Feb. 24, 1931. E. R. KAST 1,793,552

METHOD OF BINDING BOOKS OR MAGAZINES

Original Filed July 6, 1926 4 Sheets-Sheet 1

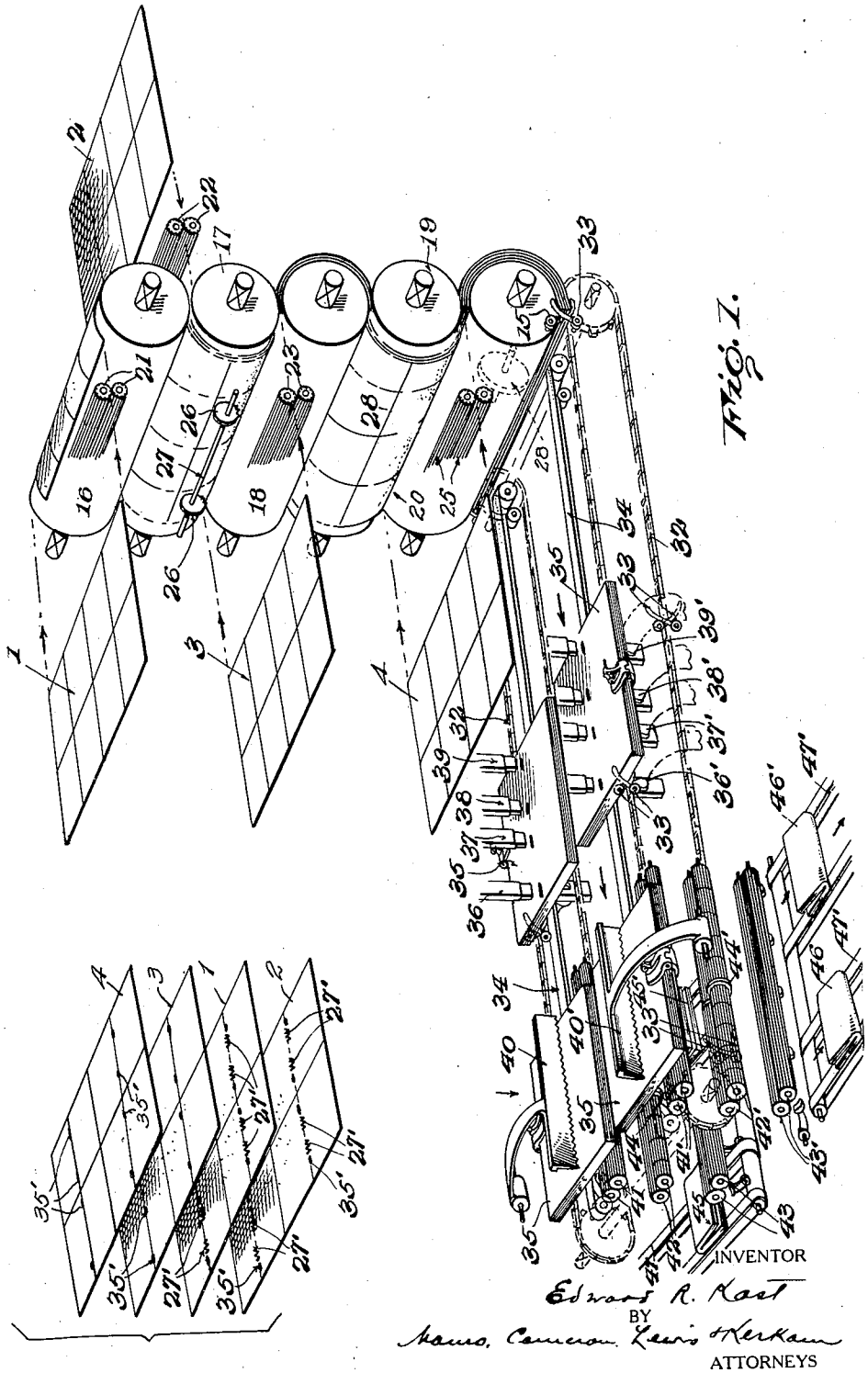


Fig. 1.

Fig. 1a.

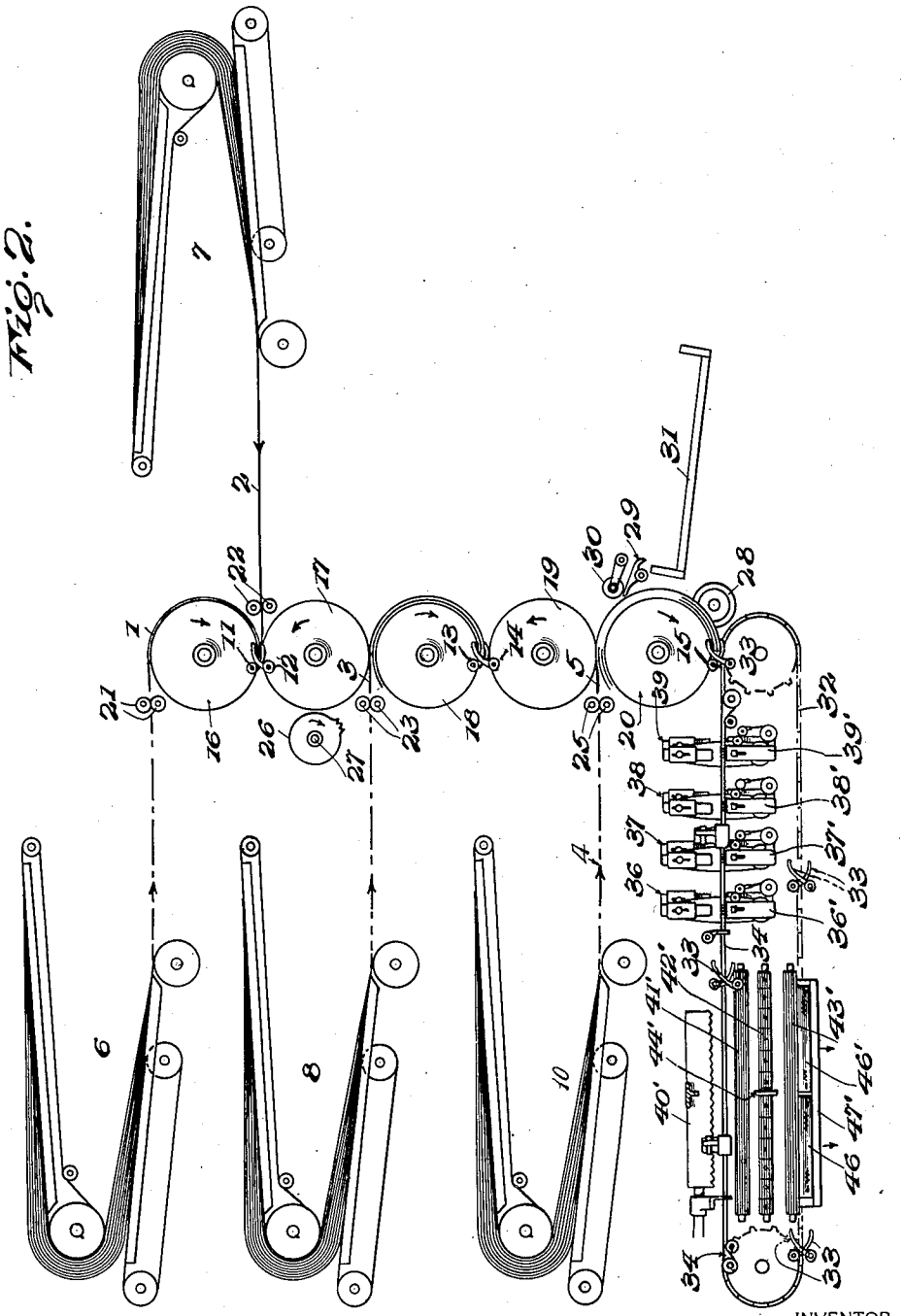
INVENTOR
Edward R. Kast
BY
Adams, Cameron, Lewis & Kerkam
ATTORNEYS

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METHOD OF BINDING BOOKS OR MAGAZINES

Original Filed July 6, 1926 4 Sheets-Sheet 2

Fig. 2.



INVENTOR
Edward R. Kast
by
Munn, Cameron, Lewis & Kerkam
ATTORNEYS

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METHOD OF BINDING BOOKS OR MAGAZINES

Original Filed July 6, 1926 4 Sheets-Sheet 3

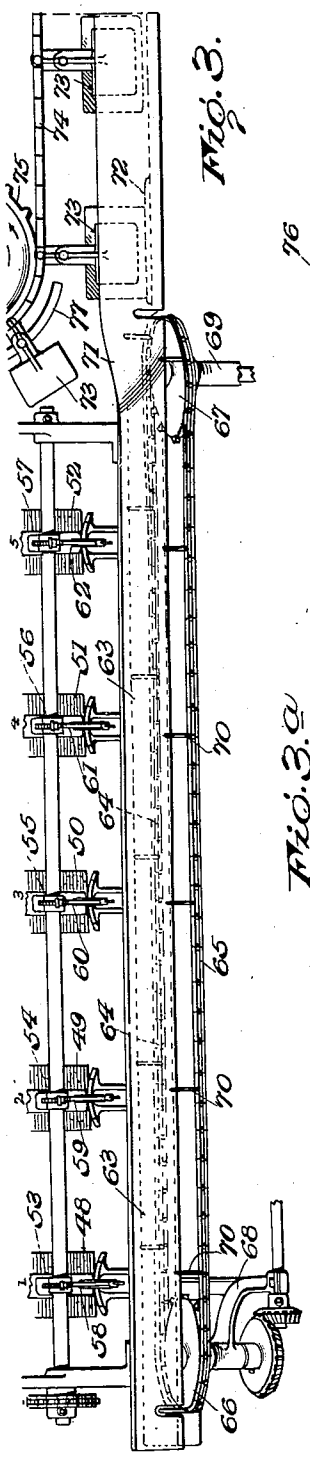


Fig. 3.

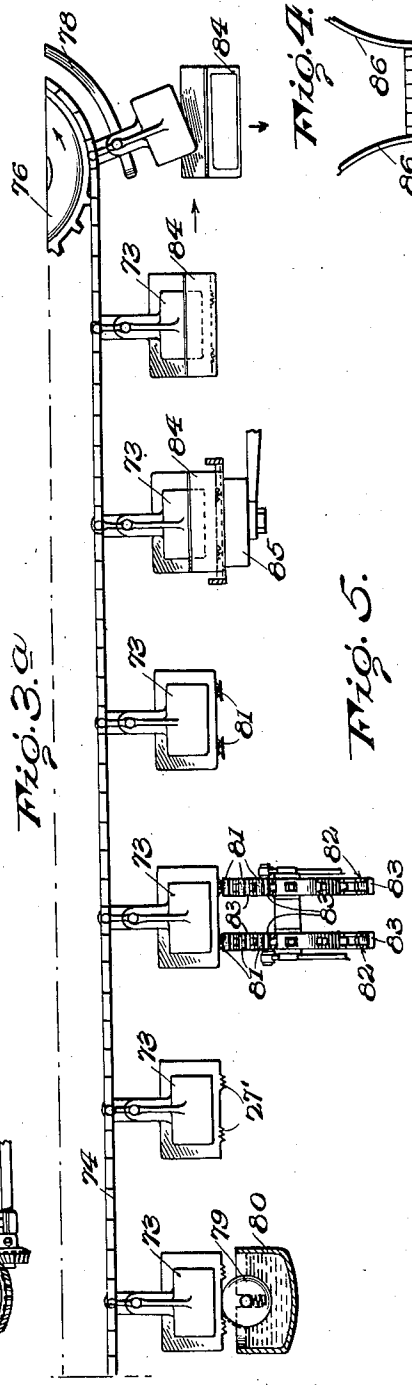


Fig. 3.a

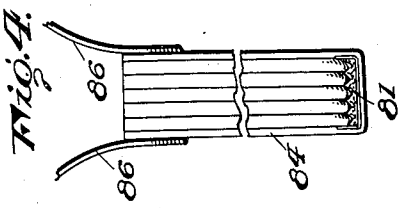


Fig. 4.

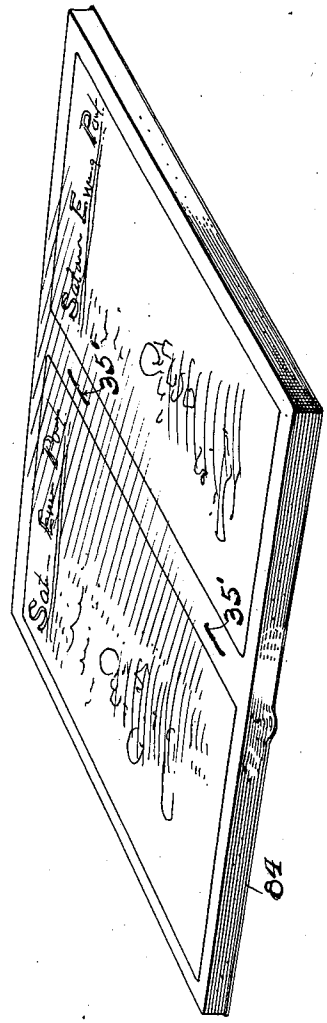


Fig. 5.

INVENTOR

Edward R. Kast

BY

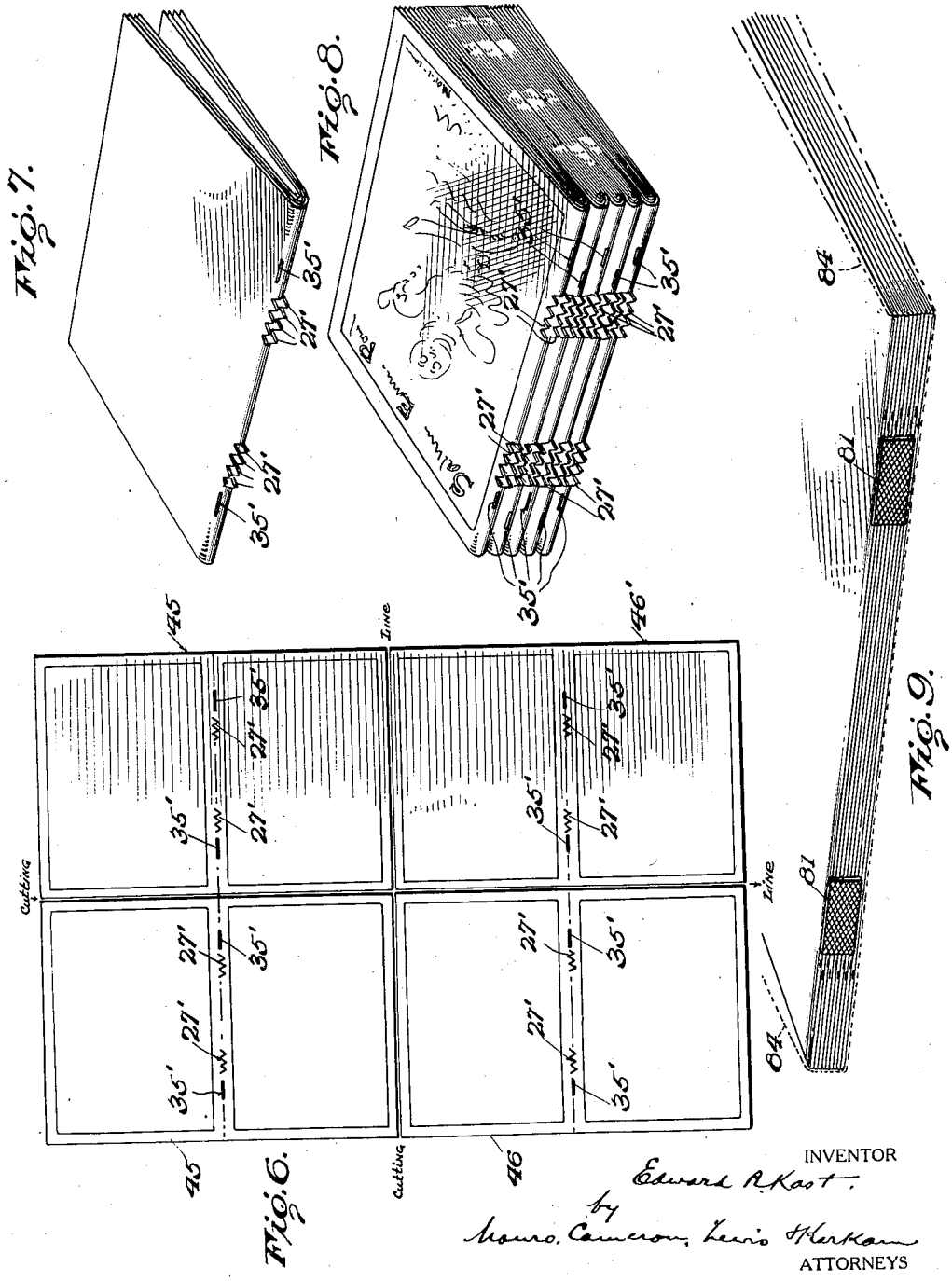
Munro, Cameron, Lewis & Kerkam

ATTORNEYS

Feb. 24, 1931. E. R. KAST 1,793,552

METHOD OF BINDING BOOKS OR MAGAZINES

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INVENTOR
Edward R. Kast.
by
Munro, Cameron, Lewis & Herkam
ATTORNEYS

Patented Feb. 24, 1931

1,793,552

UNITED STATES PATENT OFFICE

EDWARD R. KAST, OF PEARL RIVER, NEW YORK, ASSIGNOR TO DEXTER FOLDER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

METHOD OF BINDING BOOKS OR MAGAZINES

Application filed July 6, 1926, Serial No. 120,791. Renewed July 23, 1930.

This invention relates to an improved method of book binding and more particularly to a method of binding magazines or like forms of publications which are produced in fairly large editions.

It has heretofore been proposed to bind books, magazines, or the like by "inserting" and securing the signatures together with stitches or staples which pass through the signatures on their lines of fold; or by collating the signatures and securing the same together with side stitches or staples which pass through the collated signatures from side to side thereof; or by collating the signatures and securing the same together by cutting off the folded edges of the signatures after they are collated and then binding them by what is known in the art as the "perfect binding" method. These methods have certain defects and disadvantages in that assembling by inserting and stapling, while less expensive than "perfect binding", places undue strain on the staples in large editions and provides only one "double spread" for advertising or like purposes. Moreover, there is generally a variation in the margins of the sheets, the disadvantage of which is well known and appreciated by the trade, but sanctioned in order that the single "double spread" and a flat opening book may be secured. On the other hand, a side stitched book will not open flat or provide a perfect "double spread" and for these reasons is not as well adapted for the trade as a book stapled on the fold line, or a "perfect bound" book. The "perfect bound" books which are secured together with glue, if bound in such a manner that they will open flat, are objectionable in that the leaves are not securely bound, whereas if the leaves are securely bound the book will not open flat. With this type, a perfect double spread cannot be secured as the binding edges have been removed.

The objects of this invention are to provide a method of binding which overcomes the defects and disadvantages above referred to; which secures the advantages of stitching or stapling signatures together and at the same time insures the production of flat opening books; which results in the formation of a book having as many "double spreads" as there are signatures employed; which enables the formation of signatures having any desired number of sheets or leaves; which enables the signatures to be securely bound together and formed into a book having even and uniform margins; which eliminates the necessity of employing relatively large quantities of glue, particularly for securing the covers in place; and which is inexpensive, expeditious, and effective in the assembling and binding of signatures into book or magazine form. In short, this invention is directed to the production of a book that has all of the advantages of a saddle stitched book and perfect "double spread" and none of the disadvantages of uneven margins, trimming waste and lack of security in securing the sheets in place; together with the advantages of side stitched, sewed, or "perfect bound" books of neatness and quality production.

In order to more clearly understand this invention, reference may be had to the accompanying drawings which illustrate one form of apparatus for carrying out the present method and wherein:

Fig. 1 is a detail perspective view of mechanism for making signatures in accordance with the present invention, parts of said mechanism being omitted for purposes of clearer illustration;

Fig. 1*a* is a detail perspective view of superposed sheets spaced apart in order to show the disposition of serrated sheets with respect to imperforate sheets collated therewith;

Fig. 2 is a side elevation of the mechanism illustrated in Fig. 1, showing sheet feeders for delivering the sheets to the collating cylinders;

Fig. 3 is a side elevation of a signature gatherer and the left hand end of a book binding machine;

Fig. 3*a* is a side elevation of the right hand end of a book binding machine;

Fig. 4 is an end view of the completed book, showing means for securing the cover thereon

Fig. 5 is a perspective detail view of the

completed book opened at one of the "double spreads";

Fig. 6 is a bottom plan view of a plurality of collated imperforate and serrated sheets stapled together and cut so as to provide a plurality of multiple sheet signatures;

Fig. 7 is an enlarged detail perspective view of one of the completed signatures;

Fig. 8 is a view similar to Fig. 7, showing a plurality of the signatures grouped or assembled together; and

Fig. 9 is a perspective detail view of the completed book showing the gauze binding strips affixed on the backs of the connected signatures.

Referring to the drawings, wherein like reference characters indicate like parts throughout the several views, the signatures may be formed for example, from four sheets 1, 2, 3, 4 of sixteen pages each, which are collated together and cut as hereinafter disclosed, to produce four sixteen page signatures. It is to be expressly understood, however, that a plurality of signatures may be formed from any desired number of sheets in accordance with the number of pages desired for each signature. The manner of collating the signatures may be varied, but as herein shown (Figs. 1 and 2) the sheets are delivered by a plurality of suitable feeders 6, 7, 8, 10 to the grippers 11, 12, 13, 14, 15 of a plurality or series of cylinders 16, 17, 18, 19, 20 which collate the sheets and have axes of rotation all located in a straight line or in the same plane so that said cylinders are all radially aligned or arranged in radial alignment. Before being seized by said grippers the sheets pass through rollers 21, 21, 22, 22, 23, 23, 25, 25 and are registered by the usual or any suitable devices for this purpose (not shown). The collating cylinders 16, 17, 18, 19, 20 are preferably disposed vertically one above the other in superposed relation and spaced successively increasing amounts from the top of the series to the bottom thereof, in order to accommodate the increasing thickness of the sheets as they are successively collated by said cylinders.

The construction and operation of feeders such as shown at 6, 7, 8, 10, as well as the construction and operation of cylinders such as shown at 16, 17, 18, 19, 20, is well known and understood in the art and a detailed description of these instrumentalities per se is therefore unnecessary. It will be noted, however, that the feeders 6, 8, and 10 are arranged at one side of the collating cylinders in spaced superposed relation so as to deliver sheets 1, 3, and 4 to cylinders 16, 18, and 20, while the feeder 7 is arranged at the opposite side of the collating cylinders so as to deliver sheet 2 to cylinder 17. In other words the feeders 6, 7, 8, are disposed in staggered relation on opposite sides of the series of cylinders, and the feeders 7 and 10 are also disposed in staggered relation at opposite sides of the series of collating cylinders. In describing the manner of forming the signatures, therefore, the successive operations will be set forth as respects a single assembly of the four sheets above referred to.

As clearly shown in Figs. 1 and 2, the sheet 1 is first registered and fed to the grippers of the uppermost collating cylinder 16. The sheet 1 is then carried around the cylinder 16 to a point of juxtaposition thereof with cylinder 17 where a sheet 2 being fed to the cylinder 17 at said point is in proper relation with respect to said cylinder and to the sheet 1 about to be transferred from cylinder 16 to the cylinder 17. Sheet 2 is then registered and fed in registered relation to sheet 1 at which time sheets 1 and 2 are gripped by the grippers of cylinder 17 and carried around the latter past a pair of rotary segmental saws or serrators 26, 26, disposed in spaced relation on a driven shaft 27 so as to punch or cut spaced groups of serrations 27', 27' in the two collated sheets on substantially parallel lines equidistant from each other and from the opposite ends of said sheets. After passing the rotary segmental saws or serrators 26, 26, the serrated sheets 1 and 2 travel to a point of juxtaposition of cylinder 17 with cylinder 18 where they are collated with an imperforate sheet 3 being fed to the cylinder 18 at said point. Sheets 1 and 2 are then transferred to cylinder 18 where they are associated with the previously registered sheet 3 and cylinder 18 then takes the three collated sheets and carries them around to cylinder 19. The grippers of cylinder 19 then seize the three collated sheets and carry them around to a point of juxtaposition of cylinder 19 with cylinder 20 where they are collated with a previously registered imperforate sheet 4 being delivered to cylinder 20 at said point. The grippers of cylinder 20 then take the four collated and perfectly registered sheets and carry them around to a conveyor which will presently be described.

During travel of the four collated sheets on cylinder 20, they are preferably severed between the ends thereof on a line intermediate the lines of serration and substantially parallel therewith. Cutting of the sheets in this manner may be performed, for example, by a rotary cutter 28 located adjacent the lowermost cylinder 20 and driven by any suitable means. A switch 29, roller 30 cooperating therewith, and a receiver 31 may be employed, if desired, for switching out defective collated groups of sheets, a detecting mechanism (not shown) being preferably associated with each cylinder to trip the switch in the event that a sheet was absent.

The conveyor may be of a well known type comprising endless chains 32, 32, having a plurality of sets of grippers 33, 33 and belts

34, 34 which support the collated sheets during their travel on the conveyor. The cut and collated sheets, after being seized by one of the sets of conveyor grippers, are carried to a stitcher mechanism where the two piles of sheets 35, 35 after being registered are stapled together at 35′, 35′ on the lines of serrations. As herein shown, eight stitchers, 36, 37, 38, 39 and 36′, 37′, 38′, 39′ are employed, the latter preferably being disposed in slightly staggered relation with respect to the former, so that the stapling presented on the backs of grouped signatures will be staggered as shown in Fig. 8, to eliminate bulging of the book.

After the piles 35, 35 have been stapled, they are moved by the conveyor and registered under folding blades 40, 40′ which engage the stapled piles of sheets on their lines of stapling and force them between sets of rollers 41, 42, 43 and 41′, 42′, 43′. The sets of rollers 42 and 42′ are provided with cutters 44, 44′ arranged to cut the stapled and folded piles 35, 35 into equal parts on a line extending transversely of the line of serration and stapling and substantially equidistant from, and parallel with, the opposed sides of the sheets. The completed signatures 45, 45′ and 46, 46′ are then delivered from the sets of rollers 43, 43′ onto conveyors 47, 47′ which carry the sheets away from the signature-forming mechanism, for distribution in the boxes or holders of a gathering machine or the like.

Referring now to Fig. 3, 48, 49, 50, 51 and 52 designate boxes or holders of a suitable gathering machine, and 53, 54, 55, 56, 57 indicate signatures placed on these holders to thereafter be gathered into groups each containing, for example, one of these signatures. The gathering machine is provided with swinging grippers 58, 59, 60, 61, 62 which serve to take the signatures out of the boxes at the bottoms thereof and deliver said signatures in a conveyor trough 63 which is provided at the bottom thereof with a longitudinal slot 64. The signature conveyor, indicated at 65, passes around sprockets 66 and 67 journaled on brackets 68 and 69, respectively, secured to the conveyor trough 63. This conveyor is provided at suitable intervals thereon with fingers 70, 70 adapted to travel in the slot 64 of the conveyor trough and each successively engage the signatures delivered in the trough by the grippers 58, 59, 60, 61, and 62. It will thus appear that after the signatures in the boxes are delivered in the trough 63, they will be collated one above the other in groups each containing a signature from each box.

As indicated above, any suitable gathering machine may be employed. It is to be noted, however, that after a group of signatures has been gathered, the same is conveyed along the trough 63 to a "dwell" 71 therein, which turns the group of signatures in an upright position on their folded backs. At this point the conveyor finger passes out of the slotted end of the trough 63, but before passing out of said slot the finger preferably advances the signatures over a bar 72 in the bottom of the trough 63. The upper surface of the bar 72 is curved so as to "concave" the backs of the grouped signatures if this is desired, and the latter are registered by suitable means (not shown) so that the serrated projections 27′, 27′ of the grouped signatures are disposed in side by side relation.

After the group of signatures has been registered, glue is applied on the juxtaposed serrated projections of the signature group, a binding strip or strips is applied (if desired) on the backs of the connected signatures, and a cover is affixed on the back of the book. These operations are preferably carried out in a book-binding machine of any suitable construction including, for example, a plurality of sets of clamps 73, 73, an endless chain 74 supporting said clamps and passing around sprockets 75 and 76, and cams 77 and 78 for engaging the clamps with and disengaging the same from the grouped signatures respectively. In the operation of the machine, one of the sets of clamps 73, 73 engages the registered group of signatures and carries said group to suitable means for applying glue or adhesive on the juxtaposed saw-tooth projections 27′, 27′ of the grouped signatures. As here shown, the glue-applying device (Fig. 3*a*) comprises a roller 79 journaled in a box 80 containing glue or other suitable adhesive.

The group of connected signatures may then have applied on the backs thereof one or more binding strips 81, 81 but the application of said strip or strips is optional and may be dispensed with if so desired. In order to apply the binding strips 81, 81 (which may be of gauze or other suitable material), the group of connected signatures is progressed to suitable means for engaging said strips with the serrated and glued portions of the book. As herein shown, the strip-applying means may comprise an endless conveyor 82 provided at suitable intervals thereon with strip holders 83, 83 supplied with strips 81, 81 by an operative or in any other suitable manner. As the connected group of signatures arrives over a pair of holders 83, 83, the conveyor is moved bodily toward the book and the strips 81, 81 in said pair of holders are thus engaged with and secured on the glued serrations 27′, 27′. The conveyor is then moved away from the book.

A cover 84 is then applied on the back of the book. For the purpose of applying the cover, the group of connected signatures is progressed to a movable cover holder 85 which engages the cover with the back of the book. The completed book is then released from the

set of clamps 73, 73 which have progressed the book past the various instrumentalities above described, and said book then preferably falls through curved guides 86, 86 (Fig. 4) which close the cover on the book prior to its arrival at the final point of delivery.

It will appear from the foregoing that the signatures are formed with one or more outer sheets serrated on the line of fold and one or more imperforate inner sheets, the serrations projecting from the backs of the outer pages when the signatures are folded and serving to connect several of the signatures together to form a book as above described. It will further appear that the method herein disclosed secures the advantages of a stitched or stapled product and at the same time assures the production of books which will open perfectly flat. Moreover, the books produced by this method have as many "double spreads" as there are signatures employed, which constitutes a great advantage in that more of this desirable space is available to advertisers, while at the same time the value of the publication thus produced is greatly enhanced both to the general public and to the publisher.

The term "stapled" as used in the specification and claims is intended generically to indicate any suitable manner for securing together the component parts of a signature.

What is claimed is:—

1. The method of binding, which consists in forming separated serrations in a sheet adjacent a line intermediate opposite extremities thereof, folding the sheet along said line so that the serrations project from the two halves of the sheet independently of each other, assembling a plurality of sheets thus serrated and folded so that their serrations are disposed adjacent each other, and applying adhesive on the adjacent serrations of the assembled sheets to connect said sheets together.

2. The method of binding, which consists in forming spaced groups of separated serrations in a sheet adjacent a line intermediate opposite extremities thereof, folding the sheet along said line so that the serrations project from the two halves of the sheet independently of each other, assembling a plurality of sheets thus serrated and folded so that the spaced groups of serrations of the successive sheets are disposed adjacent each other respectively, and applying adhesive on the adjacent groups of serrations of the assembled sheets to connect said sheets together.

3. The method of binding, which consists in forming a signature having front and back leaves provided independently of each other with serrations projecting from said leaves adjacent the signature fold line, assembling a plurality of signatures thus formed so that their serrations are disposed adjacent each other, and applying adhesive on the adjacent serrations of the assembled signatures to connect said signatures together.

4. The method of binding, which consists in forming a plurality of signatures each having a front leaf provided adjacent the signature fold line with serrations and a back leaf provided adjacent said fold line with serrations separated from the serrations of said front leaf, and connecting together signatures thus formed by grouping them adjacent each other and applying adhesive on the serrations thereof.

5. The method of binding, which consists in forming a signature having a front leaf provided adjacent the signature fold line with serrations and a back leaf provided adjacent said fold line with serrations independent of the serrations of said front leaf, assembling a plurality of signatures thus formed so that their serrations are disposed adjacent each other, and applying adhesive on the adjacent serrations of the assembled signatures to connect said signatures together.

6. The method of binding, which consists in forming individual pointed serrations in a sheet adjacent a line intermediate opposite extremities thereof, folding the sheet along said line so that the pointed serrations project from the two halves of the sheet independently of each other, and connecting together sheets thus serrated and folded by grouping them adjacent each other and applying adhesive on the pointed serrations thereof.

7. The method of binding, which consists in forming a signature having a front leaf provided adjacent the signature fold line with serrations and a back leaf provided adjacent said fold line with serrations independent of and disposed in staggered relation with the serrations of said front leaf, and connecting together a plurality of signatures thus formed by grouping them adjacent each other and applying adhesive on the serrations thereof.

8. The method of binding, which consists in forming a stapled signature having an outer sheet serrated adjacent its fold line and an inner imperforate sheet, assembling signatures thus formed so that their serrated portions are disposed in side by side relation, and applying adhesive to the juxtaposed serrated portions of the assembled signatures to connect the same together.

9. The method of binding, which consists in forming signatures each composed of a plurality of sheets stapled together on their fold lines and serrated adjacent thereto through the outermost sheet or sheets only, assembling said signatures so that their serrated portions are disposed in side by side relation, and applying adhesive on the juxtaposed serrated portions of the assembled signatures to connect the same together.

10. The method of binding, which consists in forming signatures each composed of a plurality of sheets stapled together on their fold lines and provided thereon with saw-tooth projections extending from the outermost sheet or sheets only, assembling said signatures so that the saw-tooth projections thereof are disposed in side by side relation, and applying adhesive on the juxtaposed saw-tooth projections of the assembled signatures to secure the latter together.

11. The method of making a book which consists in forming serrations in one or more sheets, collating one or more imperforate sheets with the serrated sheet or sheets so that the latter will be disposed outwardly of the former when the collated sheets are subsequently folded, forming a stapled signature from said collated sheets, assembling a plurality of said signatures with the serrations thereof disposed in side by side relation, and applying adhesive to the juxtaposed serrations of the assembled signatures to connect the same together.

12. The method of making a book, which consists in collating serrated and imperforate sheets, stapling the collated sheets together and folding the same to form a signature having one or more outer sheets serrated on the line of fold and one or more imperforate inner sheets, assembling a plurality of said signatures so that their serrated portions are disposed in side by side relation, and applying adhesive to the juxtaposed serrated portions of the assembled signatures to secure the latter together.

13. The method of making a book, which consists in collating a plurality of outer sheets, forming serrations in one or more of said outer sheets, collating one or more inner imperforate sheets with said outer sheets, stapling the collated sheets together and folding the same to form a signature, assembling a plurality of said signatures together so that their serrations are disposed in side by side relation, and applying adhesive on the juxtaposed serrations of the assembled signatures to secure the latter together.

14. The method of making a book, which consists in collating one or more serrated sheets with one or more imperforate sheets, stapling the collated sheets together on the line of serrations, folding the sheets on the line of stapling to form a signature having the serrated sheet or sheets disposed outwardly of the imperforate sheet or sheets, assembling a plurality of said signatures so that the serrations thereof are disposed in side by side relation, and applying adhesive on the juxtaposed serrations of said assembled signatures to secure the latter together.

15. The method of making a book, which consists in collating a plurality of sheets, forming serrations in said sheets, collating one or more imperforate sheets with said serrated sheets, stapling the collated imperforate and serrated sheets together on the line of serrations of the latter, forming a plurality of signatures from the stapled sheets so that the serrations project from the backs of said signatures, assembling a plurality of the signatures with their projecting serrated portions disposed in side by side relation, and applying adhesive to the juxtaposed projections of said assembled signatures to secure the latter together.

16. The method of binding, which consists in forming a signature having one or more outer sheets serrated adjacent the signature fold line and one or more imperforate sheets disposed within said outer sheet or sheets, and connecting together a plurality of signatures thus formed by grouping them adjacent each other and applying adhesive on the serrations thereof.

17. The method of binding, which consists in forming a plurality of signatures each having at least one outer sheet serrated adjacent the signature fold line and an imperforate sheet disposed within said outer sheet, grouping signatures thus formed so that the serrations of their outer sheets are disposed adjacent each other, and applying adhesive on the adjacent serrations of said outer sheets to connect the grouped signatures together.

18. The method of binding, which consists in forming a signature having one or more outer sheets serrated adjacent the signature fold line and one or more imperforate sheets disposed within and connected to said outer sheet or sheets, grouping a plurality of signatures thus formed so that the serrations of the successive signatures are disposed adjacent each other respectively, and applying adhesive on the adjacent serrations of the group of signatures to connect them together.

19. The method of making signatures, which consists in collating one or more serrated sheets with one or more imperforate sheets, stapling the collated sheets on the lines of serrations, and folding the sheets on the line of stapling so that the serrated sheet or sheets will be disposed outwardly of the imperforate sheet or sheets.

20. The method of making signatures, which consists in collating one or more serrated sheets with one or more imperforate sheets, and folding said sheets adjacent the line of serrations so that the imperforate sheet or sheets will be disposed within the serrated sheets or sheets.

21. The method of making signatures which consists in collating a plurality of sheets, serrating said sheets on a line intermediate opposed extremities thereof, collating one or more imperforate sheets with the serrated sheets so that the latter will be disposed outwardly when the sheets are subsequently folded, stapling all of the collated sheets together adjacent said line of serra-

tion, and folding the stapled sheets on the line of stapling.

22. The method of binding, which consists in forming a signature by folding one or more serrated sheets and one or more imperforate sheets together so that the serrations of the first named sheet or sheets project from the outermost leaves of the signature adjacent the fold line thereof, assembling a plurality of signatures thus formed so that the serrations of the successive signatures are disposed adjacent each other respectively, and applying adhesive on the adjacent serrations of the assembled signatures to connect said signatures together.

23. A book comprising a plurality of signatures each having an inner imperforate sheet, and an outer sheet serrated adjacent its fold line, the serrations of each signature being secured to the serrations of the adjacent signature or signatures to connect said signatures together.

24. A book comprising a plurality of signatures each having one or more imperforate inner sheets and one or more outer sheets connected with the inner imperforate sheet or sheets, said outer sheet or sheets being serrated adjacent the fold line of the signature and the serrations of each signature being secured to the serrations of the adjacent signature or signatures to connect said signatures together.

25. A book comprising a plurality of signatures each including an inner imperforate sheet and an outer serrated sheet folded together, the serrations of said outer sheet being formed therein adjacent the fold line of the signature and the serrations of each signature being secured to the serrations of the adjacent signature or signatures to connect said signatures together.

26. A book comprising a plurality of signatures each having an inner imperforate sheet and an outer serrated sheet folded and stapled together, the serrations of each signature being formed therein adjacent the fold line and secured with adhesive to the serrations of the adjacent signature or signatures to connect said signatures together.

27. A book comprising one or more signatures having an inner imperforate sheet and an outer sheet folded with said inner sheet and provided adjacent the line of fold with serrations for securing a cover to the book.

28. A signature comprising one or more inner imperforate sheets and one or more outer sheets folded with said inner sheets, said outer sheet or sheets having binding serrations formed therein adjacent the fold line of the signature.

29. A signature comprising an inner imperforate sheet and an outer sheet both folded and stapled together on the fold line of the signature, said outer sheet having binding serrations thereon adjacent said fold line.

30. A book comprising a plurality of signatures each having a front leaf provided adjacent the signature fold line with serrations and a back leaf provided adjacent said fold line with serrations independent of the serrations of said front leaf, the serrations of each signature being secured to the serrations of the adjacent signature or signatures to connect said signatures together.

31. A book comprising a plurality of sheets folded in half and provided adjacent their fold lines with serrations, the serrations of each folded sheet projecting from the two halves thereof independently of each other and being secured to the serrations of the adjacent folded sheet or sheets to connect said folded sheets together.

32. A signature comprising a sheet folded in half and provided adjacent the fold line with serrations that project from the two halves of the sheet independently of each other.

33. A signature comprising a folded sheet having a front leaf provided adjacent the fold line with serrations and a back leaf provided adjacent the fold line with serrations independent of the serrations of said front leaf.

34. A signature comprising a folded sheet having a front leaf provided adjacent the fold line with serrations and a back leaf provided adjacent said fold line with serrations independent of and disposed in staggered relation with the serrations of said front leaf.

In testimony whereof I have signed this specification.

EDWARD R. KAST.