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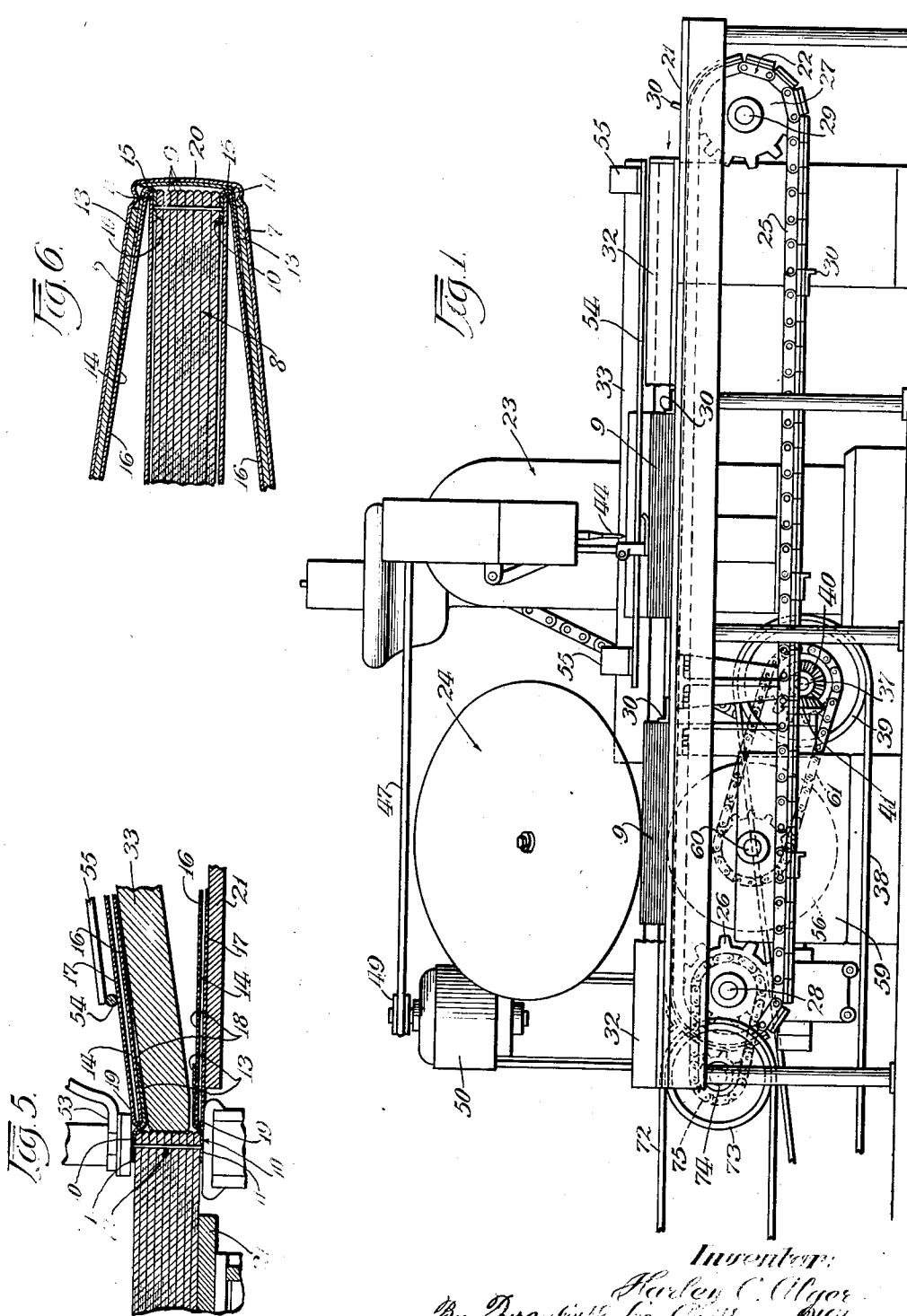
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1,972,672

METHOD OF BINDING BOOKS

Original Filed June 24, 1932

3 Sheets-Sheet 1



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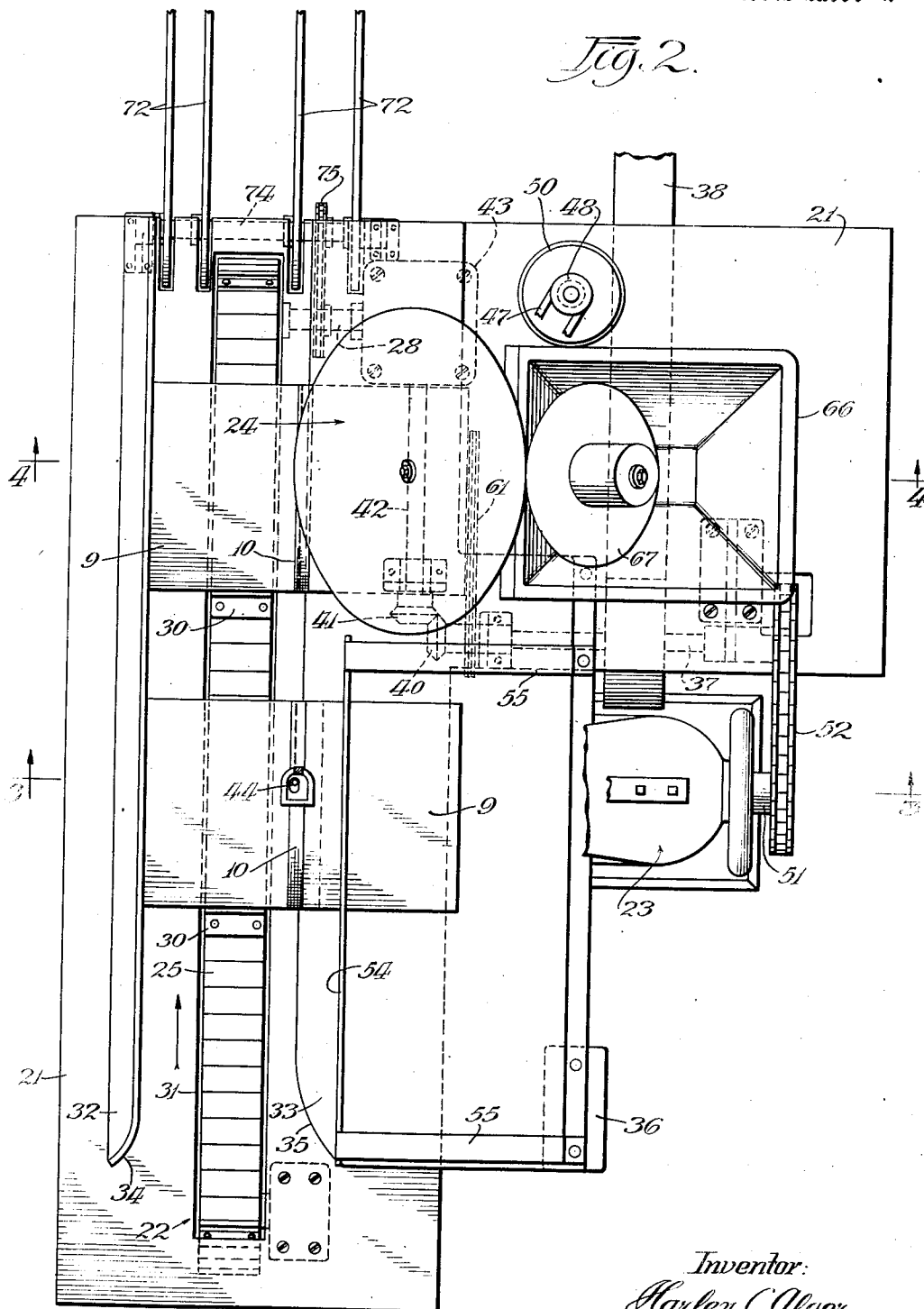
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Fig. 2.



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3 Sheets-Sheet 3

Fig. 3.

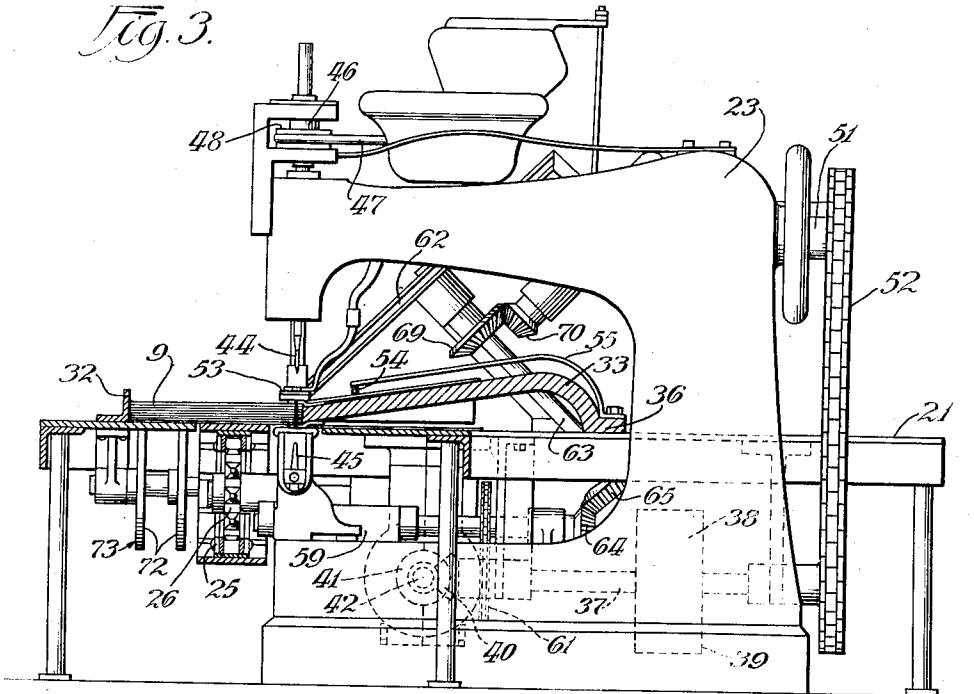
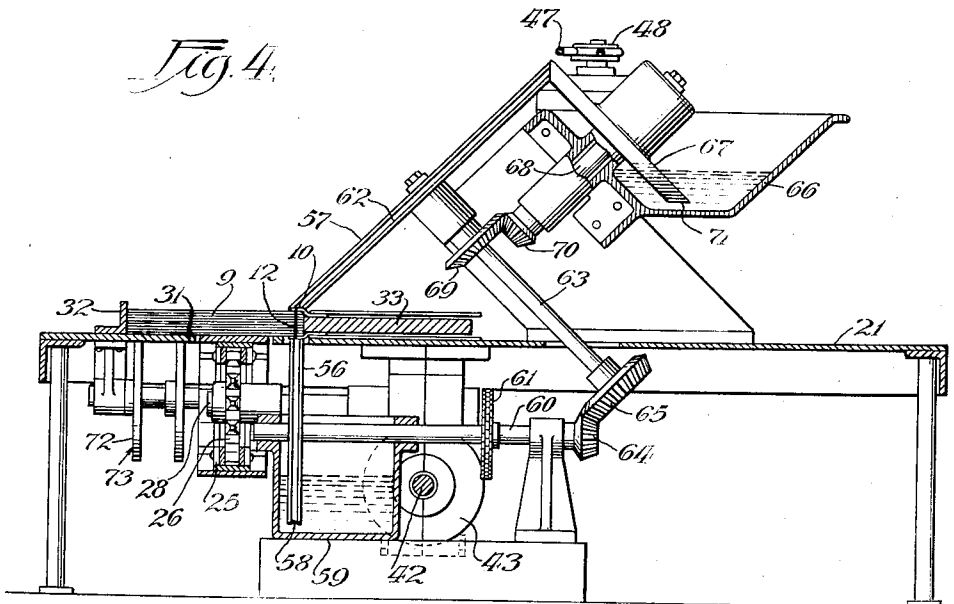


Fig. 4.



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UNITED STATES PATENT OFFICE

1,972,672

METHOD OF BINDING BOOKS

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Original application June 24, 1932, Serial No. 619,148. Divided and this application April 13, 1933, Serial No. 666,020

20 Claims. (Cl. 281—27)

My invention relates to a novel method of manufacturing so-called "side-sewn" books having end sheets, the present application, as to one phase of my invention being a division of my pending application for U. S. Letters Patent Serial No. 619,148, filed June 24, 1932.

One of my objects is to provide a novel method whereby books of the kind above referred to may be produced at less cost, and be more durable, than books of this kind as hitherto manufactured.

Another object is to provide for the manufacture of books of the kind above referred to, to the end that the sheets forming the body of the book and commonly provided in the form of signatures, together with the end sheets assembled therewith, may be trimmed before the cover sections are attached and, if desired, before the book is sewed; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:

Figure 1 is a view in side elevation of a machine suitable for performing certain of the operations in the practicing of my improved method in the preferred way.

Figure 2 is a plan view of the machine.

Figure 3 is a section taken at the line 3—3 on Fig. 2 and viewed in the direction of the arrows.

Figure 4 is a section taken at the line 4—4 on Fig. 2 and viewed in the direction of the arrows.

Figure 5 is a fragmentary enlarged sectional view of a portion of the machine of the preceding figures showing the relative positioning of the body of the book and the end sheets thereof in the operation of stitching the book; and

Figure 6, a broken sectional view showing the completed book.

As an example of a kind of book to be bound in accordance with my novel method, reference is made to the book shown in Fig. 6 wherein the securing of the cover sections, represented at 7, to the body of the book and represented at 8 (the sheets of which are preferably provided in the form of signatures 9) is by means of reinforcing strips 10, as for example, and preferably, of fabric, which are secured along their inner edge portions 11 in flatwise position to the body portion 8 adjacent the back edge thereof to extend substantially the full length of the body portion, as by the stitching represented at 12, and along their outer edge portions, or flap portions, 13 which extend beyond the back edge of the body 8 of the book, to the covers 7. In other words, the strips 10 are disposed in such a position relative to the body 8 and covers 7 that, considering the covers 7 as folded outwardly into open condition as

shown of the end sheets in Fig. 5 and represented at 14, the portions 13 of the strips 10 extend outwardly beyond the back edge of the body 8, as represented of these strips in Fig. 5, so that the lines of flexure of the strips 10 and at which the hinge joints between the covers 7 and the body 8 of the book are formed, are adjacent the back edge of the body 8 as represented at 15.

The particular book shown also comprises, in addition to the signatures 9 and covers 7, the end sheets 14 above referred to which are each in the form of a double sheet presenting a portion 16 which in the finished book is pasted to the inside surface of the adjacent cover 7 to form a lining therefor, and a portion 17 which forms a double page free sheet.

In the production of such a book the strips 10 are glued along one edge to the outer faces of the outermost ones of the signatures 9 adjacent their back edges in position thereon as above stated before the book is sewed, and preferably preliminary to the grouping of the signatures to form the body 8 thereof, and the outer edges of the strips 10 glued to the faces 18 of the portions 16 of the double end sheets 14 at the folded portions thereof as shown in Fig. 5, likewise preferably before the signatures are grouped together, the assembling of the outermost signatures with the strips 10 and the end sheets 14 to the relative positions as shown being preferably effected in accordance with the disclosure in the pending application for U. S. Letters Patent of Robert D. Easton, Serial No. 628,875, filed August 8, 1932.

The grouped signatures are preferably secured together, preferably lightly, to hold them against relative displacement in the stitching operation hereinafter described, as for example by a light application of glue to the back edge of the book.

Preliminary to the stitching of the book the flap portions 13 of the reinforcing strips 10 and the end sheets 14, when the latter are applied to the strips 10 before stitching the book, are turned outwardly to the position shown in Fig. 5 to permit of the stitching through the signatures 9 and the portions 11 only of the strips 10 which are applied flatwise thereto.

The edges of the book may be trimmed either before or after stitching the book, in which trimming operation the flap portions 13 of the strips are in turned-back condition in which they overlie the portions 11, respectively, of the strips 10 and the end sheets 14 overlie the signatures, respectively, whereby the end sheets and signatures are trimmed simultaneously; the adaptability of

the book for the trimming of the signatures simultaneously before stitching being of particular importance where it is desired to stitch the book in preliminarily rounded-back condition in accordance with the disclosure in the pending application of Philip A. Frazier for U. S. Letters Patent, Serial No. 568,433, filed October 12, 1931.

After stitching and the rounding and backing of the book, if a rounded-back book is desired, and which rounding may be effected before or after stitching as above set forth, the book is united with a case comprising the covers 7 connected together by the flexible back-edge-forming portion 20 as commonly provided, and the portions 13 of the strips 10 glued to the inside surfaces of the covers 7 and the sheet portions 16 adhered to these surfaces, as for example by pasting, as represented in Fig. 6.

Referring now to the machine shown and provided for stitching the books as above referred to with the end sheets secured to the flap portions 13 of the strips 10 prior to stitching the book, and applying glue to the portions 11 of the strips 10 for adhering them to the sheet portions 17, the machine comprises generally stated a bed 21 along which the books are fed by conveyor mechanism 22, to stitching mechanism 23 from which the stitched books are fed to mechanism 24 for gluing the outer surfaces of the portions 11 of the strips 10 and the exposed stitching.

The conveyor means shown and which operate to feed the books by an intermittent movement, comprise an endless chain 25 supported, and driven, by sprockets 26 and 27 provided on shafts 28 and 29 on the frame of the machine. The chain 25 extends lengthwise of the machine and is provided at intervals with book-feeding lugs 30, shown as in the form of angle irons which project upwardly through a slot 31 in the bed 21, the lugs 30 operating to move the books supplied to the chain between these lugs, through the stitching mechanism 23 and the gluing mechanism 24. At opposite sides of the upper reach of the conveyor chain 25 are stationary guide bars 32 and 33 for the books which extend lengthwise of the chain 25 and are so shaped at their forward ends as shown at 34 and 35, respectively, as to insure the proper guidance of the books into the space between these bars, the edge of the bar 33 against which the back edge of the book bears being spaced from the bed 21 beneath it as by securing this bar to the bed 21 of the machine at a point remote from this edge as represented at 36.

The conveyor chain 25 is driven by power applied to the shaft 28 as from a continuously operating shaft 37 shown as driven by a belt 38 engaging a pulley 39 on the shaft 37. The shaft 37 is provided with a bevel gear 40 meshing with a bevel gear 41 on a shaft 42 which, through the medium of any suitable mechanism contained in the casing 43, produces the desired intermittent rotary motion of the shaft 28. By way of example, the mechanism such as that shown in U. S. Patent No. 1,788,968, granted to R. E. Ackley January 13, 1931 and provided for producing intermittent actuation of an endless book-conveyor element, may be employed for effecting the intermittent drive of the shaft 28 from the shaft 42.

The particular illustrated construction of stitching mechanism 23 is of the chain stitch sewing machine type which, except as to the features hereinafter described, is of the same construction as the commonly known wax thread

type of sewing machine, the mechanism shown comprising, generally stated, a depending reciprocating boring tool 44 which, by way of example and as shown, may be an awl, arranged in vertical alinement with an upwardly extending hook needle 45, the awl in descending, operating to penetrate the work and the needle working through the hole made by the awl and by hooking over the thread at the upper side of the work, in the lowering of the needle, drawing the thread in looped condition downwardly through the opening, the needle and awl operating in timed relation to perform the operation stated.

In the particular construction shown the mechanism for reciprocating the awl 44 is supplemented by mechanism as in the case of the construction shown in said Patent No. 1,788,968 whereby the awl, while engaging the books, is caused to rotate therein to thereby reduce the amount of force required to drive the awl through the books. This awl-rotating mechanism being shown in detail in said Patent No. 1,788,968 it will be sufficient to state that the rotary member which rotates the awl 44 is represented at 46 and is driven by a belt 47 engaging a pulley 48 on the member 46 and a pulley 49 on the rotor of a motor 50.

As the mechanism for reciprocating the awl and needle in properly timed relation to effect the boring and stitch forming operations is well known, description thereof appears to be unnecessary, it being sufficient to state that these parts are operated by the main drive shaft 51 of the sewing machine shown as driven by a sprocket chain 52 from the drive shaft 37, it being understood that during a portion of the cycle of operation of the stitching machine the awl 44 is raised above, and the needle 45 is lowered below, the upper surface of the bed 21 along which the books to be stitched are advanced beneath, and in engagement with, a vertically reciprocable presser foot 53, as shown in Fig. 3, the presser foot 53, in accordance with machines of the common form above referred to, being reciprocated in timed relation to the needle and awl to engage the books during the operation of the awl and while the needle is moving into the book and be raised to permit of the feed of the books by the conveyor 25 when the awl is in withdrawn position.

The intermittent drive mechanism above referred to for the conveyor 25 is so constructed and timed relative to the operation of the stitching machine proper that the conveyor chain 25 operates to feed the books only during those periods when the awl is in withdrawn position relative to the books and the presser foot 53 is raised.

It may be here stated that in applying the books to the conveyor chain for movement thereby to the stitching mechanism, the end sheets 14 and flap portions 13 are swung outwardly on the grouped signatures 9 into substantially the position shown in Fig. 5, these sheets, with the flap portions 13, lying, respectively, beneath and above the guide bar 33 for the back edge of the grouped signatures the upper end sheet being held down in the position stated by a wire 54 supported by brackets 55 secured to a stationary part of the machine. The end sheets and the portions 13 of the strips 10 secured thereto thus extend to one side of the stitching mechanism to avoid stitching therethrough in the movement of the book through the stitching mechanism.

The gluing mechanism 23 comprises a lower glue-applying rotatable disk 56 and an upper rotatable glue-applying disk 57 disposed at oppo-

site faces of the book adjacent its back edge in the plane of the stitching 12.

The lower disk 56, peripherally grooved at 58, extends into the glue in a pot 59 and is fixed on a shaft 60 rotated by a sprocket chain 61 driven by the shaft 37.

The upper disk 57, also peripherally grooved at 62 and having a chamfered peripheral edge at which it opposes the book, is fixed on a shaft 63 journaled on the frame of the machine in inclined position, as shown, the shaft 63 being driven by the shaft 60 through the medium of meshing bevel gears 64 and 65. The glue is fed to the periphery of the disk 57 from a pot 66 by means of a disk 67 extending into the pot and fixed on a shaft 68 driven by the shaft 63 through bevel gears 69 and 70, the disk 67 being disposed at an angle to the disk 57 and extending at its periphery, chamfered, as indicated at 71, sufficiently close to the periphery of the disk 57 to continuously deliver glue to the latter in the rotation of these disks.

The books stitched and glued as stated, are delivered by the conveyor chain 25 to endless conveyor belts 72 mounted on pulleys those at only one end thereof being shown as 73, the pulleys 73 being fixed on a shaft 74 shown as driven by a sprocket chain 75 mounted on sprockets on the shafts 28 and 74.

After the books have been stitched and glued as stated the end-sheets 14 are swung forwardly to overlie the opposite faces of the book and adhere the portions 17 of the end sheets to the glue on the portions 11 of the strips 10, pressure to effect the proper adherence being applied in any suitable way, and the books then united with the case, comprising the covers 7, as above referred to.

The lines of adhesive applied over the stitching as stated serve a double purpose, namely, when the end sheets are folded back on the book to the position shown in Fig. 6 the stitching is firmly locked against slippage and also the rear end margins of the end sheets are held down by the adhesive so as to conceal the stitching. The resultant books have no projecting strips and can be covered in the ordinary way on standard casing-machines.

As will be understood from the foregoing, the connecting of the end signatures and end sheets together by the strips 10 to form assemblies separate from the intermediate signatures preliminary to the grouping of the signatures to form the book adapts these assemblies, upon folding the sheets 14 into a position in which they flatwise oppose the signatures carrying them, to be gathered with the intermediate signatures of the book on a gathering machine of standard construction.

While I have described the preferred manner of practicing my novel method and certain variations thereof, I do not wish to be understood as intending to limit it thereto as the method may be further modified without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is:

1. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips to extend flatwise against opposite sides, respectively, of said body portion adjacent its back edge with portions of the strips extend-

ing outwardly beyond the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion and before or after stitching and before application of the cover sections to said body portion securing the end sheets to the edges of said strips opposite those at which the strips are secured to said body portion.

2. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises securing one edge of each strip to one of said end sheets, assembling the sheets, which form said body portion, with the end sheets, with the other edges of said strips lapping said body portion and with the edges of said strips at which they are secured to said end sheets extending outwardly beyond the back edge of said body portion, and stitching continuously through said body portion and the portions of said strips lapping said body portion.

3. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips so that one edge only of each lies flatwise against respective sides of said body portion adjacent its back edge with the opposite edges of the strips extending outwardly beyond the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion, before or after stitching securing the end sheets to the edges of said strips opposite those at which said strips are secured to said body portion, trimming the edges of said sheets comprising said body portion of the book and said end sheets simultaneously, and thereafter securing said cover sections to said body portion.

4. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips so that one edge only of each lies flatwise against respective sides of said body portion adjacent its back edge with the opposite edges of the strips extending outwardly beyond the back edge of said body portion, securing, before or after assembly of said strips with said body portion, said end sheets to the edges of said strips opposite those for attachment to said body portion, trimming the edges of the sheets comprising said body portion and said end sheets, manipulating said sheets to cause them to extend in rounded-back-forming condition, thereupon stitching through said body portion and those portions only of said strips lapping said body portion, and securing said cover sections to said body portion.

5. The method of binding books comprising body portions formed of signatures, cover sections, strips connecting said cover sections with said body portion and forming hinged joints therebetween, and end sheets, which comprises securing one edge of each strip to an end sheet and its opposite edge to the respective outermost ones of said signatures adjacent the back edges of the latter, assembling said signatures, and, with said end sheets extending outwardly beyond the back edge of said body portion, stitching through said signatures and the portions of said strips lapping the end ones of said signatures.

6. The method of binding books comprising body portions formed of signatures, cover sections, strips connecting said cover sections with said body portion and forming hinged joints therebetween, and end sheets, which comprises
 5 securing one edge of each strip to an end sheet and its opposite edge to the respective outermost ones of said signatures adjacent the back edges of the latter, gathering said signatures with said
 10 end sheets on the outermost signatures flatwise opposing the signatures carrying them, to compose the body of the book, swinging said end sheets to extend outwardly beyond the back edge of said body portion and stitching through said
 15 signatures and the portions of said strips lapping the outermost ones of said signatures.

7. The method of binding books comprising body portions formed of signatures, cover sections, strips connecting said cover sections with said body portions and forming hinged joints
 20 therebetween, and end sheets, which comprises securing each of said strips along the edge of one face only to a corresponding end sheet and at the opposite edge of its opposite face to the
 25 outermost ones of said signatures adjacent the back edges of the latter, gathering said signatures with said end sheets on the outermost signatures flat upon the signatures carrying them, to compose the body of the book, swinging said
 30 end sheets to extend outwardly beyond the back edge of said body portion, stitching through said signatures and the portions of said strips lapping the outermost ones of said signatures, swinging said end sheets back to a position in which they
 35 lie flat upon said body portion, and trimming the edges of said signatures and said end sheets simultaneously.

8. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said
 40 body portion and forming hinge joints therebetween, and end sheets, which comprises securing one edge of each strip to an end sheet which is outermost in the finished book in closed position,
 45 assembling the sheets, which form said body portion, with the end sheets, with the other edges of said strips lapping said body portion and with the edges of said strips at which they are secured to said end sheets extending outwardly
 50 beyond the back edge of said body portion, and stitching continuously through said body portion and the portions of said strips lapping said body portion.

9. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said
 55 body portion and forming hinge joints therebetween, and double end sheets, which comprises securing one edge of each strip to an end sheet at the edge thereof along which they are folded,
 60 assembling the sheets, which form said body portion, with said end sheets, with the other edges of said strips lapping said body portion and with said end sheets and the edges of said strips at which they are secured to said end sheets extending
 65 outwardly beyond the back edge of said body portion, and stitching continuously through said body portion and the portions of said strips lapping said body portion.

10. The method of binding books comprising body portions formed of sheets, end sheets, cover sections, and strips connecting said cover sections with said body portion and said end sheets
 70 and forming hinge joints therebetween, which comprises assembling said body portion with said end sheets attached to either side of said body

portion by means of hinge joints, each joint formed by a strip in folded condition with its fold adjacent the rear edge of the book, the outer lap of said folded strip overlying and secured to one of said end sheets and the inner
 80 lap of the strip overlying the rear margin of said body portion, and attached thereto, throwing back said end sheets to expose the inner laps of said strips which overlie said body portion, and stitching through said body portion and both
 85 inner laps of said strips.

11. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises
 90 positioning the strips to extend along one edge only flatwise against opposite sides of said body portion adjacent its back edge with the opposite edges of the strips adapted to extend outwardly beyond
 95 the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion, applying a line of adhesive to extend over the stitching at one side of said body portion, and before or after stitching and before the application of said cover sections to said body portion securing said end sheets to the edges of said strips opposite those at which said strips are secured to said body portion.
 105

12. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises
 110 positioning the strips to extend along one edge only flatwise against opposite sides of said body portion adjacent its back edge with the opposite edges of the strips adapted to extend outwardly beyond the back edge of said body portion, stitching
 115 through said body portion and those portions only of said strips lapping said body portion, applying lines of adhesive to extend over the stitching at opposite sides of said body portion, and before or after stitching and before the application of said cover sections to said body portion securing said end sheets to the edges of said strips opposite those at which said strips are secured to said body portion.
 120

13. The method of binding books comprising body portions formed of sheets, end sheets, cover sections, and strips connecting said cover sections with said body portions and said end sheets and forming hinge joints therebetween, which comprises assembling said body portion with said end sheets attached to either side of said body portion by means of hinge joints, each joint formed by a strip in folded condition with its fold adjacent the rear edge of the book, the outer lap of said folded strip overlying and secured to one of said end sheets and the inner lap of the strip overlying the rear margin of said body portion, and attached thereto, throwing back said end sheets to expose the inner laps of said strips which overlie said body portion, stitching through
 135 said body portion and both inner laps of said strips, and applying a line of adhesive to extend over the stitching at one side of said body portion.
 140

14. The method of binding books comprising body portions formed of sheets, end sheets, cover sections, and strips connecting said cover sections with said body portions and said end sheets and forming hinge joints therebetween, which
 145 comprises assembling said body portion with said end sheets attached to either side of said body

end sheets attached to either side of said body portion by means of hinge joints, each joint formed by a strip in folded condition with its fold adjacent the rear edge of the book, the outer lap of said folded strip overlying and secured to one of said end sheets and the inner lap of the strip overlying the rear margin of said body portion, and attached thereto, throwing back said end sheets to expose the inner laps of said strips which overlie said body portion, stitching through said body portion and both inner laps of said strips, and applying lines of adhesive to extend over the stitching at opposite sides of said body portion.

15. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips to extend flatwise against opposite sides, respectively, of said body portion adjacent its back edge with portions of the strips adapted outwardly beyond the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion and before or after stitching and before application of the cover sections to said body portion securing the end sheets to said strips.

16. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips to extend flatwise against opposite sides, respectively, of said body portion adjacent its back edge with portions of the strips extending outwardly beyond the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion, before or after stitching securing the end sheets to said strips, trimming the edges of said sheets comprising said body portion of the book and said end sheets simultaneously, and thereafter securing said cover sections to said body portion.

17. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips to extend flatwise against opposite sides, respectively, of said body portion adjacent its back edge with portions of the strips extending outwardly beyond the back edge of said body portion, securing, before or after assembly of said strips with said body portion, said end sheets to said strips, trimming the edges of the sheets comprising said body portion and said end sheets,

manipulating said sheets to cause them to extend in rounded-back-forming condition, thereupon stitching through said body portion and those portions only of said strips lapping said body portion, and securing said cover sections to said body portion.

18. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips to extend flatwise against opposite sides, respectively, of said body portion adjacent its back edge with portions of the strips extending outwardly beyond the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion, applying a line of adhesive to extend over the stitching at one side of said body portion, and before or after stitching and before the application of said cover sections to said body portion securing said end sheets to said strips.

19. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips to extend flatwise against opposite sides, respectively, of said body portion adjacent its back edge with portions of the strips extending outwardly beyond the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion, applying lines of adhesive to extend over the stitching at opposite sides of said body portion, and before or after stitching and before the application of said cover sections to said body portion securing said end sheets to said strips.

20. The method of binding books comprising body portions formed of sheets, cover sections, strips connecting said cover sections with said body portion and forming hinge joints therebetween, and end sheets, which comprises positioning the strips to extend flatwise against opposite sides, respectively, of said body portion adjacent its back edge with portions of the strips extending outwardly beyond the back edge of said body portion, stitching through said body portion and those portions only of said strips lapping said body portion and before or after stitching and before application of the cover sections to said body portion securing the end sheets to said strips, applying the cover sections to the assembled sheets, strips and end sheets and adhering the outer faces of the strips and the outer faces of the end sheets to the inner faces of the cover sections.

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