

June 2, 1964

E. C. RANKIN

3,135,531

BOOK WITH FREE-OPENING COVERS

Filed Aug. 22, 1960

3 Sheets-Sheet 2

Fig. 6.

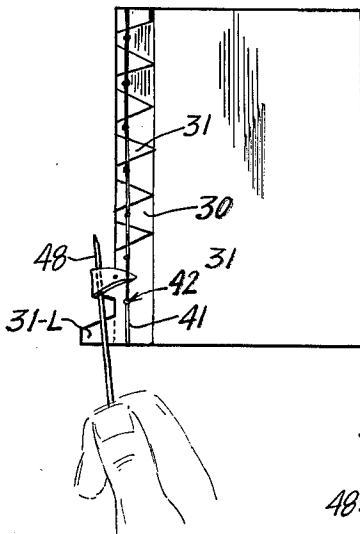


Fig. 6-B.

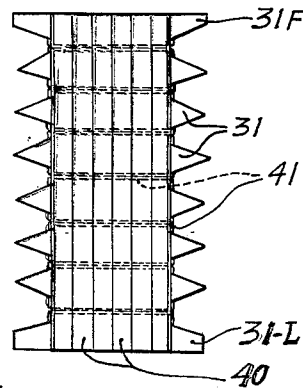


Fig. 6-A.

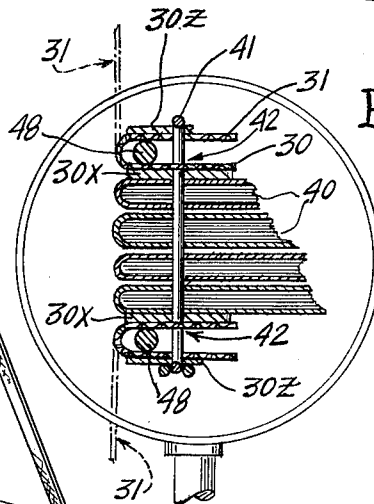


Fig. 8.

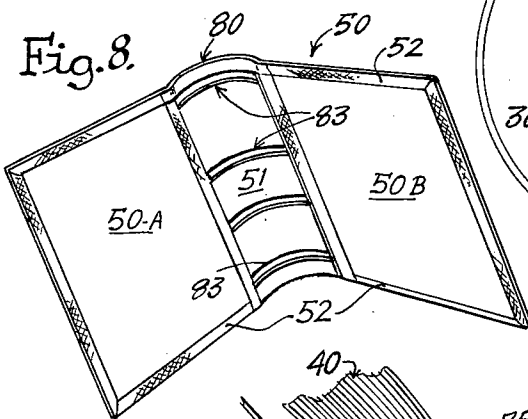
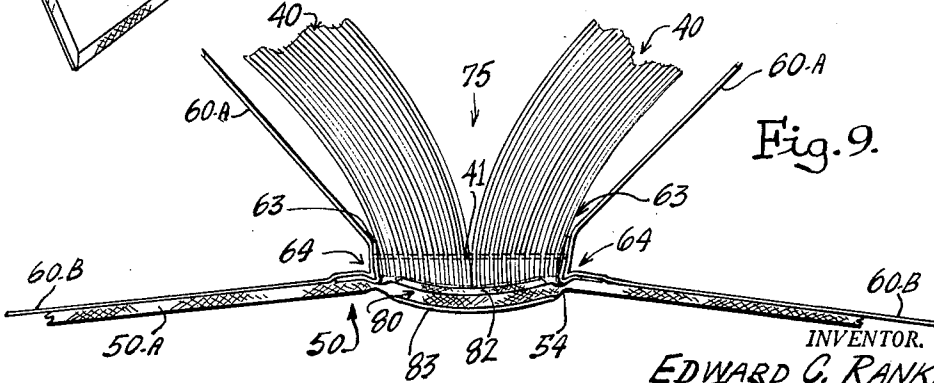


Fig. 9.



INVENTOR.
EDWARD C. RANKIN
BY *Edward C. Rankin*
ATTORNEY.

June 2, 1964

E. C. RANKIN

3,135,531

BOOK WITH FREE-OPENING COVERS

Filed Aug. 22, 1960

3 Sheets-Sheet 3

Fig. 7A

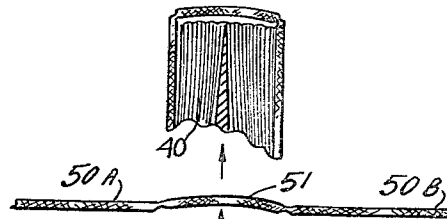


Fig. 7

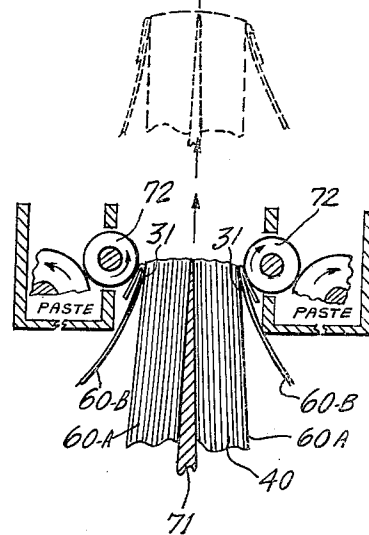
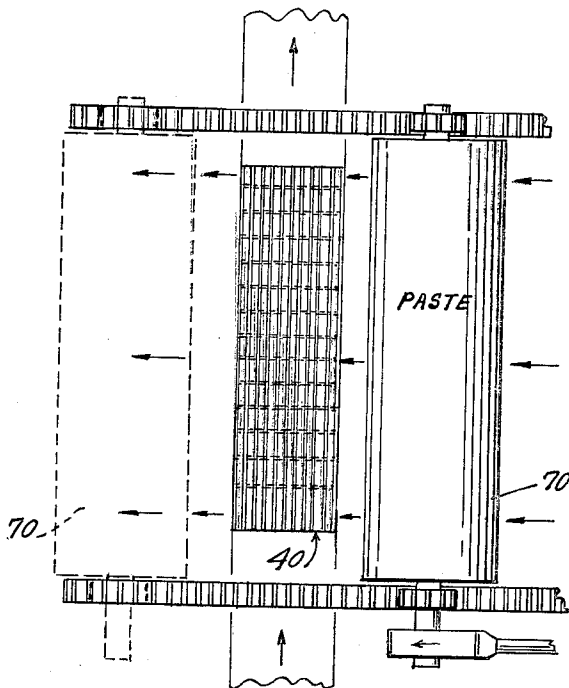


Fig. 11.

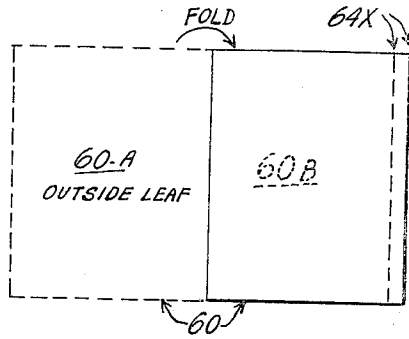


Fig. 10.

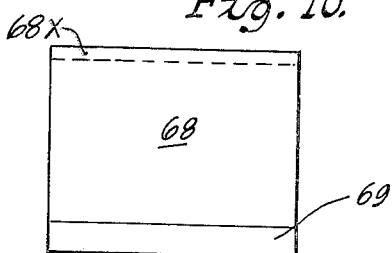
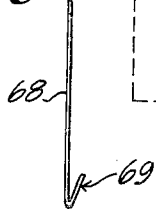


Fig. 10-A



INVENTOR.
EDWARD C. RANKIN
BY *Allen Livingston*
ATTORNEY.

1

3,135,531

BOOK WITH FREE-OPENING COVERS

Edward C. Rankin, Oak Park, Ill., assignor to Brock and Rankin, Chicago, Ill., a corporation of Illinois

Filed Aug. 22, 1960, Ser. No. 50,952

9 Claims. (Cl. 281-27)

This invention pertains to the bookbinding arts and has as its principal object the disclosure of an economical method and means for attaching free-opening covers to side-stitched books in simulation of the action and appearance of the covers of the more costly edge-sewn or Smyth-sewn types of book, low production costs being achieved to make the process feasible and economical by reason of the fact that existing equipment and practices usually employed in the binding of side-stitched books, are fully utilized in the new process in conjunction with certain novel hinge means, including more particularly a special free-opening hinge strip especially shaped for attachment by sewing onto a gathering of books signatures concurrently with the stitching thereof in a Singer or McCain machine (with or without glue) by use of intermediary pilot end sheets which are contrived to be foldable and to be gathered along with the signatures in the same manner as ordinary end sheets and signatures, the pilot end sheets being of temporary character and adapted to be wholly or partly replaced by permanent end sheets in the finished book.

A more detailed object is the provision of a free-opening hinge structure having a configuration adapted to be sewn onto the gathering concurrently with the stitching thereof in a manner such that certain hinge projections will be missed by the needle and temporarily tucked beneath the lay of the stitches for easy subsequent withdrawal and attachment to a set of covers in a conventional casing-in machine.

A further object is the provision of a combination free-opening hinge and end sheet assembly adapted for use in side-stitching operations for attaching a set of covers to side-stitched book fillers or gatherings, and to be gathered and stitched with the pages or signatures in conventional machines, and of a character such that a portion or all of the end sheet may be removed and the removed parts may be replaced, if desired, by corresponding new end sheet portions.

Additional objects and aspects of novelty and utility characterizing the invention will appear as the following description proceeds in view of the annexed drawings, in which:

FIG. 1 is a plan view of a pilot end sheet before folding;

FIG. 2 is a plan view of a pair of front and back hinge strips;

FIG. 3 is a plan view of a front pilot end sheet with assembled or tipped-in hinge strips;

FIG. 3-A is a plan view of a folded back pilot end sheet and assembled hinge strip;

FIG. 4 is a lateral cross section of the stitched gathering prior to removal of the pilot end sheets;

FIG. 5 is a plan view of the front face of the stitched gathering with both halves of the front pilot end sheet in the process of removal;

FIG. 6 is a plan view of the front face of a stitched gathering or book of signatures illustrating a method for freeing the captured hinge wings;

FIG. 6-A is a magnified fragmentary sectional detail of the stitched gathering with inserted wing-pulling tools;

FIG. 6-B is an elevation of the spine of the stitched gathering with both pilot end sheets removed and the wings projecting free;

FIG. 7 is a diagram illustrating the application of paste or glue in the casing-in operation;

2

FIG. 7-A is another diagram illustrating the application of paste in the casing-in operation;

FIG. 8 is a perspective of a set of covers or so-called "manufactured casing";

FIG. 9 is a partial end view of the cased-in book with covers lying in free-opened condition;

FIGS. 10 and 10-A are diagrammatic illustrations of the half end sheet;

FIG. 11 is a diagram of a folded permanent end sheet.

As a departure from standard side-stitching practices, the new process requires the use of temporary or pilot end sheets 20 (FIG. 1), each provided with folding perforations 21 laid along a desired folding line or axis Z-Z (FIGS. 1, 3, 3-A). The row of folding perforations is flanked by weakened tearing lines comprising, on one side thereof, a narrow lane 22 formed by two series of staggered and spaced apart die-cuts 23 and 24, and on the opposite side thereof, by a single line of die-cuts 25, these tearing lines being asymmetrically situated on opposite sides of the axis Z-Z, the staggering of the cuts on the one side minimizing the weakening of the paper while creating the narrow lane 22, which is of a width to be overlaid (on the outer flies 20A of the sheet only, FIG. 5) by the string of stitches and the stitching glue, for purposes to appear. The cut pilot end sheets 20, thus perforated and scored, are suitable for handling in conventional "one-fold" and gathering machines in the same manner as ordinary end sheets.

A further requirement of the process is a supply of hinge strips 30 (FIG. 2) prepared by die-cutting any suitable hinge fabric, such as cambric, buckram, binder's cloth, or the like. Two of the strips 30 are used for each book, and will be oriented as shown in FIG. 2 when placed upon their respective pilot end sheets to become part thereof, as in the case of the "front" pilot end sheet shown in FIG. 3, these hinge strips ultimately being utilized to function in their relative positions at the front and back of the stitched book in the relationship seen in FIG. 6-B.

The hinge strips 30 are provided along one longitudinal edge with a series of evenly spaced tabs or wings 31 which may economically be in the shape of triangular serrations, the space between each of which is calculated to bridge with considerable latitude the length of one full stitch made by the Singer or McCain or other type of side-stitching book-sewing machine to be used. The seeming difference in shape of the first and last hinge wings 31F, 31L (FIG. 2) is the result of trimming operations to be explained, and is not critical.

The stock pilot end sheets are completed initially in open or flat condition by tipping (gluing) into position the main body portion only (not the wings 31) of a properly-facing hinge strip positioned in the manner depicted in FIG. 3, in which condition these end sheets can be handled like ordinary end sheets in the standard folding machines through which batches of "front" and "back" sheets will next be run to emerge folded once over along the fold axis defined by perforations 21, so as to have the general appearance of the ("back") end sheet shown in FIG. 3-A.

It will be observed that the unfolded end sheet of FIG. 3 is a "front" sheet while the folded sheet of FIG. 3-A is a "back" sheet, it being especially noted in the latter view that the hinge wings 31 appear to have become shortened (the result of being folded over upon themselves) and they now point away from the perforations 21 toward the die-cut line 25 and side opening opposite thereto, whereas in the unfolded condition of the "front" end sheet in FIG. 3 the wings 31 will point in the opposite direction with respect to those in FIG. 3-A when the outer leaf 20A is folded in the direction of the fold arrow onto the leaf 20B.

The printed pages to be bound are commonly gathered in books of signatures 40, by the usual gathering machines along with a set of pilot end sheets in their proper front and back positions; and each such gathering or book is thereafter preferably rounded and glued-off in the usual manner by standard machines so as to throw a curve across the back to conform to the rounded back of the covers and to glue off the backs so that the gatherings will hold their shape for further handling.

After rounding and gluing off, the gatherings are fed serially through a Singer, McCain, or similar side-stitching type of book-sewing machine from which the stitched or sewn books will emerge in the structural condition depicted somewhat schematically in cross-section in FIG. 4, and in part in FIG. 5, it being especially noted in the latter view that the outermost wing portions 31 of the front (and back) hinge cloths are each caught beneath a stitch 41, whereas the appertaining main body portions 30 of the strips (FIG. 5 or 6-A) are actually pierced by the needle and penetrated by the thread as at 42, which continues completely through the gathering of signatures and passes out through the back of the cloth, where the stitch is locked or caught and the needle retreats for the next stitch back into the front face of the book.

As is common in book-sewing operations employing side stitching, the needle takes at least one, and often two, idle stitches between successive books in order to fully catch the last stitch and leave extra thread exposed for cut-off, the first stitch in the following book frequently being made somewhat closer to the leading or top edge of the book than is the last stitch relative to the bottom edge thereof because the feeding lugs on such machines are not necessarily changed whenever the size of the book is changed slightly. The idle stitch loops over the last folded-under (by the folding out of the end sheet) hinge wing 31L and falls around the trailing or departing edge of the book and into the space between the latter and the next succeeding book for the linking cut-off stitch before entering the following book.

Thus, the stitched books or gatherings will approach the discharge station of the sewing machine in a connected series linked together by the idle stitches, which will be automatically cut as each leading book passes from the machine.

The operations next ensuing require the removal of at least one, and usually both leaves of the two sets of pilot end sheets 20 by tearing them off at both the front and rear of the stitched gathering along their respective die-cut tearing margins 22, 25, thus leaving adhered between the face of the underlying signatures 40 and the overlying main body portion 30 of the corresponding hinge strip, glued reinforcing end sheet remnants 30X and 30Z (FIG. 6-A). Following the casting off of the pilot sheets the captured hinge-wing portions 31 (FIGS. 5, 6, 6-A) are freed from beneath the overlying line of stitching 41 as illustrated in FIGS. 6 and 6-A, by action of a rod-like tool 48 having a pointed end inserted beneath the wings and worked from one or the other of the endmost tabs 31F or 31L, with an added sidewise or outward prying motion so as to slip all of the wings back out from beneath the stitch in order that they may project freely into space from the back of the book, for instance in the manner depicted in FIG. 6-B.

Whether or not a "full" or "half" permanent end sheet is to be used depends mainly upon the customer's specifications. In cases where the books are to be closely simulative of expensive free-opening and hand-turned custom bindings, the full type of end sheet would probably be used and might be of highly polished paper stock, or perhaps a fancy marbelized stock, or possibly the end sheets may be lithographed with pictures or special copy, so that in each instance a full permanent end sheet would be indicated.

The use of a half-sheet has no advantage other than a saving in cost, which may be offset, however, by a loss

in appearance, since the line of attachment of the half-sheet will always be apparent.

In general, the permanent, full end sheet blanks shown in FIG. 11 will be identical in appearance to those employed as regular end sheets in the prior standard manufacturing processes for side-stitched books, the cut paper blank 60 being folded off center and not across the middle of the sheet, so as to produce two unequal pages, 60A and 60B, the outer leaf 60A extending about one-quarter inch beyond the side or opening margin of the inner leaf to provide a boning or tucking excess 64X to be taken up when the sheet is boned back into the joint after the covers are attached.

The full permanent end sheet 60 is shown in FIG. 11 in dotted lines representing the unfolded condition of the blank, and in full lines for the folded condition thereof, the boning excess 64X constituting an overhang or lip which will largely disappear when the end sheets are boned back into the joints at 64 (FIG. 9) at both the front and back of the cased-in book. Thus, the permanent end sheets 60 have no folding perforations and no tear-off scorings like the perforations 21 and scorings 23, 24, and 25, which characterize the pilot end sheets.

The full new end sheets 60, each consisting of an inner leaf 60B and an outer leaf 60A, are tipped into the rough trimmed book (FIG. 6-B) resulting from the tear-off operations of FIG. 5, and the releasing of the hinge wings according to FIG. 6, the glue or paste being applied only to the inside margin of the inner leaf 60B near its fold which will be juxtaposed with only the main body 30 of each hinge strip, no adhesive being applied to the hinge wing portions 31 at this stage, for the reason that if paste were permitted to dry on the wings they would become hardened and lose the flexibility necessary to make them lie back easily when passing between the paste rollers of the casing-in machine, it being usually necessary to send the finished gatherings (i.e. after attachment of new end sheets) to the trimming cutter to square off any remaining irregularity in the margins following which the gatherings are ready for application of the covers in a standard casing-in machine, this operation being illustrated schematically with reference to FIG. 7 wherein the stitched gathering, now called a "filler," is conveyed along the infeed channel to the casing-in mechanism and while at rest therein will have its back traversed by a paste roller 70 moving transversely thereacross, from which position the filler will be conveyed onto a saddle 71 (FIG. 7-A), which will automatically thrust the filler into the back 51 of a set of covers, and in doing so will carry the filler between a pair of flanking paste rollers 72, so that the exposed hinge wings 31 and the outside faces of the outer permanent end sheets 60A will have a generous coating of paste laid thereon by the time the overlying cover is engaged and caused to hang onto the filler as the latter continues to move upwardly, as a result of which motion the wings and end sheets are joined to the inside faces of the covers and the book is ready for discharge. Promptly on leaving the casing-in machine and before the paste has an opportunity to set up, the covers are squared off and both of the joints 64 at the end sheets will be traversed by a hand tucking bone to thrust the end sheet paper and the hinge wings well down into the cover joint 64 in the manner of a well finished book.

In the event that a half end sheet is required, the procedure described in view of FIG. 5 is modified to the extent that only the outer leaf 20A is removed; and since the half-sheet will be pasted onto the appertaining cover, the main body of the hinge strip and the stitching thereon are to be concealed beneath a narrow fold provided on this type of end sheet.

A half end sheet 68 is shown in FIG. 10 and is provided with a narrow tipping fold or lip 69 of the same length and width as the main body portion of the hinge strip. In addition, this end sheet is provided with an overhang

or boning excess 68X corresponding to the marginal excess 64X provided on the full end sheet.

The tipping lip 69 is pasted in along its full area and pressed onto the hinge strip body 30 to conceal the latter, this operation being performed before casing-in, and the hanging of the covers then being effected as described in the case of the full end sheet, so that the finished book would have an appearance similar to that in FIG. 9 if the leaves 60A were assumed to be missing.

The disclosed methods produce a free-opening hinge action of the covers, such as illustrated in FIG. 9 wherein it will be apparent that both covers 50A, 50B can fall back considerably below the line of stitching indicated at 41, although the signature pages 40 are constrained to spread open at most up to the stitching, at which depth the reading gutter 75 is rather deeper than is desirable, this being characteristic of side-stitched books, since there is obviously a practical limit to how close the stitching can be laid to the outer boundary of the spine.

Thus, unless the hinge joint for the covers can be located outwardly (downwardly in FIG. 9) of the line of stitching 41, the covers can have no freer opening range than the pages, and while a variety of proposals have been made heretofore to overcome these difficulties, and various auxiliary hinge structures have been suggested from time to time to afford free-opening movement to the covers of side-sewn and wire-stitched books, no prior economically successful mass production method is known which does not require special equipment or expensive, unconventional processing expediences which make it uneconomical to compete with ordinary side-stitched books.

Therefore, while the pages of the side-stitched volume as depicted in FIG. 9 are not capable of true free-opening action and present the relatively deep reading gutter 75 characteristic of the side-sewn book, it is nevertheless a decided commercial advantage to have the covers capable of lying back fully, as shown, in the manner of a back-stitched book—the book, closed and open, having a better appearance, and it being a convenience to the reader to have the covers capable of lying on a surface instead of tending to spring back to closed position as is the case with most side-stitched books.

In addition to the foregoing advantages, the described improvements have a further important area of application in connection with the manufacture of books which simulate the appearance of hand-sewn, or fine quality custom bound books, having such expensive features as free-opening hinge action, simulated turned-in ends, such as the ends 80 in FIG. 8, simulated set heads 82, and raised bands 83 (FIG. 9), and other features more particularly set forth in said application, the present free-opening hinge structures and methods of fabrication being especially adapted to utilization in the further binding methods therein set forth to complete a minimum inventory of features considered necessary to produce such a commercially acceptable simulated quality binding at the much lower cost levels of the side-stitched class of binding.

I claim:

1. A machine gathered and side-stitched book consisting of a book of pages gathered with front and rear end pages each having a hinge strip adhesively attached thereto, said book having free-opening covers attached by means of elongated hinge strips disposed respectively on, and substantially entirely along the length of, the front and back hinge margins of the gathered book pages along the line of stitching and each pierced and secured in position by the side stitches throughout the length of the stitching and strip, said strips having a series of spaced apart lateral integral hinge projections each in alignment with a stitch and which are free from the stitches and adhesively attached respectively at the front and back sides of the book to the respectively confronting inside faces of the corresponding front and back covers close to

the hinge joint thereof, whereby the covers can hinge along a line which is closer to the spine of the book than is the line of stitching.

2. A book according to claim 1 further characterized in that it has full two-leaf folded end sheets gathered and sewn with the book of pages at its front and back faces, each said end sheet having its outer leaf adhesively joined to the inside face of the adjoining cover and overlaid upon and concealing the appertaining hinge projections, which are adhered to the appertaining cover as aforesaid, each said end sheet having its remaining inside leaf adhesively secured upon the body portion only of the appertaining hinge strip portions which are stitched to the book pages as aforesaid, whereby to conceal the said hinge cloth and stitching.

3. The method of binding a book to provide free-opening covers with side-stitched signatures which comprises the steps of: preparing a pair of foldable pilot end sheets for each book, each sheet having an approximately central fold margin and each having a pliable hinge strip with a main narrow body portion adhered thereto bordering along the length of the fold line, each said strip having a series of freely and laterally-projecting, uniformly spaced-apart, hinge wings along that one of the long edges thereof which borders said fold margin; folding said sheets at said margin whereby to fold over said wings back upon the main body portion of the hinge strip; gathering the book pages with one of said folded pilot end sheets at the front of the gathering and another at the back of the gathering; stitching said gathering through said end sheets and strips along the side of the book near its spine with stitches spaced evenly so as to fall in the spaces between succeeding hinge wings, whereby the folded-over wing portions are caught beneath but not pierced by the stitches and only said main body portion is penetrated by the stitches; detaching the two halves of each said pilot end sheet from those portions thereof caught beneath the main body portions of the appertaining hinge strips; freeing the caught wings from beneath respective stitches, and attaching the gathered book to a set of covers by adhering the free wing portions at the front and back thereof to the inside faces respectively of corresponding front and rear covers, whereby the covers hinge beyond the stitching line toward the spine in the manner of free-opening covers.

4. In the art of bookbinding, improvements comprising: a gathering of book signatures joined in book form by uniformly-spaced side stitches along, and spaced inwardly of, the back margin thereof with hinge means attachable to a set of covers to provide free-opening action and appearance to the bound book, said hinge means comprising a pair of narrow main-body strips of hinge fabric one each of which is attached to the gathering along the back margins at the front and back faces thereof at least by said side-stitching penetrating said main body strips, and each said strip having a longitudinal hinge line substantially aligned with said back margin of the gathering to provide a hinge line, said strips each having a plurality of lateral wings joined thereto at said hinge line and spaced apart uniformly a predetermined distance substantially greater than the distance between successive stitches of said side stitching and each of a length to project substantially beyond said hinge line and each adhesively attached respectively to the inside faces of an appertaining front or back cover; together with at least one end sheet at front and back of the gathering adhesively attached to the inside face of the appertaining cover with the corresponding hinge wings secured thereto and to the cover therebeneath, each said end sheet having a fold line along the hinge line of said wings and a lip substantially the same width as the appertaining main-body strip and adhered upon the latter to substantially conceal the same and the stitches thereon.

5. In the bookbinding arts, a combination cover-hanging hinge and end-sheet assembly for attachment by Singer, McCain and like side-stitching machines to book

fillers which are to be hung in said covers and which consist of gathered pages secured together by said stitching machine, each said assembly comprising: an end sheet folded upon itself to form two hingedly-joined leaves, one inner and one outer leaf; a pliable hinge strip consisting of a main body portion of predetermined narrow width at least several times greater than the line of stitching to be laid down, and of substantially the same length as the trim distance between the head and foot of the sheet and gathering, each said strip body portion having a plurality of equally spaced-apart laterally-projecting hinge tabs along one of its long edges, the spacing between the adjacent tabs being not less than the distance between successive stitches to be laid down as aforesaid and each tab being of a width to fit beneath one stitch without penetration thereby; each folded sheet having the main body portion of one of said hinge strips attached to the inner leaf thereof with the edge from which the tabs project registering with the fold line of the sheet and said tabs projecting beyond said line in a direction toward the outer leaf; said sheet being folded upon itself toward the main body portion with said tabs resultantly folded back upon said main body portion of the strip in a condition of readiness to be gathered and side-stitched with said filler pages in the manner of ordinary end sheets under the condition that the side stitches are spaced uniformly a distance to lodge in the spaces between said tabs, whereby said tabs will be caught removably beneath the stitching as aforesaid for subsequent withdrawal and attachment to cover means.

6. An end sheet assembly according to claim 5 further characterized in that each said end sheet has lines of weakened portions each bordering one of the two long margins of the attached hinge strip, whereby either or both the inner and/or outer end sheet leaves may be torn free of the stitched filler, prior to attachment of the remnants to a set of covers.

7. In the manufacture of book fillers consisting of machine-gathered, -folded, and -stitched gatherings of sheets adapted to be encased in a set of covers, improvements comprising, namely: a side-stitched filler for encasement in covers of the flat-opening type with full-length hinge means at front and rear hinge margins for attachment to a set of covers which can hinge along a line closer to the spine of the book than to the stitching, said filler being in the form of a book of gathered sheets or signatures including first and last sheet members to which are respectively adhesively attached along the length of the respective hinge margins thereof, the main base portion of a long pliable hinge strip having a hinge wing portion folded back upon the base portion, said wing portion in each instance comprising a longitudinally-extensive series of spaced-apart tabs of uniform size and spacing predetermined for alignment of each tab with a loop of one of the side stitches, said gathering being side-stitched along said base portion such that each stitch penetrates the base portion and also captures, but does not penetrate, an appertaining one of said aligned tabs in a manner to render the same retractable from beneath its stitch loop for subsequent attachment to a corresponding front or rear cover member along the inside face at the hinge margin thereof on being cased-in as aforesaid, said stitched gatherings

including notably the said first and last sheet members and their appertaining folded-back hinge wings and captured hinge tabs in a form adapted for handling and processing in economical machine manufacturing processes employing conventional folding, gathering, side-stitching, and casing-in machines to provide a book having a side-stitched filler with covers of the flat-opening type.

8. A side-stitched book of gathered signatures adapted for production by gathering and stitching machines, and provided with hinge means at front and rear along the hinge margins of the spine for attachment respectively to the front and back covers of a casing, which will provide a book having the flat-opening type of hinge means which is closer to the spine of the gathering than to the side-stitching thereof, said hinge means comprising: front and rear hinge strips each consisting of an elongated stitching panel and a wing panel with the stitching panels of the front and rear strips respectively secured to the outside fold of a once-folded page sheet included respectively at the front and rear of the gathering, the wing panel of each strip being turned back upon the corresponding stitching panel along a line overlying said hinge margin and the entire gathering being side-stitched along a line paralleling said turned-back line so as to catch portions of both panels of both said strips beneath the stitching, said stitching panel being penetrated by the stitches and said wing panels being serrated to provide a series of hinge tabs so spaced and of such width in the direction of the stitching that each tab is caught beneath a stitch but not penetrated thereby, whereby to leave each tab free for retraction from beneath its stitch for attachment to a corresponding front or rear cover of the case when said gathering is cased-in.

9. The method of making a filler for encasement in flat-opening covers which comprises: preparing pilot and sheets each having adhered along the length of the hinge edge thereof the longitudinal base portion of an elongated hinge strip having a longitudinal wing portion projecting laterally beyond the hinge line for attachment to the inside face of an appertaining front or rear cover, each said wing portion having a longitudinally-extensive series of evenly-spaced hinge tabs therealong and all folded back along said hinge line onto the base portion of the strip, gathering the filler pages with one of said pilot end sheets at the front and at the rear of the gathering and the hinge strips thereof respectively bordering the spine of the filler gathering, side-stitching said gathering along and through said base portions of the hinge strips with stitches having loops spaced each to capture one of said hinge tabs, and thereafter withdrawing all tabs from beneath the stitch loops capturing the same to dispose the tabs in freed conditions for attachment to corresponding cover members as aforesaid.

References Cited in the file of this patent

UNITED STATES PATENTS

464,310	White	Dec. 1, 1891
2,154,516	L'Enfant	Apr. 18, 1939

FOREIGN PATENTS

14,730	Great Britain	July 18, 1899
--------	---------------	---------------