above modified method and apparatus make it possible to punch and cut a wider variety of cover boards than is possible in a one stage cut-off because of the elimination of the space restriction of a one stage cut-off.

Referring finally to FIGS. 7 to 9, the hinge paper strip **154** can be severed into two separate streams before being bonded to the leaf board and spine board streams in order to reduce the width of hinge paper needed. This results in a savings of material without loss of strength or other structural characteristic in the final product. As shown in FIG. 8, a suitable slitter assembly **525** is interposed in the path of the hinge paper strip after it leaves the roll **152** and passes over guide roller **526**. The hinge paper strip **154** is continuously split by the knives **527** of the slitter assembly **525** into two streams **154'**, **154''**, passed by a suitable separator guide **528** and passed over the glue roller **156** in a manner as above described. The remainder of the structure illustrated in FIGS. 7 to 9 is similar to the structure described above and like reference characters have been utilized to indicate such.

As shown in FIG. 9, the respective hinge paper strips **154'**, **154''** are pressed into a single leaf board portion stream and a minor portion of the spine board portion stream **124**. The amount of overlap of the hinge paper strips on the respective board streams is sufficient to establish a good bond and a strong joint. Accordingly, the width of hinge paper required may be reduced by one-third to one-half of the former width.

The cover board structure of this invention so far described, cover board structure **292**, for example, has included two leaf board portions, a spine board portion, and a hinge paper or hinge material portion. It is also, however, within the contemplation of this invention to provide a cover board structure which includes only two leaf board portions and a hinge material portion, the leaf board portions being jointed in spaced relation by the hinge material portion with the cover board structure opened up and laid out flat. A cover board structure such as this will be useful in the manufacture of a book of a permanently bound nature. It is capable of being made by the apparatus and method of this invention as so far described with only comparatively minor modifications.

For the making of such a cover board structure for a permanently bound book, the chipboard in strip form which is wound into rolls **36** and **38** has a width at least somewhat greater than the combined widths of the two leaf boards of the cover board structure intended to be produced. At their bites, upper slitter device **86** and the lower slitter device in shearing alignment with it are spaced from upper slitter device **92** and the lower slitter device in shearing alignment with that device by a distance equal to the combined widths of the two leaf boards of the cover board structure intended to be produced. Upper slitter devices **88** and **90** and the lower slitter devices in shearing alignment with them are replaced by a single set of upper and lower slitter devices in shearing alignment centrally located on the shafts of the slitter rolls with respect to upper slitter devices **86** and **92** and the lower slitter devices in shearing alignment with them.

Guide plates **128** and **130** are so spaced on bracket or platform **126** that the distance between their outer surface is equal to the spacing between the leaf boards of the cover board structure intended to be produced. Guide plate **132** is so spaced from guide plate **128** that the distance between the inner surface of the former and the outer surface of the latter is equal to the intended width of a leaf board portion. Guide plate **134** has the same spacing from guide plate **130**. The hinge paper or hinge material in strip form which is wound into roll **152** has a width at least somewhat greater than the spacing between the leaf boards of the cover board structure intended to be produced. The reciprocating-type punch and die mechanism includes cutting off means such as cutting rule **336**, and it may include corner rounding means such as corner rounding punches **326** and **328** and corner rounding dies **392** and **390**. It does not include either perforating means or bending means since neither one of these means is needed in the absence from the intended cover board structure of a spine board portion upon which to operate.

It is intended to secure protection by Letters Patent to the full extent that the prior art permits of this invention in all its aspects of book cover boards and board structures and apparatus and method for making the same as these aspects are defined in the appended claims.

What is claimed is:

1. A cover board structure for books, said structure comprising a first leaf board portion, a second leaf board portion, a spine board portion disposed between said first and second leaf board portions, and a hinge material portion on one side of said cover board structure including a pair of hinge material strips, each of said strips being bonded to one of said first and second leaf board portions and a minor portion of said spine board portion.

2. A cover board structure for books as set forth in claim **1** wherein said hinge material portion is of a material amenable to having vinyl sheet material heat sealed thereto.

3. A cover board structure for books as set forth in claim **2** wherein said hinge material portion is made of open weave cloth.

4. A cover board structure for books as set forth in claim **1** wherein said board portions are all multi-layer portions.

5. A cover board structure for books, as set forth in claim **1**, wherein said spine board portion is of less length than said leaf board portions and is positioned inwardly of the edges of said leaf board portions.

6. A cover board structure for books, said structure comprising a first multi-layer leaf board portion, a second multi-layer leaf board portion, a multi-layer spine board portion disposed between and in spaced relation to said first and second multi-layer leaf board portions, said first and second multi-layer leaf board portions having rounded corners distant from said multi-layer spine board portion, and a hinge material portion on one side of said cover board structure including a pair of hinge material strips, each of said strips being bonded to and extending across a minor portion of said multi-layer spine board portion and a minor portion of one of said multi-layer leaf board portions, said hinge material being indented substantially flush into each of said multi-layer leaf board portions.

7. A method of making a cover board structure for books which comprises the steps of (1) generating a pair of streams of leaf board material in a spaced co-planar manner, (2) generating a stream of spine board material between and co-planar with said leaf board streams, (3) generating a stream of hinge material, (4) splitting said stream of hinge material into two separate streams, (5) guiding said separate streams of hinge material into vertical alignment with a leaf board stream and a spine board stream, (6) bonding each of said separate streams of hinge material to a leaf board stream and a minor portion of the spine board stream to form a cover board

structure stream, and (7) severing successive cover board structures from the cover board structure stream.

8. A method of making a cover board structure as set forth in claim 7 which further comprises the step of indenting said hinge material streams into said leaf board streams before said severing step.

9. A method of making a cover board structure for books which comprises the steps of (1) generating a cover board structure material stream having a spine board portion spacedly disposed between a pair of leaf board portions and a hinge material portion bonding said board portions together, (2) rounding two corners on the leaf board portions of the farthest advanced cover board structure in the stream of cover board structure material and also rounding two corners on the leaf board portions of the cover board structure next farthest advanced at a first station, (3) severing successive rounded corner cover board structures from said stream of cover board structure material at a second station spaced from the first station, and (4) punching out a section of spine board from said spine board portion of the farthest and next farthest advanced cover board structures at the first station simultaneously with said rounding step.

10. A method of making a cover board structure as

set forth in claim 9 which further comprises the step of punching at least one rivet hole in the spine board portion of the farthest and next farthest advanced cover board structures at the first station simultaneously with said rounding step.

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