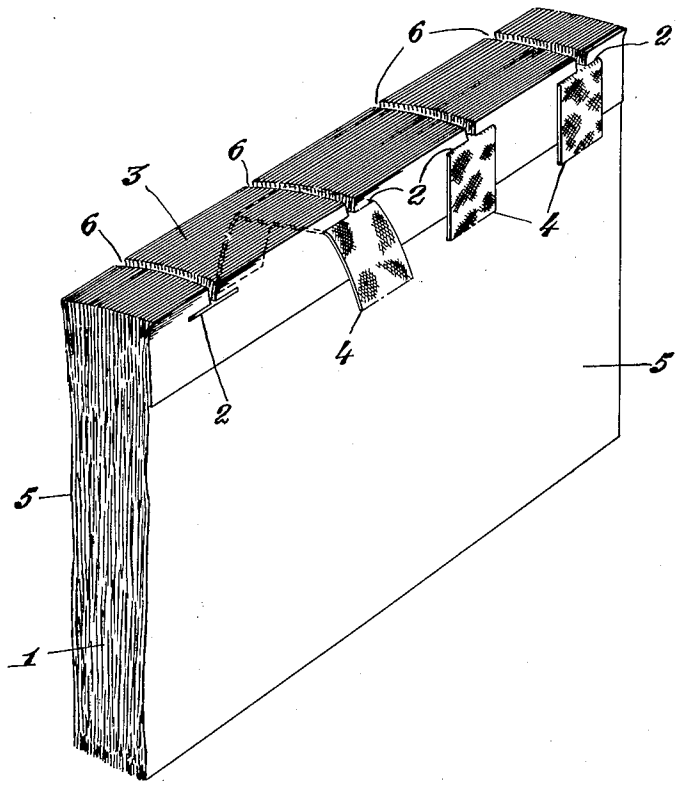
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BOOKBINDING

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Fig. 1.



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Fig. 2.

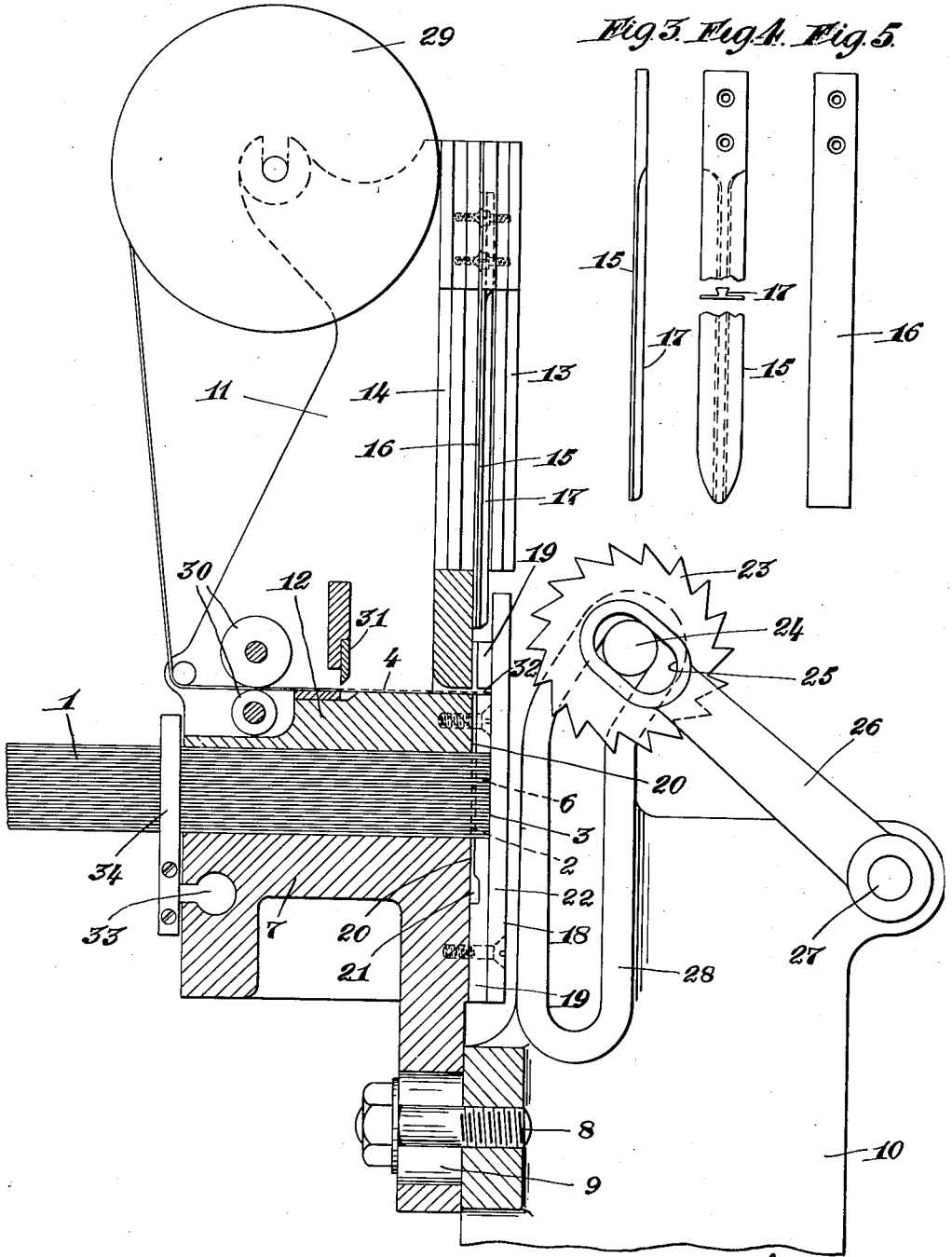


Fig 3. Fig 4. Fig 5.

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UNITED STATES PATENT OFFICE

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BOOKBINDING

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In Great Britain January 26, 1933

5 Claims. (Cl. 11—1)

This invention concerns improvements relating to the binding of books, book sections and the like. An object of the invention is to provide an improved binding machine whereby folded sections of paper, a series of single leaves or combinations of such sections and leaves, hereinafter simply termed leaves, may be secured together in such manner that the resultant book is much more durable, although less expensive to produce, than a similar class of book as bound hitherto. A further object is to ensure that every part of the book, including single leaves such as illustrations, is held in the book covers with equal strength. Yet a further object is to ensure a desired measure of flexibility in the binding so that the book can be opened in a convenient manner.

For the binding of books it has already been proposed to saw-cut relatively wide slots in the back of the book, to extend these slots somewhat by saw-cuts parallel to the back, and to draw, into the extended saw-cuts, bands to which the leaves were fastened by glue introduced into said cuts, the covers being finally attached to the ends of the bands. This proposal was not successful from a practical standpoint, its non-success being due, it would now appear, to the removal of excessive material from the back of the book by the saw-cutting operations, this rendering the binding weak and vitiating advantages which it might otherwise have possessed. The present improvements are intended to overcome this disadvantage with the added advantage of being considerably less costly in operation.

The invention will now be more fully explained with reference to the accompanying drawings which illustrate one example of binding and one example of machine for effecting such binding. In the drawings:—

Figure 1 is a perspective view of a partially bound book, Figure 2 is a vertical section of a machine or device for use in carrying out the binding and Figures 3–5 illustrate details.

Referring first of all to Figure 1, the leaves of the book 1 are pierced with elongated knife slits 2 close to the back-edge or spine 3 of the book and are laced through the said slits 2 with lengths 4 of tape or other flat flexible material the ends of which are stuck down upon the end sheets 5 of the book. The lacing 4 serves to hold the leaves together to form the book. The number of slits 2 and their size and distance from the back 3 will naturally depend upon the size and nature of the particular book. If desired, narrow transverse slots or recesses 6, preferably slightly flared outwardly as illustrated, may also be provided extending from the back 3 into the slits 2. These transverse slots or recesses may be utilized for the introduction of glue and like adhesive and for the reception of string and other additional staying or reinforcing material, thus imparting a desired degree of additional support to the back of the book. The provision of the transverse slots or recesses is, however, not essential for all purposes. In some cases such slots or recesses may be provided in conjunction with some only of the slits 2.

Figure 2 illustrates a machine or device in which both the slits 2 and the slots 6 can be produced and the tape 4 laced through said slits in a single cycle of operations. In this machine, a bed 7 is secured to a fixed lower frame 10 in such manner as to be vertically adjustable for different thickness of books by means of screws 8 passing through elongated slots 9 in said bed. An upper frame 11 carrying a book-clamping plate 12 is made vertically movable in relation to the fixed frame 10 to permit of the placing of the book upon the bed 7. Also carried upon the upper frame 11 are vertical guides 13, 14 for cam-operated slides carrying a series of slitting tools 15 in the form of thin knives (Figures 3 and 4) and lacing blades 16 (Figure 5) respectively. Each plain blade 16 is arranged to lie flat and close against a plain face of the corresponding tool 15 which is provided on its other face with a strengthening rib 17. A back gauge-plate 18 and a lower spacing plate 19 are secured to the back of the bed 7 and an upper spacing plate 19^1 is secured to the clamping plate 12, the spacing plates 19, 19^1 being formed with a series of shallow recesses, as 20, each of a width sufficient to receive the respective tool 15 and blade 16. Each recess is of increased depth at its lower end 21. Both the back gauge-plate 18 and the spacing plates 19, 19^1 are divided vertically, as at 22, at right angles to the recesses 20 to permit of the passage of a series of rotary saws 23, the section in Figure 2 being taken in the plane of one of the vertical divisions 22. The appropriately driven spindle 24 of the saws 23 is mounted in slots 25 at the ends of arms 26 rockable upon a shaft 27. Said spindle is also guided in slots 28 carried by the frame 10 and so shaped that the rotating saws are carried down across the back of the book when the arms 26 are rocked by, for example, cam agency. The upper frame 11 further carries tape-spools 29, tape-feed rolls 30 and a cam-operated tape-severing knife 31. The spacing

plate 19¹ is slotted at 32 at right angles to the recesses 22. A rod 33 reciprocatable in the bed 7 carries a combined head-gauge and discharger 34.

The modus operandi is as follows: The leaves of the book 1 gathered together in their proper order are placed by the operator upon the bed 7 and are registered against the back gauge 18 and head gauge 34. The machine is then set in operation, the first step being the depression of the plate 12 to clamp the leaves securely upon the bed 7. Next the saws 23, rotating anti-clockwise travel forwardly and downwardly under the guidance of the slots 28, their teeth entering the divisions 22 and cutting the transverse slots 6 in the back of the book. Following upon the cutting of the slots 6, the slitting tools 15 descend and form the slits 2 in the back of the book. No material is removed by the knife-tools 15 in cutting the slits, the provision of the reinforcing ribs 17 permitting of the knife blades being made extremely thin. As the tools 15, in ascending, uncover the slots 32, the rolls 30 feed lengths of tape 4 into said slots until they overlap the slits 2 and abut against the back gauge-plate 18. These lengths are then severed by the knife 31 so that upon the descent of the lacing blades 16 they are drawn down the recesses 20 and through the slits 2. Upon the ascent of the blades 16, the doubled-back ends of the tapes are trapped in the cavities 21 so that the tapes are left behind in the slits 2 and do not tend to follow said blades. The arrangement is such that the amounts of tape protruding above and below the book are about equal. The upper frame 11 and clamping plate 12 are then raised, releasing the book so that it can be pushed away, perpendicularly to the plane of Figure 2, by the discharger 34. When said hook is clear of the saws 23, these are raised back to their initial position.

As the book is moved, its protruding tapes are flattened to its sides and it is left in this condition between the bed 7 and plate 12 whilst the discharger is returned to its original position. A fresh book is then placed upon the bed 7 and clamped by the plate 12, the clamping force also serving to press the tapes of the preceding book into place. The cycle of operations is then repeated upon the fresh book. When the latter is pushed forward by the discharger, the first book is either pushed out of the machine or into a further stage of the binding process. At this stage the book can be rounded, backed, glued and lined in any known and appropriate manner according to the nature of the paper and ultimate binding. The invention permits of the use of practically any form of end-paper and of either French groove or tight joints for the cases. Also the back may be made tight or hollow.

The number, size and spacing of the tools 15, blades 16 and saws 23 can be altered to suit requirements, interchangeable spacing plates 19, 19¹ with correspondingly disposed recesses 20 being mounted in the machine as required. The length of the projecting ends of the tapes 4 and the manner in which said tapes are further disposed depends upon the manner in which the binding of the book is to be completed. Adhesive may be applied to said tapes at various stages in the binding process depending upon what parts of the book or binding said tapes are to be secured to. The projecting ends of the lacing material may be used, as desired, for reinforcing either the boards, joints, end-papers or the back. If required, double lacing material may be employed and utilized, for example, for reinforcing both the end-papers and the boards. Alternatively the boards may be laced in, or split boards may be used.

We claim:—

1. Device for use in book binding, comprising in combination means for registering the stack of leaves of which the book is composed, means for clamping said stack, piercing knives for forming elongated slits in said stack close to the back edge thereof, and lacing tools for passing lengths of tape through said slits.

2. Device for use in book binding, comprising in combination means for registering the stack of leaves of which the book is composed, means for clamping said stack, piercing knives for forming elongated slits in said stack close to the back edge thereof, cutting devices for cutting transverse slots extending from the back edge of the book into some at least of said slits, and lacing tools for passing lengths of tape through said slits.

3. Device for use in book binding, comprising in combination means for registering the stack of leaves of which the book is composed, means for clamping said stack, piercing knives for forming elongated slits in said stack close to the back edge thereof, lacing tools for passing lengths of tape through said slits, and tape feeding and severing means for feeding severed lengths of tape to said lacing tools.

4. Machine for binding books, comprising in combination means for registering and clamping the leaves thereof and mechanically operated knives for cutting slits in said leaves close to the back edge, reinforcing ribs upon the rear sides of said knives and lacing tools for passing tapes through the said slits.

5. Machine for binding books, comprising in combination means for registering and clamping the leaves thereof and mechanically operated knives for cutting slits in said leaves close to the back edge, reinforcing ribs upon the rear sides of said knives, lacing tools for passing tapes through the said slits and guides whereby said slitting knives and lacing tools are guided flat against each other so that the lacing tools readily enter the slits cut by the knives.

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