May 9, 1967 E. K. MULLEN ET AL 3,318,618

BOOK COVER BOARDS

Original Filed Feb. 17, 1965 3 Sheets-Sheet 1

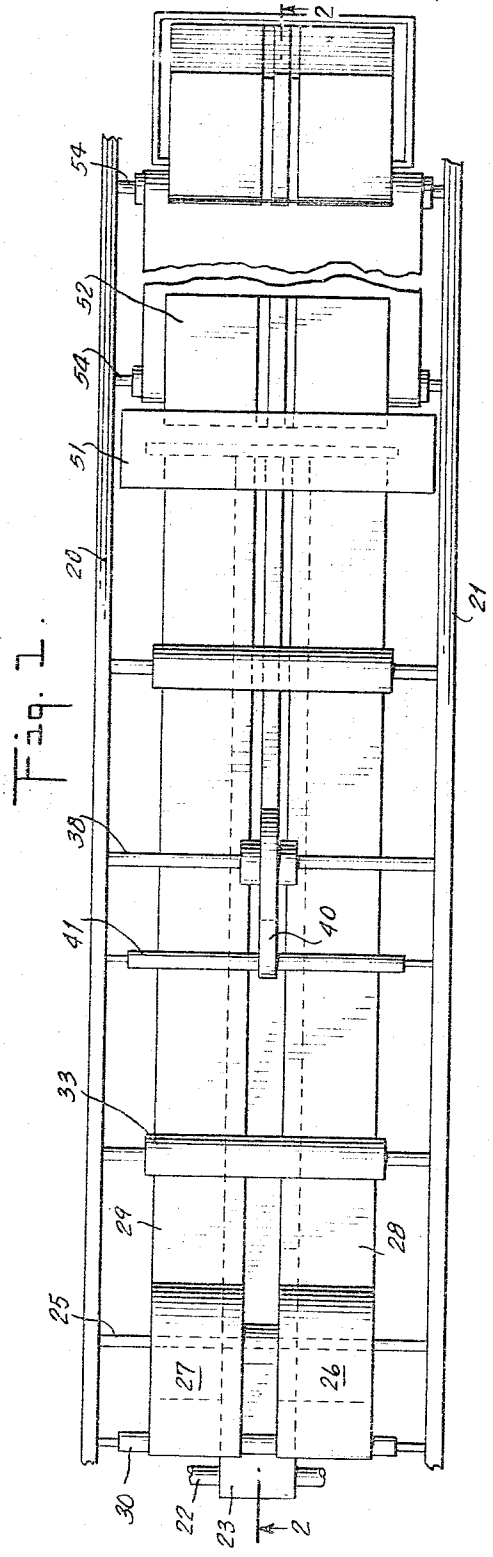


Fig. 1.

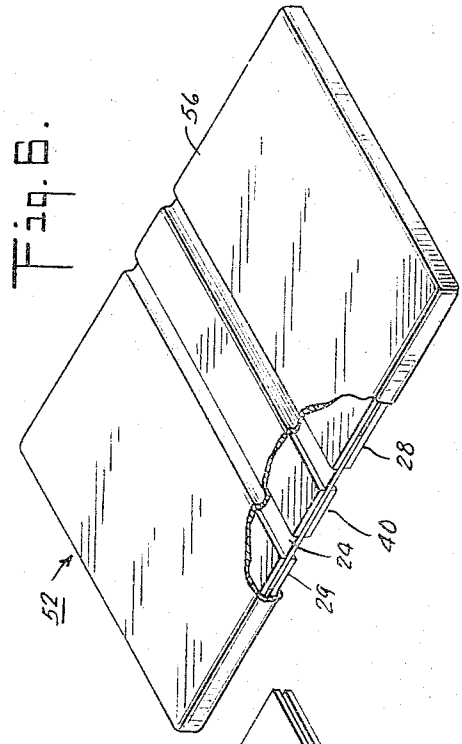


Fig. 6.

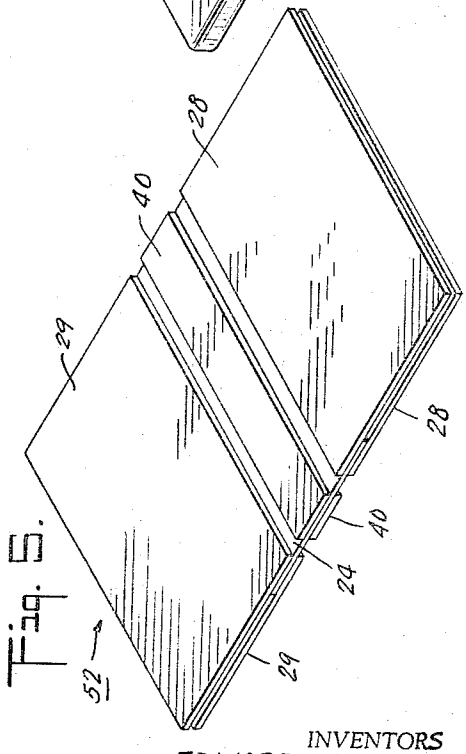


Fig. 5.

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BOOK COVER BOARDS

Original Filed Feb. 17, 1965 3 Sheets-Sheet 2

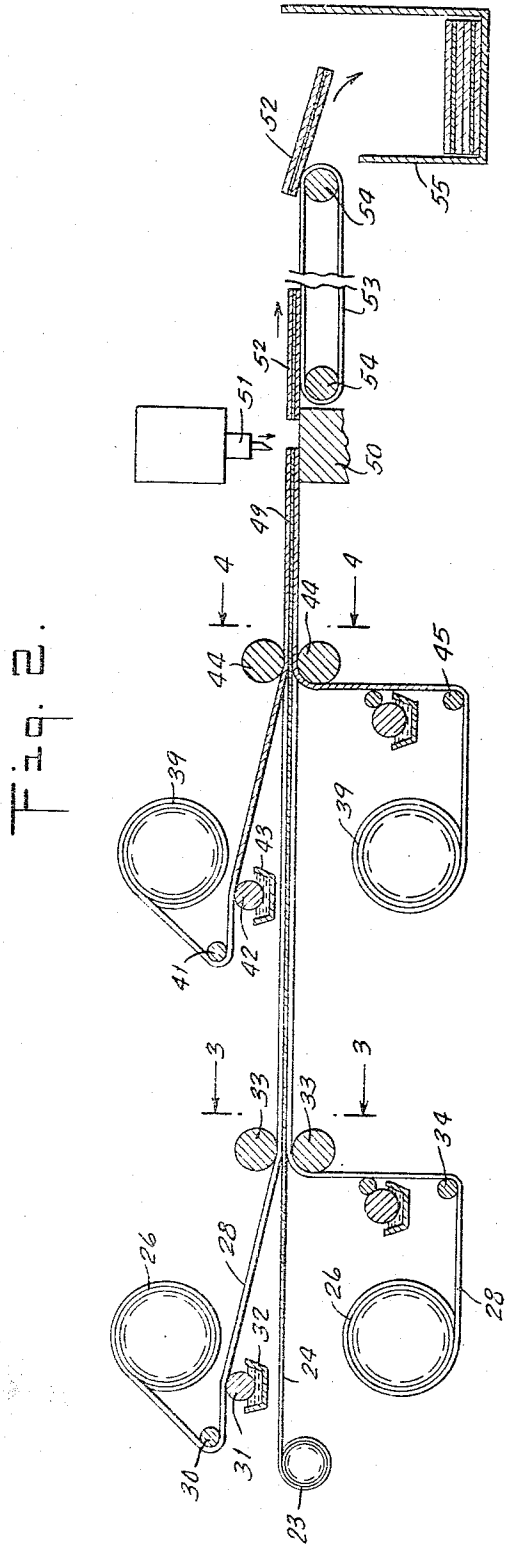


Fig. 2.

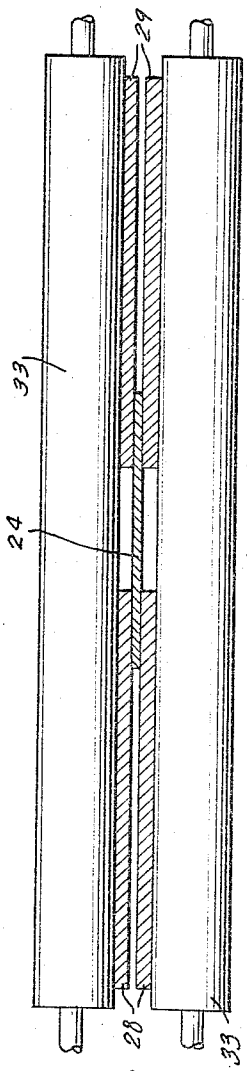


Fig. 3.

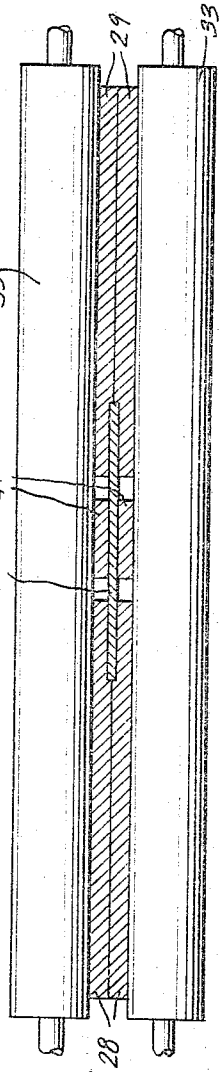


Fig. 4.

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BOOK COVER BOARDS

Original Filed Feb. 17, 1965 3 Sheets-Sheet 3

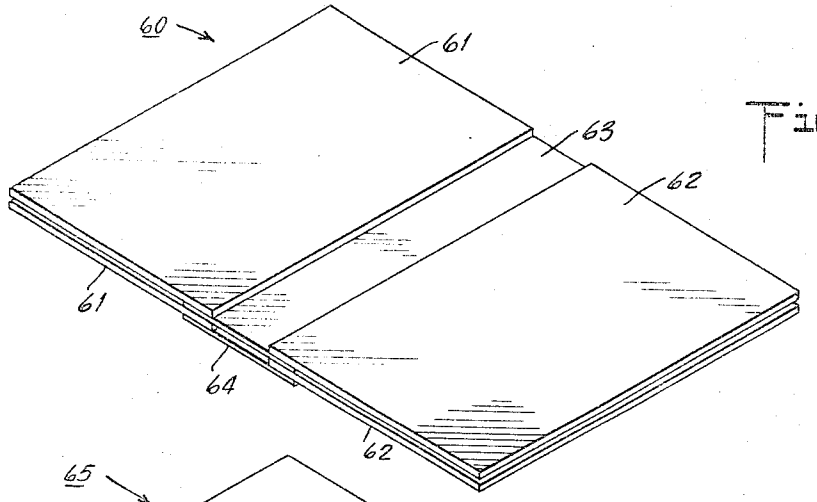


Fig. 7.

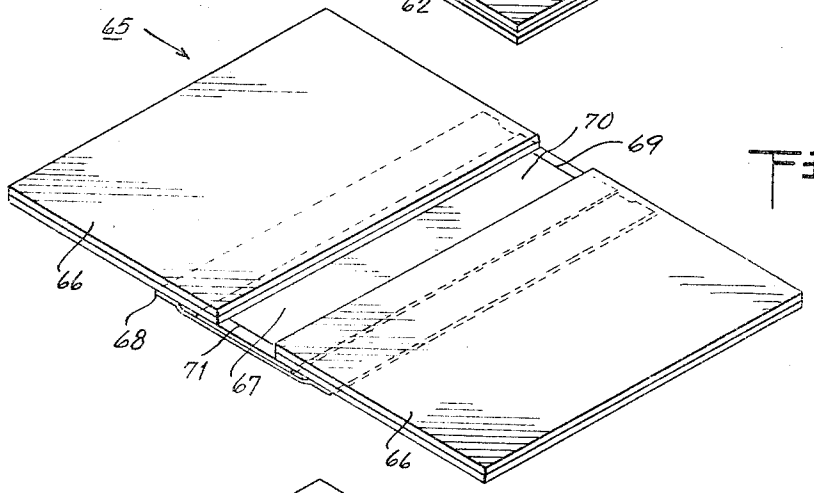


Fig. 8.

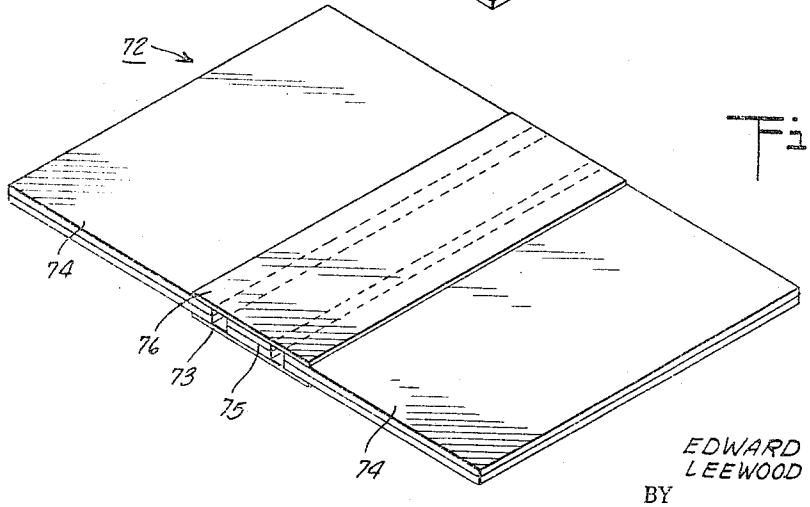


Fig. 9.

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BOOK COVER BOARDS

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Original application Feb. 17, 1965. Ser. No. 433,346. Divided and this application Apr. 4, 1966, Ser. No. 547,685

5 Claims. (Cl. 281—29)

This application is a division of application Ser. No. 433,346, filed Feb. 17, 1965, now abandoned.

This invention relates to book cover boards, loose leaf cover boards, album or catalogue cover boards and the like. Particularly, this invention relates to a book cover board having leaf boards and a spine board of multi-layer construction. More particularly, this invention relates to a book cover board having leaf boards hinged in spaced relation to a spine board.

It is an object of this invention to provide a book cover board which can be conveniently constructed.

It is another object of this invention to provide a book cover board having a pair of double thickness leaf boards hingedly connected together.

It is another object of this invention to provide a book cover board with a spine which can be made from various materials.

It is another object of this invention to provide a book cover board with a double hinge.

It is another object of this invention to provide a book cover board which can be made economically and conveniently.

It is another object of this invention to provide a book cover board which can be neatly and conveniently affixed to a book.

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 is a plan view of the assembly machine which assembles the book cover board;

FIG. 2 is a cross-sectional view taken at line 2—2 in FIG. 1;

FIG. 3 is a cross-sectional view taken at line 3—3 in FIG. 2;

FIG. 4 is a cross-sectional view taken at line 4—4 in FIG. 2;

FIG. 5 is a perspective view of the book cover board after leaving the assembly machine shown in FIG. 1;

FIG. 6 is a perspective view of the book cover board of FIG. 5 enveloped in a plastic coating; and

FIGS. 7 to 9 are perspective views of other embodiments of this invention.

Referring to the drawings, particularly FIGS. 1 through 5, the assembly machine of the invention comprises two side plate assemblies **20** and **21** which are maintained in spaced parallel relation by means of a plurality of cross bars or cross ties (not shown) and which are suitably supported above the level of the floor, for example by a plurality of leg members. A hinge material shaft **22** is rotatably mounted in the side plate assemblies **20** and **21** at the left-hand end thereof as viewed in FIGS. 1 and 2 and a hinge material roll **23** is wrapped thereon. The hinge material **24** which is in strip form and relatively thin compared to the leaf boards is made of a material to which vinyl film can be dielectrically heat-sealed and which is suitable for joining the leaf and spine boards of a cover board structure, for example, polyvinylacetate coated paper, vinyl impregnated cloth (plain open weave cloth through which the vinyl may fuse to itself), pure vinyl, or indeed, any flexible material to which the leaf boards can be adhesively secured.

A pair of leaf board shafts **25** are rotatably mounted in the side plate assemblies **20** and **21** to the right of the hinge material roll **23**, one above and one below the plane of the hinge material roll **23**. Each leaf board shaft **25** has a pair of spaced apart leaf board rolls **26, 27** wrapped thereon. The leaf board material **28, 29** which is in strip form and of a thickness usually in the range of from 0.030 inch to 0.060 inch, leaving it sufficient flexibility for winding, is made of material suitable for leaves of a book cover. The leaf board rolls **26, 27** are spaced from each other by a distance slightly greater than the width of the spine to be incorporated in the book cover board.

The leaf board strips **28, 29** of the top leaf board rolls **26** are passed over a suitable idler roll **30** which is rotatably mounted in the side plate assemblies **20, 21** and moved over a suitable glue roll **31**. As these leaf board strips **28, 29** move over the glue roll **31**, a sufficient amount of glue is adhered to the underside of each leaf board strip **28, 29** from a glue reservoir **32** by means of the glue roll **31**. The glue containing leaf board strips **28, 29** are then directed between a pair of press rolls **33**.

The leaf board strips **28, 29** of the bottom leaf board rolls **26** are passed around a suitable idler roll **34** which is rotatably mounted in the side plate assemblies **20, 21** and moved past a suitable glue roll **35**. As the leaf board strips **28, 29** move past the glue roll **35**, a sufficient amount of glue is adhered to the top side of each leaf board strip **28, 29** from a glue reservoir **36** by means of a glue transfer roll **37** and glue roll **35**. The glue containing leaf board strips **28, 29** are then directed between the pair of press rolls **33**.

The hinge material strip **24** is directed from the hinge material roll **23** to the press rolls **33** where it is sandwiched between the pairs of leaf board strips **28, 29**, respectively, as shown in FIG. 3. The press rolls **33** are rotatably mounted to the right of the leaf board rolls in the side plate assemblies **20, 21** and are spaced apart vertically. The vertical spacing between the press rolls **33** is slightly less than the combined thickness of the hinge material strip **24** and a pair of leaf board strips **28** or **29** so that these strips pass between the press rolls, a sufficient force is applied thereto to press the leaf board strips together into bonded relationship with the hinge material **23** depressed into the respective leaf board strips so as to form a single adhered unit.

A pair of spine board shafts **38** are rotatably mounted in the side plate assemblies **20** and **21** to the right of the press rolls **33**, one above and one below the plane of the hinge material strip **23**. Each spine board shaft **38** has a spine board roll **39** wrapped thereon. The spine board material **40** which is in strip form and of the same thickness as the leaf board is made of any material, for example plastic, light-weight steel, fibre board, or any other suitable material. Each spine board roll **39** is positioned between a coplanar pair of leaf board strips **28, 29**.

The spine board strip **40** of the top spine board roll **39** is passed over a suitable idler roller **41** which is rotatably mounted in the side plate assemblies **20, 21** and moved over a suitable glue roll **42**. As the spine board strip **40** moves over the glue roll **42**, a sufficient amount of glue is adhered to the underside of the spine board strip **40** from a glue reservoir **43** by means of the glue roll **42**. The glue containing spine board strip **40** is then directed between a pair of press rolls **44**.

The spine board strip **40** of the bottom spine board roll **39** is passed over a suitable idler roller **45** which is rotatably mounted in the side plate assemblies **20, 21** and moved past a glue roll **46**. As the spine board strip **40** moves past the glue roll **46**, a sufficient amount of glue is adhered to the topside of the spine board **40** from a glue reservoir

47 by means of a glue transfer roll 48 and glue roll 46. The glue containing spine board strip 40 is then directed between the pairs of press rolls 44.

The previously formed leaf board and hinge material unit is also directed between the press rolls 44 where the glue containing spine board strips 40 are adhered to the top and bottom surfaces of the hinge material strip 24 in the area between the leaf board strips 28 and 29, as shown in FIG. 4. The press rolls 44 are spaced apart vertically so that a sufficient force can be applied to the spine board strips 40 to insure their adherence to the hinge material strip 24 and to compress them sufficiently in thickness to provide a total uniform thickness of spine boards and hinge material equal to the thickness of the bonded pairs of leaf boards. The spine board strips 40 thus become part of the leaf board and hinge material unit to form a book cover unit 49 of uniform thickness.

The book cover unit 49 then moves away from the press rolls 44 to a cutting block 50 above which a cut-off knife 51 is positioned. After a predetermined length of the book cover unit 49 passes by the cut-off knife 51, the cut-off knife 51 drops down to sever the predetermined length from the remainder of the unit 49 so as to form a book cover board 52. The severed book cover board 52 leaves the cutting block 50 to be picked up by a discharge conveyer belt 53 which is mounted on rotating conveyer rollers 54 which are rotatably mounted in the side plate assemblies 20, 21. The conveyer belt 53 moves at a slightly faster rate of speed than the book cover unit 49 so that a space can be maintained between successively severed book cover boards. The book cover board is then delivered by the discharge conveyer belt 53 to a receiving bin where it is stacked upon previously formed book cover boards.

Referring next to FIG. 6, the book cover boards 52 may be fed to a jacketing or casemaking machine and therein be provided with a jacket 56 of plastic material, specifically a vinyl material. However, many materials can be used to form a jacket for the book cover boards. For example, a cloth and/or paper jacket which are well known in the art may be glued all over to the book cover boards. Such jacketing results in a bonded three-layer hinge structure joining leaf boards and spine boards together which is both strong and flexible. Further, when jacketing with a vinyl material the vinyl may be dielectrically heat sealed, sprayed on or flowed on each pair of leaf boards and spine boards as well as the hinge material.

Referring next to FIG. 7, a book cover board 60 is comprised of pairs of leaf boards 61 and 62 hinged together by hinge material 63 in a manner as set forth above. However, in place of a pair of spine boards, a second strip of hinge material 64 is adhered to the bottom side of the leaf board and hinge material unit below the hinge material 63. This second strip of hinge material 64 is adhered to the bottom leaf boards 61 and 62 in a manner similar to the manner in which the bottom spine board is adhered in the book cover board 52 described above; that is, a roll of hinge material is rotatably mounted in the side plate assemblies to the right of the leaf board rolls, the hinge material strip is then moved over a glue roll and reservoir assembly so that the glue may be applied to the top side of the hinge material strip and the strip is passed between the press rolls where it is adhered to and pressed into the bottoms of the bottom pair of spaced apart leaf boards.

The book cover board 60 of FIG. 7 has particular values in the construction of conventional trade books and in the elimination of the "glueing-off" of books and the use of super or crash in building strength into the joints between book and cover. By way of example, a close weave cloth is used as the hinge material between the plies of the leaf boards and a paper or saturated paper is used as the second hinge material on the outside surface of the leaf boards. Further, the two hinge materials can be cut out from the top and bottom of the book cover board between the leaf boards inwardly about one-half inch during the assembly process of the book cover board. This would allow cover material to be brought around the edges of the book cover board without catching the hinge material, thus permitting the book cover board to be covered by any material in a conventional case maker.

Referring next to FIG. 8, a book cover board 65 which is a modification similar to the book cover board 60 of FIG. 7, is constructed in a similar manner so that the two hinges are placed on the same side of the leaf boards. The book cover board 65 is comprised of a pair of spaced apart two-ply leaf boards 66 which are hinged together by a first strip of hinge material 67 and a second strip of hinge material 68. The book cover board 65 is constructed in a manner similar to the book cover board 60 by an assembly machine similar to the assembly machine of FIGS. 1 and 2, that is, the strips of hinge material are adhered to the bottom surfaces of the leaf boards in continuous fashion by suitable material rolls, glue rolls and press rolls. The adhered strips are subsequently formed with a slit about one-half inch from the longitudinal ends between the leaf boards 66 so that three separate and distinct hinge sections 69, 70, 71 are formed. This allows a cover material to be brought around the edges of the book cover board to the extent of the outside hinge sections 69, 71 without interfering with the hinge section 70 of the inside or first hinge material strip 67. Thus, the hinge 70 may be secured in the usual manner to the backbone of a book with the attendant characteristic of allowing the book with the hinge section 70 to move away from the cover material upon opening of such a book and cover board assembly. Alternatively, the strips of hinge material may be suitably cut out between the leaf boards near the longitudinal ends so as to extend inwardly of the leaf board edges and to achieve the same result of not permitting the cover material to interfere with the inside or first strip 67 of hinge material.

The first strip of hinge material 67 is preferably made of close woven cloth and is adhered to the leaf boards 66 near the adjacent edges thereof. The outside or second strip of hinge material 68 is preferably made of paper or latex saturated paper and is adhered to the leaf boards 66 at an area remote from the adjacent leaf board edges that is, only the edge portions of the second strip 68 are provided with adhesion means for adhering the strip 68 to the leaf boards 66 at a spaced distance from the edges of the first strip 67 thereby precluding any of the adhesion means from passing to the second strip 68. The paper hinge material 68 is thus spaced from the close woven cloth hinge material 67 by a slight space. When a suitable cover material is placed around the bottom and top edges of the book cover board 65 and a book is suitably adhered to the close woven cloth hinge material 67, adhering material will not pass through the close woven cloth hinge material 67 onto the paper hinge material 68 and cover material. Further, since the close woven cloth is adhered to the side of the book cover board covered by the cover material, a substantially strong joint is made.

Additionally, where the book cover board is subjected to a casemaking process wherein a cloth or paper, either pre-printed or subsequently stamped, is wrapped around and glued to the cover board to form the outer covering of the book as ordinarily used the paper hinge 68 is non-porous. Thus, the glue adhering the cover material to the cover board structure will not pass through the hinge 68 to the hinge 67 thereby insuring the separability of the hinges 67, 68.

The book cover board 65 can be used in the manufacture of round back or the conventional type of book whereas, previous constructions have been limited to juvenile type "stiff back" books. When used for the expensive round back type book, the book cover board 65 facilitates opening of the book by allowing a space to develop between the back of the book and the outer covering thereby effecting a strong binding as well as facilitating opening of the book.

Referring next to FIG. 9, a book cover board **72** which is a further modification similar to the book cover board of FIG. 7 is constructed by an assembly machine similar to the assembly machine of FIGS. 1 and 2. The book cover board **72** is assembled in a suitable manner whereby the outside hinge material **73** which is preferably kraft paper, is fed from a suitable roll over a glue roll and adhered to and pressed into the two-ply leaf boards **74** and the two-ply spine board **75**. By modifying the assembly machine of FIGS. 1 and 2 with another set of press rolls, the inside hinge material **76** which may be colored canvas, colored paper or any other similar colored fabric is similarly fed, adhered to and pressed into the two-ply leaf boards **74** and two-ply spine board **75**.

This book cover board **72** provides a reinforcing effect by use of the kraft paper on the outside of the book cover board structure as well as the very desirable characteristic to the loose leaf manufacturer of having his inside hinge material **76** already in place.

While the invention is thus described, it is not wished that it be limited to the precise details described, as changes may be readily made within the scope of the claims without departing from the spirit of the invention.

What is claimed is:

1. A cover board comprising a first pair of leaf boards, a second pair of leaf boards disposed in spaced relation to said first pair of leaf boards, and a pair of hinge material strips adhered to said first pair of leaf boards and said second pair of leaf boards, one of said hinge material strips being adhered to a surface of each of said first and second pairs of leaf boards and the other of said hinge material strips being wider than said one hinge material strip and overlying said one hinge material strip in spaced relation and being adhered only to said surface of each of said leaf boards.

2. A cover board according to claim **1** wherein said one strip is a close woven cloth and said other strip is paper.

3. A cover board as set forth in claim **1** wherein each of said hinge material strips has three longitudinally arranged hinge segments between said leaf board portions whereby a cover material can be folded over the edges of the cover board without interfering with subsequent movement of the interior hinge segment of said one hinge material strip.

4. A cover board as set forth in claim **1** wherein said one strip is a close woven cloth and said other strip is latex saturated paper.

5. A cover board as set forth in claim **1** wherein said one strip is a close woven cloth and said other strip is non-porous paper.

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