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E. D. RADEF

1,777,448

BOOKMAKING METHOD

Filed Oct. 18, 1928

2 Sheets-Sheet 2

Fig. 5.

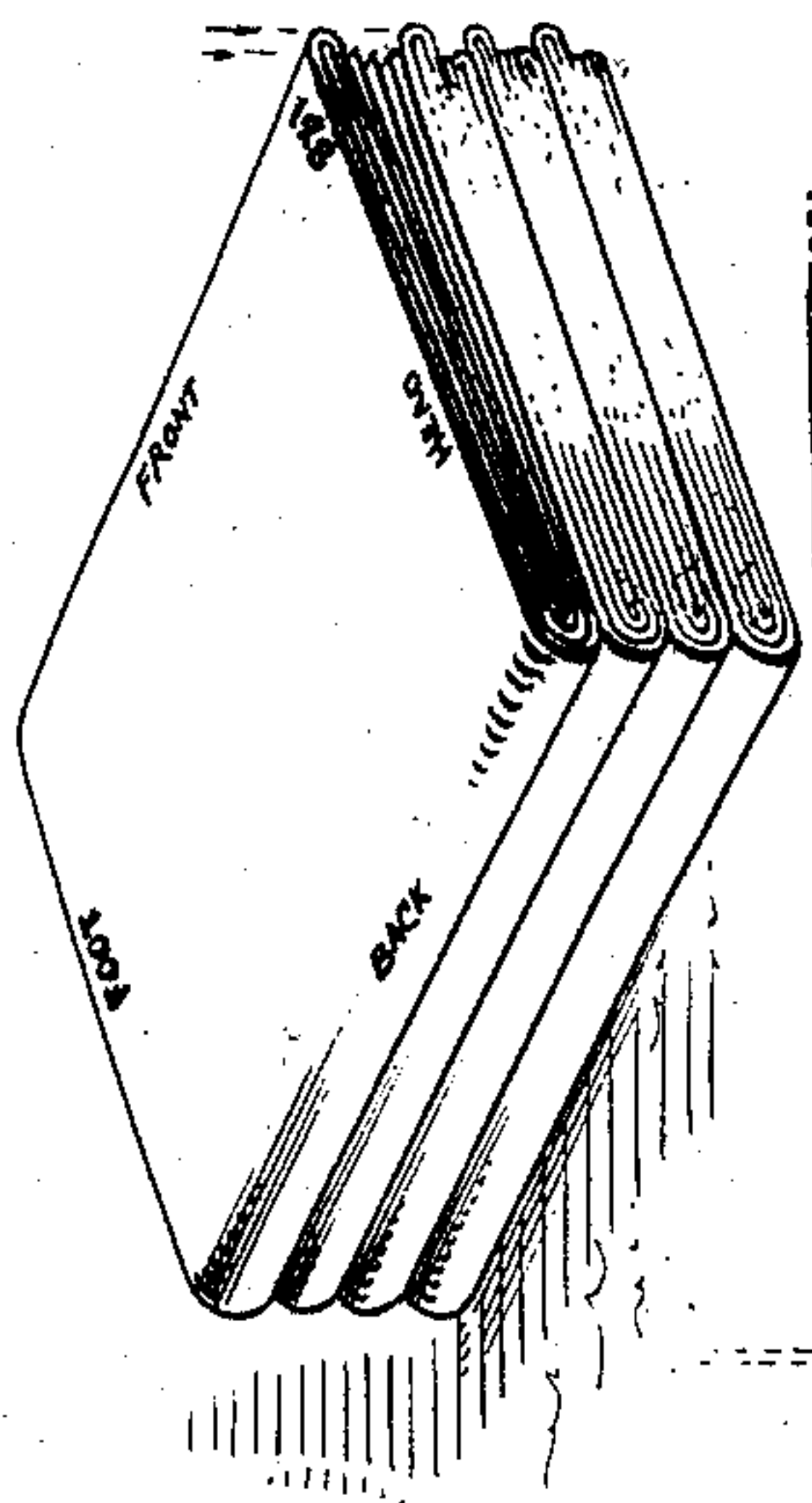


Fig. 7.

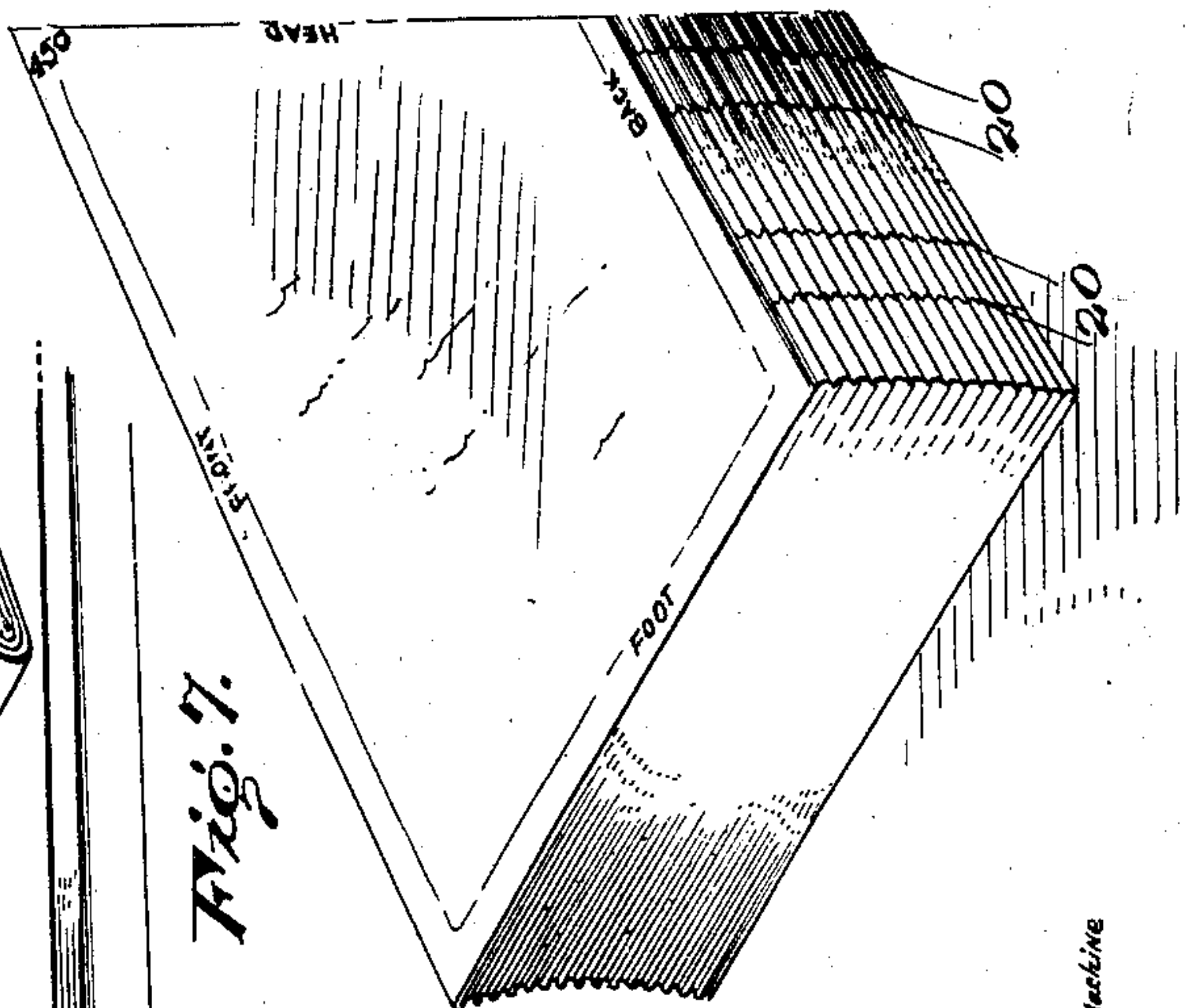


Fig. 4.

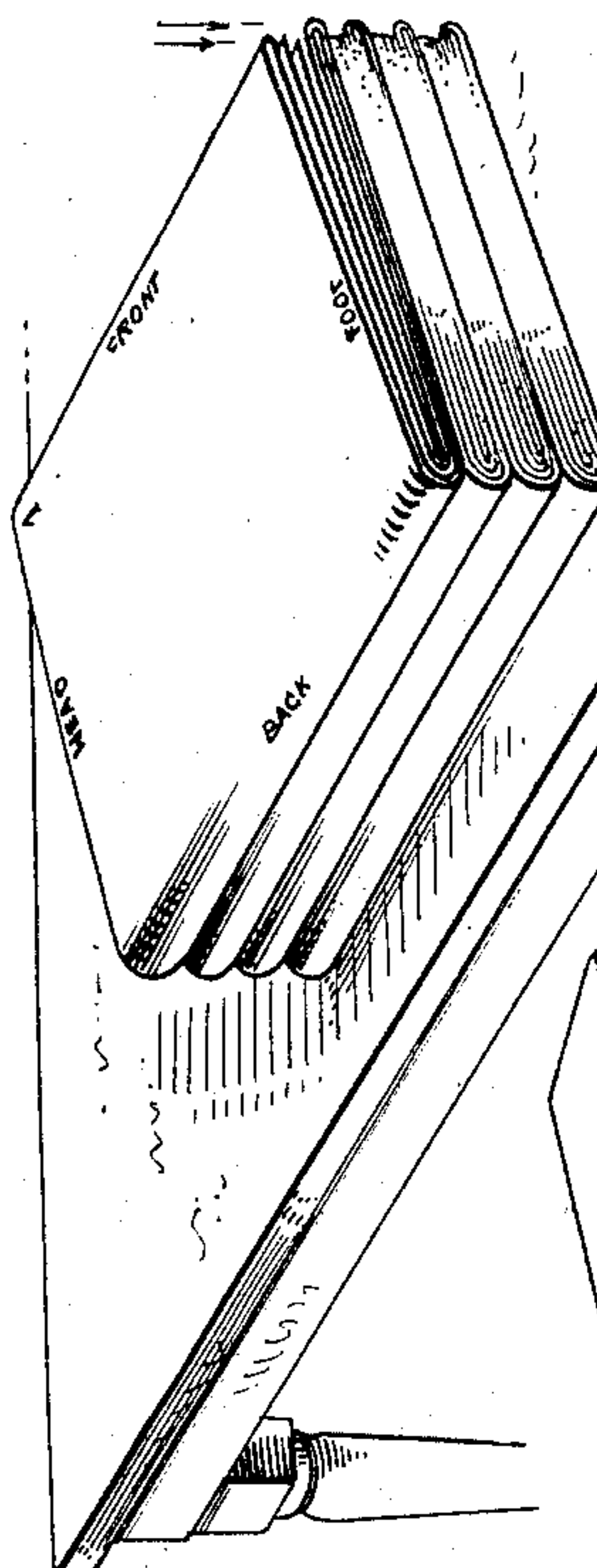
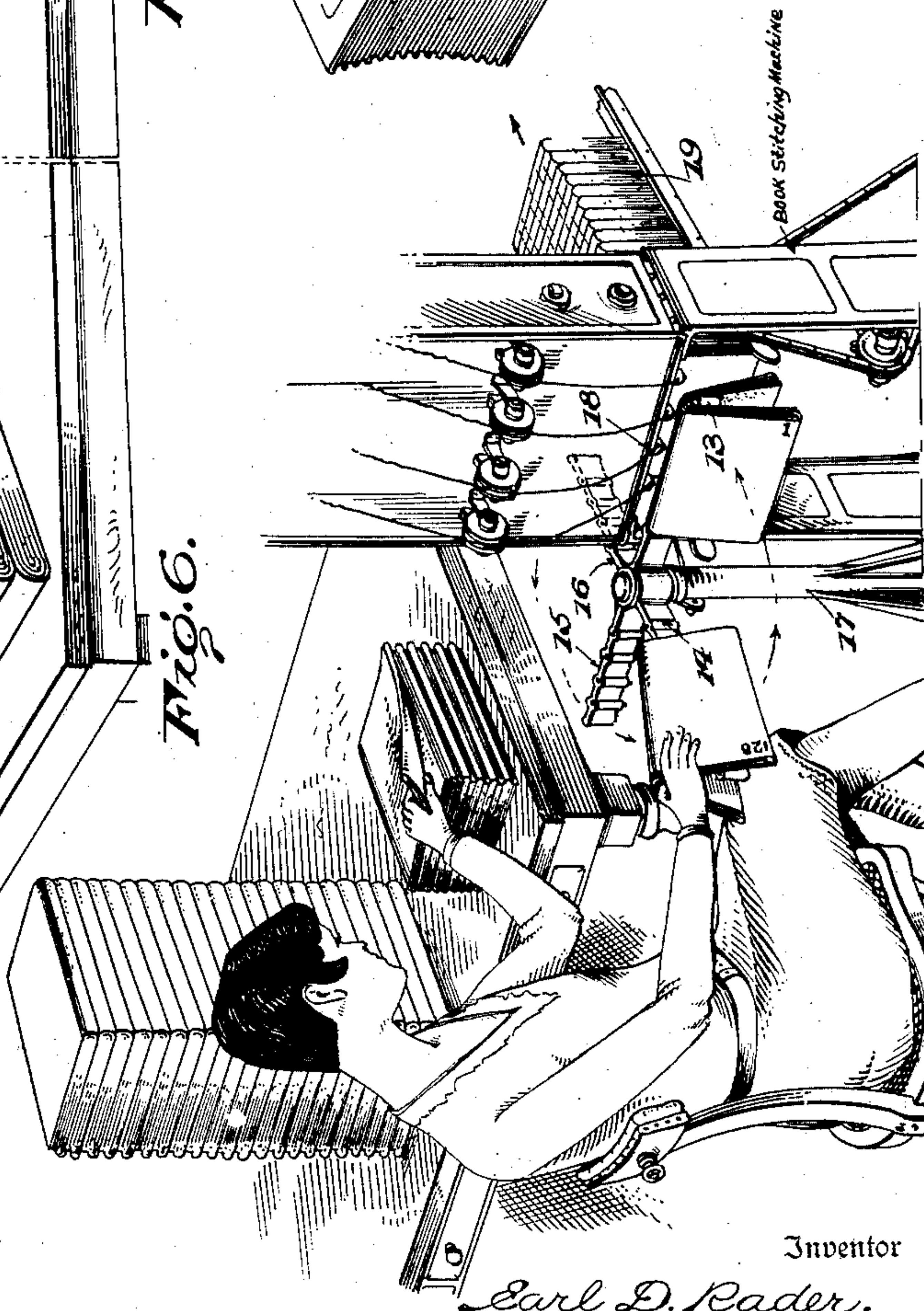


Fig. 6.



Inventor

Earl D. Rader.

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Cameron, Kerkam and Sutton,
Attorneys

UNITED STATES PATENT OFFICE

EARL D. RADER, OF BEDFORD, NEW YORK, ASSIGNOR TO DEXTER FOLDER COMPANY,
OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

BOOKMAKING METHOD

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The present invention is an improved method of making books. More specifically, the method involves the making of books from signatures that have received a plurality of parallel folds, the last fold being preferably reversed.

Attempts have heretofore been made to produce books from signatures with three parallel folds, the folds being over and over or all in the same direction. These attempts have resulted in failure because a signature made with three parallel over and over folds would, after the book was reversed by the sewing operator, as was necessary in order that the signatures be fed in the proper order to the sewing machine to make the book from finis to preface, present to the operator an open end and an open front which made it very difficult for the operator to open the signature at its middle to place it over the saddle of the sewing machine. This was a fundamental objection.

Prior to the present invention therefore the standard practice was to make books from signatures having one or more right angle folds, and this practice has been persisted in notwithstanding the fact that such signatures almost inevitably showed gussets when a right angle fold followed parallel folds, and notwithstanding the fact that parallel signatures are tighter, more perfect in register, simpler in make-up, and can be produced at a much higher rate of speed than a signature having a right angle fold.

In standard practice, as is well known, the unstitched signatures in book assembly form have been delivered to the sewing operator and have been sewed by the operator registering and opening from the head, which is a practice that has been consistently followed for a great many years. The signatures so registered have been fed to the sewing machine in such fashion that the signature embodying the finis of the book was first fed and stitched and the remaining signatures composing the book were successively stitched, the book being progressively assembled from the finis to the preface. This likewise has been standard practice for many years.

The failure heretofore to produce a method

of making books from signatures provided only with parallel folds, although many attempts to do so have been made, has rendered it necessary that standard signatures provided with either parallel followed by right angle folds, right angle folds alone, or right angle followed by parallel, should be used even though such signatures involved in their use greater expense and all the disadvantages of gussets and other imperfections in registry that it was desired to eliminate, and which registry imperfections could only be partially met by complicated and involved perforating devices, the accuracy of operation of which was uncertain. So fixed was the view of the most enlightened book makers in the art that signatures with right angle folds were necessary, that it was not until after the clearest demonstration of the comprehensive solution of the problem by the present method that the latter was adopted.

The problem therefore that has been presented to the art, and which has been solved by the present invention, was to make a book from signatures that had only parallel folds, without any change in the standard methods of imposition or registering from the head, and which, at the same time, could be opened by the operator and placed on the saddle with the ease and facility with which standard signatures involving one or more right angle folds could be so placed. This problem has been solved by providing a signature of three parallel folds, the last of which was reversed, so that when the book of unstitched signatures is turned end for end by the operator in order to make the book from finis to preface, there will be presented to the operator a closed front or bolt that will be instantly and accurately seized without fumbling and without the operator even looking at the signature; and can be placed on the saddle with the same ease and facility with which standard signatures provided with one or more right angle folds can be done.

By the present method the book sheet may be fed direct from the printing press to a suitable folding machine where it is subjected to the desired parallel folding operations,

the last fold being preferably reversed; and this direct feeding from the press to the folding machine may be effected whether the sheet includes four 32-page signatures or eight 16-page signatures. It is one of the advantages of the present method that from the same size book sheet either four 32-page signatures or eight 16-page signatures may be secured, the page size remaining the same either for the 32-page signature or the 16-page signature. However, in order to secure this result, if it is desired to fold four 32-page signatures, the book sheet must first be given a fold through its shorter dimension and at a medial point along its longer dimension, and the once folded signature then subjected to three folds parallel to each other but at right angles to the first fold along the shorter dimension of the sheet. The folded sheet is then separated into its component signatures, the signatures making up the book being thereafter assembled as, for example, on a standard gathering machine of the Juengst or Sheridan type, after which the piles of unstitched signatures, arranged in book order, are deposited on the table or support from which successive signatures are taken by the sewing operator, placed on the saddle of the sewing machine, and stitched with the other signatures constituting the book.

The unstitched signatures constituting a book are presented to the operator with the preface uppermost and with the heads of the signatures remote from the operator. The signatures constituting the book are then turned end for end by the operator so that the finis of the book is uppermost and the heads of the signatures are adjacent the operator; and in this order they are successively placed by the operator on the saddle of the sewing machine and are stitched together. The signature so stitched are delivered from the sewing machine with the signatures of a number of books sewed together, the sewed books being later severed from each other. As is well known, in this stitching operation, no effort is usually made to deliver separate books from the sewing machine, the preface of one book being sewed to the finis of the next.

The procedure may be automatic so far as concerns the feeding of the printed sheet to the folding machine, the folding of the printed sheet, the separation of the folded sheet into its component signatures, and the assembling of the signatures into unstitched books for presentation to the sewing operator. But after the books in unstitched form have been placed on the table of the sewing operator there enters the manual operation of feeding the book signatures to the sewing machine. It was the difficulties encountered by the sewing operator in readily finding the center of the parallel signatures folded over

and over that was largely responsible for the complete failure and abandonment of the various prior attempts to use parallel folded signatures in making books and which, prior to the present invention, confirmed the art in the conclusion that it was necessary to use signatures having a right angle fold; for whereas the latter presented to the operator a closed head which could be readily seized to open the signature to place it on the saddle of the sewing machine, the former presented to the operator not only an open head but an open front as well. This open head and open front being on the upper half of the signature made the effort to open the signature to place it on the saddle of the sewing machine a difficult one that slowed up production and introduced an item of expense and uncertainty of production that forced the book makers to use signatures with a right angle fold notwithstanding the many disadvantages of the latter.

The reversal of the last fold of the signature presented the signature to the sewing operator with the front of the upper half of the signature in the form of a closed bolt which could be readily felt and seized by the sewing operator with her left hand to open the signature, without looking at the pile of signatures, and the operator then seized the upper half of the signature with her right hand and placed it on the saddle of the sewing machine where it was registered at its head in conformity with standard practice.

The procedure followed in the making of a book according to the improved method is graphically indicated in the accompanying drawings, in which—

Fig. 1 indicates a book sheet as it comes from the press with printed matter for four 32-page signatures or eight 16-page signatures;

Fig. 2 indicates a mechanism for making three parallel folds, the first being preferably a knife fold and the second and third preferably loop folds, the latter of which as shown being reversed;

Figs. 2^a and 2^b are detail perspective views of a book sheet after the same has received one and two of the aforesaid folds, respectively;

Fig. 2^c is a similar view of the book sheet after it has received the third fold and been divided transversely into a plurality of signatures;

Fig. 3 indicates a gathering machine on which the signatures are assembled in unstitched book form;

Fig. 4 indicates a group of signatures as they are deposited on the table of the sewing operator with the preface of the book uppermost and the heads of the signatures remote from the operator;

Fig. 5 indicates the same group of signatures after the operator has turned them end

for end so that the finis of the book is uppermost and the heads of the signatures are adjacent the operator, the signatures being then in position to be fed to the sewing machine with the front of the upper half of the signatures in the form of a closed bolt that is readily seized by the operator to open the signature and place it on the saddle of the sewing machine.

Fig. 6 is a view of an operator feeding signatures to the sewing machine; and

Fig. 7 is a view of a completed book made by the improved method.

Referring to the drawings, Fig. 1 indicates a book sheet on which is indicated 64 pages on the top and 64 pages on the reverse side of the sheet, commonly known as a 128-page signature. This sheet may be folded into four 32-page signatures or eight 16-page signatures, and the page size would be the same in either event, provided that in the case of the 32-page signature the book sheet was first folded once through its shorter dimension and at a medial point along its longer dimension, and then subjected to three folds parallel to each other but at right angles to the first fold. In the example indicated in the drawings, however, the book sheet is folded into eight 16-page signatures. The first fold in the book sheet is made by the knife A which produces the product shown in Fig. 2^a. The second parallel fold is produced by the loop mechanism B and the product at this stage is illustrated in Fig. 2^b. The third parallel fold is effected by the loop mechanism C and the product therefrom is illustrated in Fig. 2^c. After the signature so folded is delivered from the folding mechanism C, it is separated into eight 16-page signatures, the cuts being along the lines 10 shown in Fig. 2^c, the cutting along these lines being effected by the cutters 11 indicated in Fig. 2.

The several 16-page signatures are then deposited in suitable boxes of any suitable gathering machine, such as the Juengst or the Sheridan gathering machines, or they may be hand gathered, as desired. If the signatures are gathered automatically, the signatures including the pages 1 to 16 are piled in one box, the signatures including the pages 17 to 32 in the next box, the signatures including the pages 33 to 48 in the next box, the signatures including the pages 49 to 64 in the next box, and so on, in proper sequence, so that when the signatures are assembled in the trough 12 of the gathering machine they will issue therefrom in the form of assembled but unstitched books in proper order from finis to preface. Thereafter the unstitched books are placed on the table of the sewing operator in the manner illustrated in Fig. 4. It will be apparent from an inspection of this figure that the preface or page 1 is uppermost, the foot of the signature is adjacent the operator, the head of the signature is remote from the

operator, and the front and foot of the signature are open, the bolt being on the under half of the signature. Thereupon, and prior to the sewing operation, the operator reverses the group of signatures, the back and front remaining in the same relative positions, but the head and the foot of the signature being reversed, as shown in Fig. 5, in which figure the head is shown adjacent the operator and the front of the upper half of the signature is in the form of a closed bolt.

The books in this order and in position for sewing are shown in a pile under the left hand of the operator in Fig. 6. In that figure the operator is shown seizing the bolt along the front of the upper half of the uppermost signature, which signature is then seized by the right hand of the operator and placed over one of the four saddles 13, 14, 15 and 16 of the sewing machine, which saddles rotate in a counterclockwise direction, as shown in Fig. 6, around a standard 17. This sewing machine may be of the standard Smythe type. Succeeding signatures are stitched together by the sewing mechanism at 18, and the signatures stitched together are shown as feeding rearwardly of the machine at 19. In the operation as illustrated in this figure, it will be observed that the signature including pages 1 to 16 is on the saddle 13 and is about to be sewed to the signature including pages 17 to 32 inclusive of the preceding book. The operator has just placed on the saddle 14 the signature including pages 113 to 128 inclusive, which will in due course be progressed to sewing position, and the operator is about to feed onto saddle 15 the signature including pages 97 to 112, which will be sewed to the signature on saddle 14 in due course.

No effort is usually made to deliver separate stitched books from the sewing machine, but commonly a string of books sewed together is delivered therefrom and are subsequently severed and thereafter bound. The book shown in Fig. 7 has been severed from adjacent books, but has not yet been bound, though the lines of stitching are shown at 20, the book being shown with the last page uppermost. It will be understood that the book in the form in which it is shown in Fig. 7 may thereafter be trimmed and subjected to the other book binding operations. However, books by the present process are produced so accurately that it is frequently desirable, and particularly in the higher priced books, not to trim any part of the book except the head, which is trimmed for gilt or other edging. However, if it is desired to trim the book, the trim will be substantially less than is necessary in the case of the standard right angle signatures heretofore used where the variations are thrown to the foot of the signature.

Among the outstanding advantageous results secured by my improved method of book

making are flat opening books of greatly improved quality without gussets or other imperfections due to imperfect registry at the heads that characterize books made of signatures having a right angle fold; a fifty per cent saving in labor costs from the laying of the form (which is a much simpler procedure where the signatures are subjected to parallel folds only because there is no need to calculate the desired spacing between the pages to compensate for the progressive wrapping of the folded sheet) to the finished book; an increase in production of signatures of more than one hundred per cent; a substantial saving of paper due to decreased trimming; the facility with which inserts may be placed in the front half of the signature without slitting, which is a great advantage and involves large economy; a saving in floor space of more than one hundred per cent in the folding operation as twice as many signatures of the parallel type can be folded than signatures having a right angle fold in the same floor space; and the power requirements for the folding operations are decreased from one-quarter to one-third.

In the present method it is preferred to reverse the last parallel fold in order to present the front of the signature in the form of a bolt to the sewing operator in proper position, and preferably the last fold is so made that the bolt extends a trifle beyond the under half of the signature so that it may be more readily seized. This is the particular procedure that has gone into extensive use and is displacing former procedure. Further, while I prefer to use as an instrumentality in the performance of my method one employing loop folding means, the same reversal of the last fold of the signature can be secured by a knife folding machine in which two or more of the knives operate in one direction and the last knife in the opposite direction. But my method may also be followed by using a knife folding machine in which all the knives operate in one direction and the head of the signature is maintained toward the operator, in which event the desired page arrangement would be secured without reversing the last fold. In addition, I have discovered that my method may be followed by using signatures having the standard over and over parallel folds, without any reversal of the last fold, but this involves reversing the make-up or imposition and necessitates a further departure from standard practices in that, in such case, registry must be effected from the foot of the signature rather than the head of the signature. Also, I have discovered that the bolt on the front of the signatures may be secured by parallel over and over folds, and properly presented to the operator, without change of imposition and registering from the head, by using Dexter knife folders of the 290 and 189^a types, but

the adaptability of these machines for use in the making of books from parallel folded signatures has never before been recognized. Further, while the preferred method is being successfully employed without any modification or change in the standard make-up registering from the head and assembling the books from finish to preface, I have found that it is also adapted for assembling books from preface to finish.

While, for the purpose of illustration, there has been described herein in detail the preferred manner of accomplishing the desired results, and while I have disclosed other procedures involving my improved method, it is to be understood that the invention is not limited to any one of these disclosures, and that the limits of the same are as defined in the appended claims.

What is claimed is:—

1. The method of making stitched books, embodying a plurality of signatures and in which the signatures are successively assembled and stitched and registered at the head, consisting in imparting to each signature a plurality of parallel folds, assembling the signatures in order exteriorly of each other with page one at the top and the last page on the bottom, reversing the non-stitched book so that the last page is uppermost and with the upper half of the front of the signature closed in the form of a bolt and then stitching the signatures together.

2. The method of making books of a plurality of signatures, which consists in imparting a plurality of parallel folds to each signature with the last page of each signature uppermost and the front of the upper half of each signature closed, and subjecting successive signatures arranged exteriorly of each other to a sewing operation.

3. The method of subjecting a sheet of book paper to successive parallel folds, then separating it into a plurality of book signatures, and gathering said signatures exteriorly of each other with the last page of each signature appearing on top and on the bolt side of the signature, and the bolt side of the signature being uppermost.

4. The method of subjecting a sheet of book paper to successive parallel folds, then separating it into a plurality of book signatures, the last page of each signature appearing on the top and on the bolt side of the signature and the bolt side of the signature being uppermost, gathering the signatures exteriorly of each other in unstitched book form, and feeding and stitching successive signatures of a book.

5. The method of making books of a plurality of signatures, which consists in imparting a plurality of parallel folds to each signature with the last page of each signature uppermost and the front of the upper half of each signature closed, and projecting

slightly beyond the lower half of the signature, assembling the signatures exteriorly of each other, and subjecting successive signatures to a sewing operation.

5 6. The method of making books embodying a plurality of signatures, which consists in folding the signatures so that they each include a plurality of parallel folds, assembling the signatures exteriorly of each other so that
10 the last pages and bolt sides thereof are uppermost, and stitching said signature to connect the same together.

15 7. The method of making a signature, which consists in subjecting a sheet of paper to successive parallel folds, and folding the closed half of the signature over the other half thereof with the last page of said signature disposed uppermost on the bolt-like portion thereof.

20 8. The method of making a signature, which consists in imparting one or more folds to a printed sheet, and forming a bolt-like folded part of said signature above a lower part thereof with the last page of said
25 signature disposed uppermost.

30 9. The method of making books, which consists in imparting one or more folds to a printed sheet, forming the sheet into a signature by folding it parallel with the preceding fold or folds and in a direction opposite that of the previous folding, assembling a plurality of signatures thus formed exteriorly of each other with their bolt sides
35 uppermost, and connecting the assembled signatures together.

40 10. The method of making a book, which consists in imparting a plurality of parallel folds to a printed sheet in the same direction, imparting a final fold to the sheet parallel with the preceding fold and in a direction
45 opposite that of the previous folding, assembling a plurality of signatures thus formed exteriorly of each other with the bolt sides thereof disposed uppermost, and connecting the assembled signatures together.

In testimony whereof I have signed this specification.

EARL D. RADER.

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