Dec. 5, 1950 A. W. BIESEN 2,532,535

TAPE THREADING MACHINE

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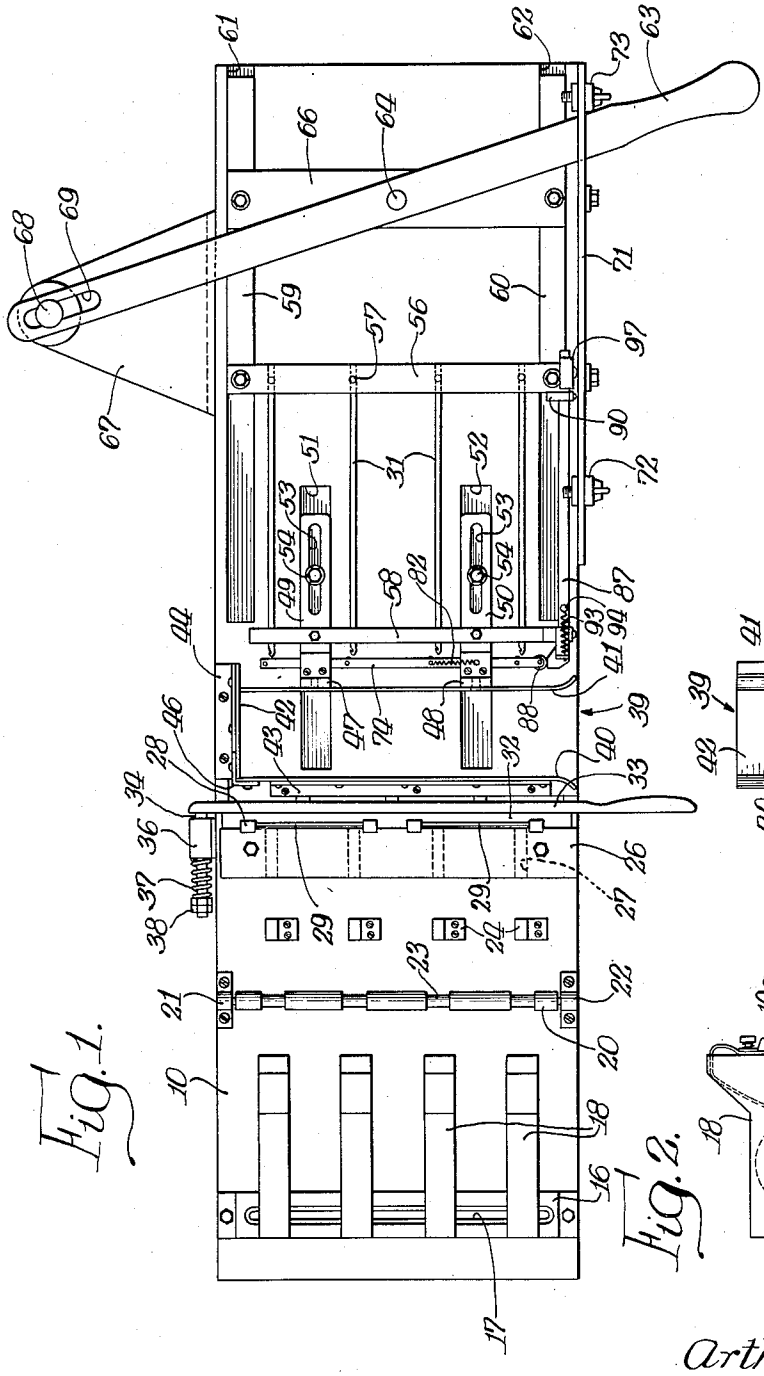


Fig. 1.

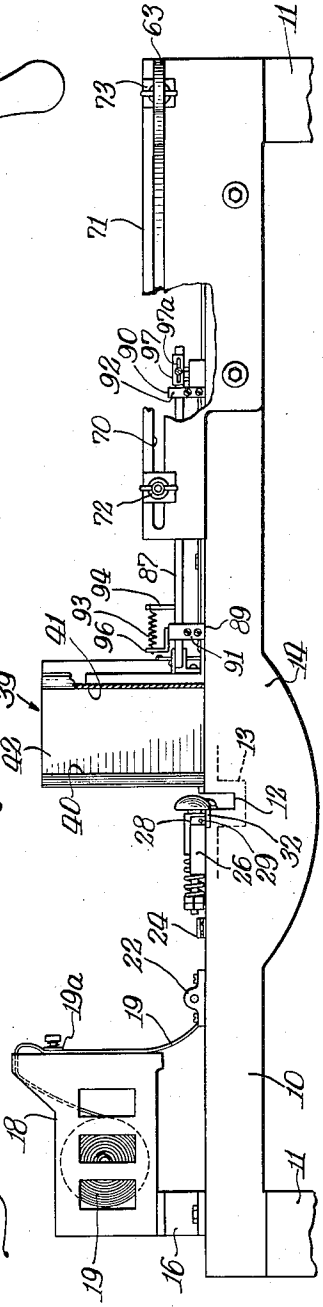


Fig. 2.

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Fig. 3.

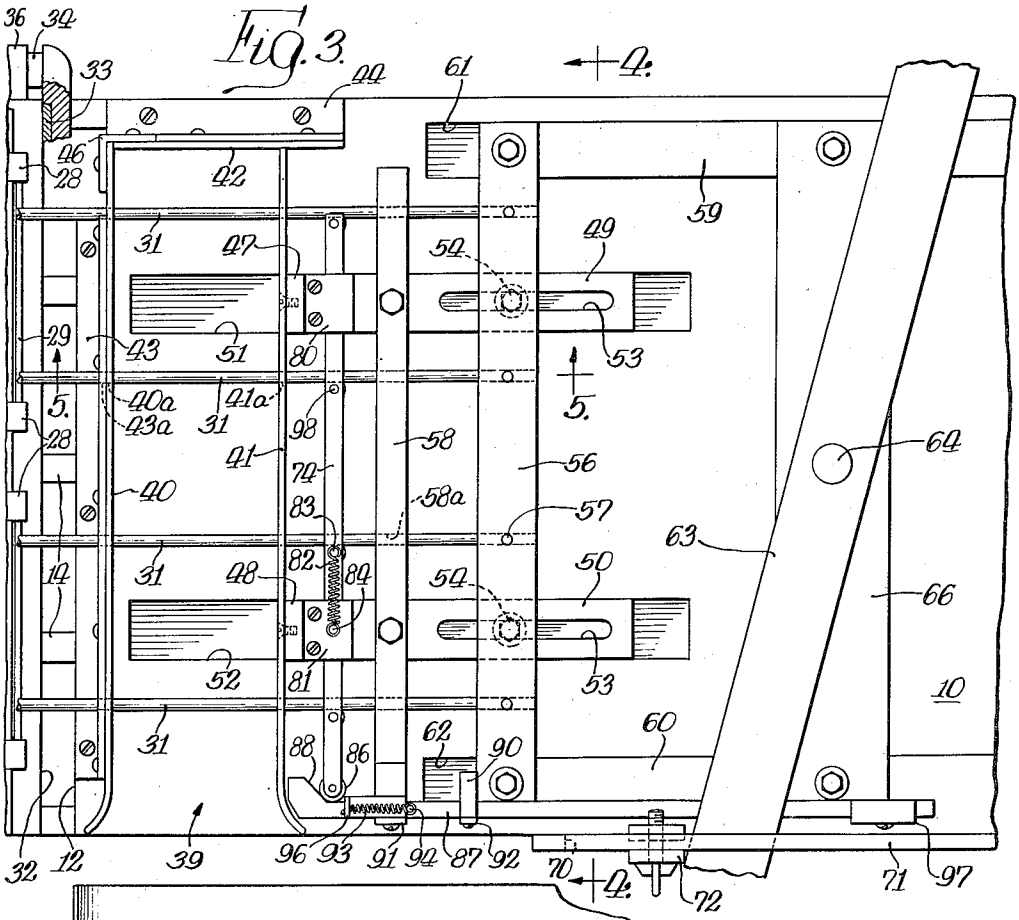
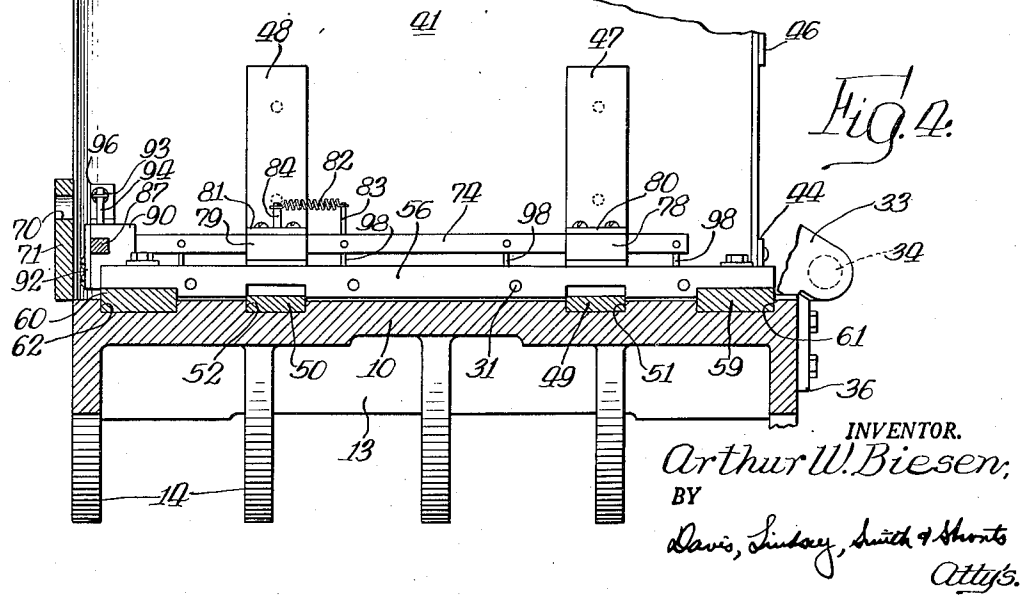


Fig. 4.



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TAPE THREADING MACHINE

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Fig. 5.

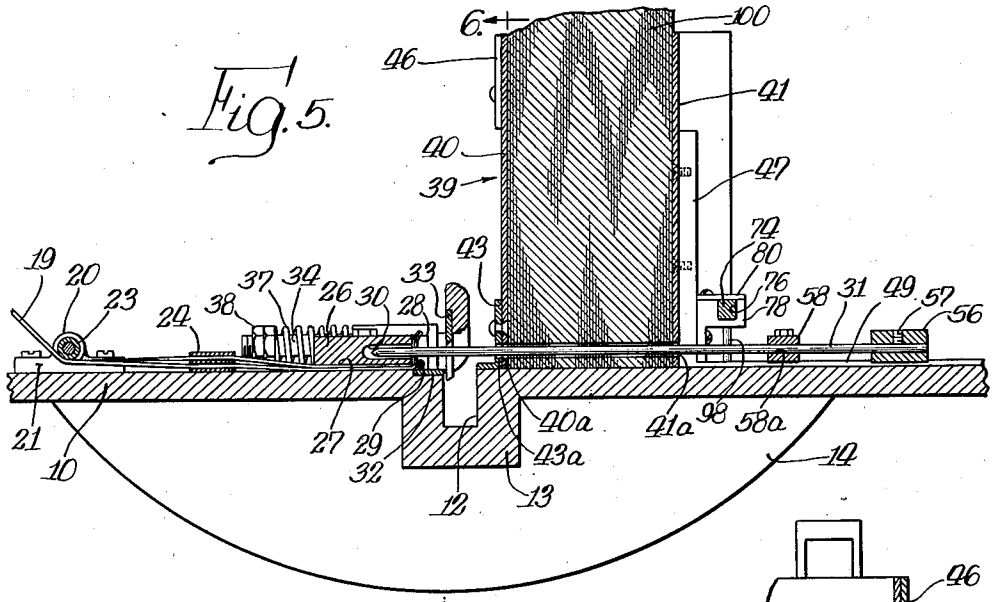


Fig. 6.

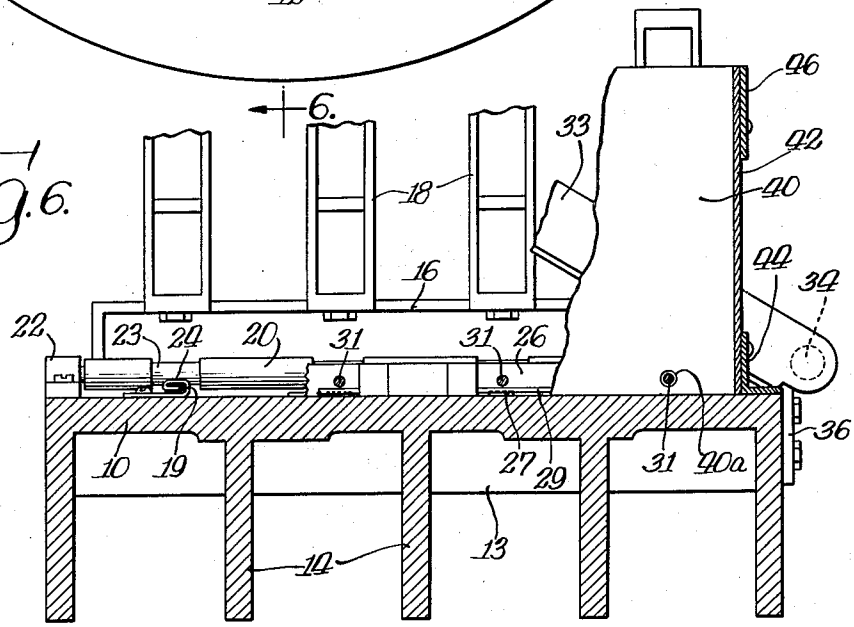


Fig. 7.

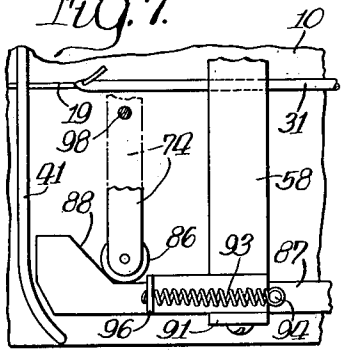
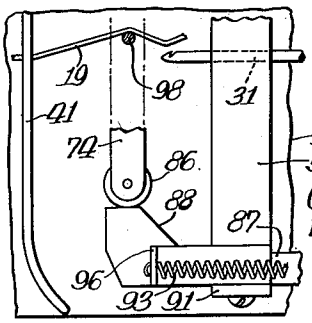


Fig. 8.



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TAPE THREADING MACHINE

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Fig. 9.

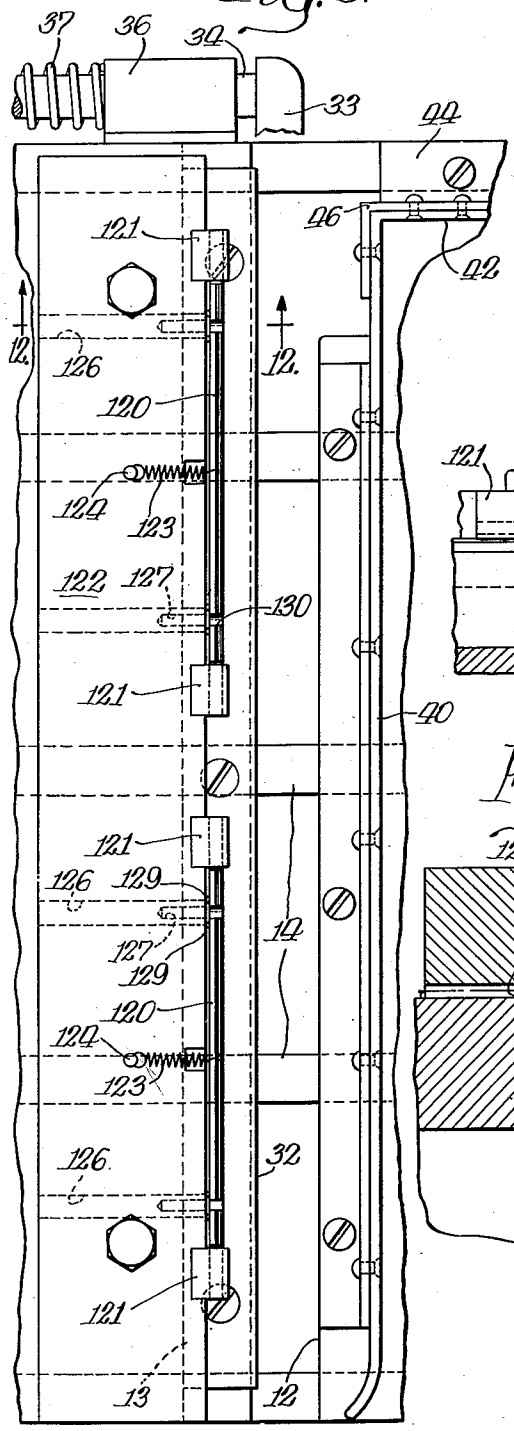


Fig. 10.

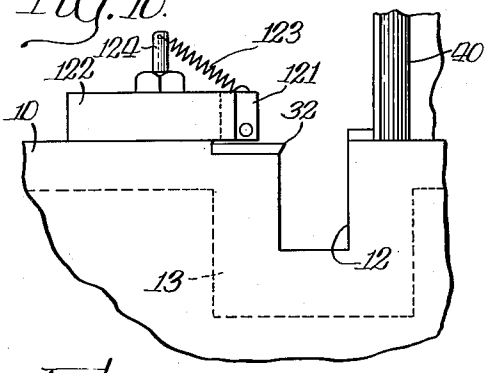


Fig. 11.

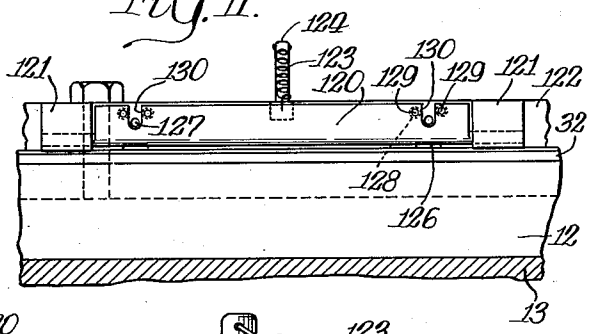
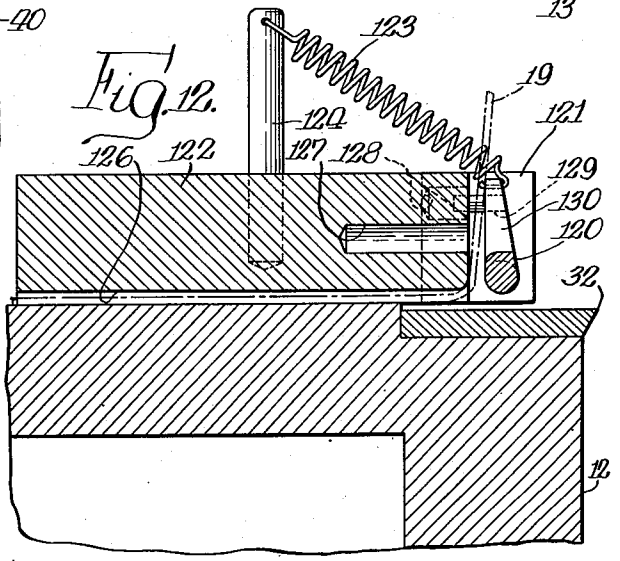


Fig. 12.



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UNITED STATES PATENT OFFICE

2,532,535

TAPE THREADING MACHINE

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Application October 3, 1946, Serial No. 700,886

11 Claims. (Cl. 11—1)

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This invention relates to book binding and more particularly to a machine for threading binding tapes through binding holes of books, catalogs or the like, or portions thereof.

It has been long recognized that the use of flat tapes is a desirable, strong and inexpensive manner of binding together into a book a plurality of pages or signatures, such manner being disclosed, for instance, in the Kint Patent No. 1,554,436 of September 22, 1925. However, the use of such tape bindings has been somewhat restricted due to the lack of satisfactory devices or machines by which the tapes could be rapidly and inexpensively threaded through the signature without failure. The threading of such flat tapes individually and by hand was, of course, highly unprofitable and never practical, particularly where the runs of books or the like to be bound numbered in the thousands or even the hundreds. Certain machines were devised and used with the intention of overcoming the deficiencies and expense of hand operation but their operation was so uncertain and unsatisfactory that the productive capacity of an operator therewith was not excessively above that of hand production.

In some of such machines, the flat tapes were laid over the holes of the book to be bound and then a plurality of rods were brought against the tapes to force them through the book. Oftentimes the tapes, having no positive interengagement with the rods, slipped therefrom, allowing the rods alone to pass on through the book and leaving the tapes in partially threaded position. This failure greatly reduced the production rate since the operator was required to break the normal routine feeding and threading procedure and restore the machine to its initial operable condition. Furthermore, certain of the tapes sometimes failed to become properly aligned over the book holes so that some became threaded and others not upon movement of the push rods. In addition, no positive mechanism was provided for causing the threading means to positively engage the tapes nor for disengaging the tapes therefrom upon completion of the threading operation nor for cutting the threaded lengths of tapes rapidly from the supply rolls thereof.

It is therefore, one of the objects of the present invention to provide an improved tape threading machine for book binding that is of simple and inexpensive construction, positive and continuous in operation and capable of a high rate of production.

Another object of the invention is to provide an improved machine for threading tape through the binding holes of books comprising an improved tape pickup mechanism by means of which a plurality of needles may simultaneously become positively engaged with the tapes and the tapes pulled through the binding holes simultaneously without detachment from the needles.

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A further object of the present invention is similar to the next preceding object but with the addition of a means for automatically detaching the tapes from the needles upon completion of the threading operation.

Another object is to provide a tape threading machine comprising a tape pickup mechanism having provision for automatically restoring tapes to tape pickup position upon severance thereof by a cutter.

Still another object of the invention is to provide an improved mechanism for feeding lengths of tape from a plurality of sources of supply to a tape pickup mechanism and facilitating positive and efficient operation of the latter mechanism.

A still further object is to provide an improved mechanism for supporting and operating a plurality of tape threading needles in alignment with the binding holes of a book and with a tape pickup mechanism.

Other and further objects of the invention will become apparent hereinafter as this description progresses, reference being had to the accompanying drawings, in which:

Figure 1 is a top plan view of one form of improved tape threading machine comprising the present invention;

Fig. 2 is a front elevational view of the same;

Fig. 3 is an enlarged, fragmentary, top plan view of the central portion of the machine and showing the threading needles in projected position;

Fig. 4 is a vertical sectional view of the machine taken on the line 4—4 in Fig. 3, looking in the direction of the arrows;

Fig. 5 is a vertical sectional view of the machine taken on the line 5—5 in Fig. 3, looking in the direction of the arrow;

Fig. 6 is a vertical sectional view of the machine taken on the line 6—6 in Fig. 5, looking in the direction of the arrows, certain of the parts being broken away for clarity;

Fig. 7 is a fragmentary top plan view of a portion of the tape detaching mechanism illustrating the position of the mechanism relative to a needle and tape prior to disengagement thereof;

Fig. 8 is a view similar to Fig. 7 but showing the relative positions of the parts after the tape has been detached from the needle;

Fig. 9 is a top plan view of a modified form of tape pickup mechanism;

Fig. 10 is a fragmentary, side elevational view of the modified form of tape pickup mechanism;

Fig. 11 is a detailed elevational view of one of the tape supporting and guiding members of the tape pickup mechanism with the needles projected therethrough; and

Fig. 12 is a vertical sectional view taken on the line 12—12 in Fig. 9 and showing one of the

tape pickup supporting and guiding members in the vertical position with a tape in pickup position.

The tape threading machine illustrated in the drawings comprises a preferred embodiment of the present invention and is adapted to thread flat tapes through a plurality of predrilled holes in a group of signatures comprising a book or the like, the tape serving to bind the signatures together in the manner disclosed in the Kint Patent No. 1,554,436 of September 22, 1925. As shown more particularly in Figs. 1 and 2 of the drawings, the present machine comprises a rectangular bed 10 which is supported by a plurality of legs 11 and provided with a vertical cutting groove 12. To provide sufficient strength and depth of body for the cutting groove 12, the bed 10 is formed with a transverse enlarged portion 13 and a plurality of depending reinforcing webs 14 extending longitudinally on the under side of the bed 10 in spaced relation.

On the top of the bed 10 adjacent its left end edge there is bolted an elongated, upstanding plate 16 extending transversely thereof from side to side and being provided with a slot 17. The plate 16 serves as a raised support for a plurality of tape holders 18 which may be secured thereto by appropriate fastening means extending through the slot 17. The tape holders 18, which are directed inwardly to the right toward the center of the bed 10, may be of conventional form and adapted to support rolls of flat tape 19 and permit the tape 19 to be pulled therefrom under tension of a spring 19*a*.

The tape 19, as it is pulled out of the tape holders 18, extends downwardly and to the right and under a transversely extending guide roller 20 journaled in bearings 21 and 22 secured by screws to the upper surface of the bed 10 adjacent its respective rear and front edges. The roller 20 is provided with a plurality of grooves 23 through which the tapes 19 are guided, these grooves 23 being in alignment with the tape holders 18. Beyond the roller 20 the four tapes 19 pass through clips 24 which are secured in spaced relationship to the top surface of the bed 10 in alignment with the roller guide grooves 23. As shown more particularly in Figs. 5 and 6 of the drawings, the clips may comprise flat lengths of sheet metal doubled back upon themselves into the forms of loops. The loops of the clips 24 are of lesser extent than the width of the tapes 19 so that when the tapes 19 pass therethrough they will be doubled over on themselves to increase their inherent resiliency and to facilitate their entry into the pickup bar assembly and their pickup therein by the needles, which assembly will now be described.

The tape pickup bar assembly, as shown in Figs. 1, 2 and 5, is bolted to the top surface of the bed 10 to the right of the tape doubling clips 24 and comprises a transverse bar 26 extending from front to back of the bed 10 and having four longitudinally extending grooves 27 in its under surface. These grooves 27 are in alignment with the doubling clips 24 and are of such restricted width and height as to maintain the tapes 19 in their doubled over condition. The forward or right vertical wall of the pickup bar 26 is provided with four spaced and projecting bearing members 28 in which are journaled a pair of transversely extending rollers 29. The rollers 29 are supported across the pickup bar grooves 27 and serve to direct the tapes 19 upwardly in front of and over the mouths of four horizontally and longitudinally extending holes 30 in the pickup bar 26. In the preferred form, the tapes 19, when doubled over, are of sufficient resilience and stiffness to remain in the vertical position over the holes 30 to which they are forced by the rollers 29 after they emerge from the pickup bar grooves 27. The holes 30 are adapted to receive the hooked ends of the four needles 31 as they are moved to the left to pick up and engage the tapes 19.

Along the left transverse edge of the cutting groove 12, the bed 10 is provided with a shear plate 32 which is adapted to cooperate with a vertically movable cutting blade 33 having a horizontally directed pivot pin 34 pivotally supported in an upstanding bracket 36, bolted to the vertical back wall of the bed 10. The left end of the pivot pin 34 projects beyond the bracket 36 and is encircled by a spring 37 whose respective ends are secured to the bracket 36 and a tension adjusting bolt 38. This spring mounting serves to maintain the cutting blade 33 in its inoperative raised position, shown in Fig. 6, wherein it will not interfere with the needles 31 during threading movement thereof.

As indicated by the numeral 39, a book receiving magazine is disposed on the top surface of the bed 10 immediately to the right of the cutting groove 12 and comprises transversely extending vertical plates or jaws 40 and 41 and a longitudinally extending vertical back plate 42, the jaw 40 being stationary and the jaw 41 being adjustable longitudinally toward or from the stationary jaw 40 in order to accommodate books of varying thicknesses. The stationary jaw 40 and the back plate 42 are riveted along their lower portions to the upstanding portions of supporting angle plates 43 and 44, respectively, fixedly secured to the top surface of the bed 10 adjacent the slot 12 and along the back edge thereof, respectively. The left vertical side edge of the back plate 42 abuts the jaw 40 and these members are secured together at their upper portions by an angular tie plate 46.

The adjustable jaw 41 is secured to the vertical upstanding arms 47 and 48 of slides 49 and 50, respectively, which are slidably mounted within spaced and longitudinally extending channels 51 and 52, respectively, in the upper surface of the bed 10. The slides 49 and 50 are each provided with elongated slots 53 through which fastening bolts 54 extend downwardly into threaded engagement with the bed 10. When the bolts 54 are loosened, the slides 49 and 50 may be moved longitudinally within the channels 51 and 52 toward and from the fixed jaw 40, the direction of movement depending upon the size of the book to be accommodated within the magazine 39. When the jaw 41 has been moved to the desired spacing from the fixed jaw 40, the bolts 54 may be tightened down against the slides 49 and 50 so that the jaw 41 may be retained against longitudinal movement during operation of the machine on a particular run of books.

As shown in Figure 5, the upstanding portion of the supporting angle plate 43, the fixed jaw 40 and the adjustable jaw 41 are each provided adjacent their lower portions with four spaced openings 43*a*, 40*a*, and 41*a*, respectively, these respective openings 43*a*, 40*a*, and 41*a* being in alignment with each other and in alignment with the four spaced openings 30 in the tape pickup bar 26. These various openings are of sufficient diameter to permit the ready passage there-

through of the needles 31 and the tape 19, when it is hooked to the needles 31.

The four needles 31 have their right ends received within a holder bar 56 (Figs. 1 and 3) in which they are retained by set screws 57 extending vertically down within the holder bar 53 into engagement with the needles 31. The needles 31 are slidably supported to the left of their holder 56 by a guide bar 58 which extends transversely of the machine and is mounted on the jaw adjusting slides 49 and 50. The guide bar 58 is provided with four spaced and longitudinally extending holes 58a which are in alignment with the four spaced holes 41a of the adjustable jaw 41 and are of such diameter to permit free relative sliding movement of the needles 31 therethrough. The needle holder bar 56 also extends transversely of the machine and is mounted at its respective outer ends on the left ends of slides 59 and 60, which slides are received with longitudinally extending channels 61 and 62, respectively, formed in the upper surface of the bed 10 adjacent its respective front and rear edges.

The slides 59 and 60 are adapted to slide freely within the channels 61 and 62 and their longitudinal sliding movement is effected by means of a manual actuating lever 63. The actuating lever 63 is pivotally connected at its central portion as at 64 to a cross plate 66 which is mounted on the slides 59 and 60 to the right of and spaced from the needle holder bar 56. An outwardly directed bracket 67 secured to the vertical rear face of the bed 10 supports the rearward end of the lever 63 which is pivoted thereto by means of a pin 68 which is received with a slot 69 in the lever 63. The forward or handle portion of the lever 63 is supported for horizontal slidable movement within a slot 70 of a vertically extending bracket 71 which is secured to the vertical front face of the bed 10. Horizontal slidable movement of the lever 63 is limited by left and right stops 72 and 73 adjustably secured within the bracket slot 70 adjacent the respective ends thereof.

In order to automatically detach the four tapes 19 from the hooked ends of the needles 31 after they are pulled to the right through the book and through the adjustable jaw 41, there is provided a tape detaching mechanism which is operable upon return movement of the lever 63 to the right. This tape detaching mechanism comprises (Figs. 1, 2 and 3) a cross bar 74 slidably supported within transversely extending grooves 76 and 77 of bearing blocks 78 and 79 secured to the lower portion of the vertical upstanding arms 47 and 48, respectively, of the slides 49 and 50. The cross bar 74 is maintained within the bearing grooves 76 and 77 by retaining plates 80 and 81 secured to the top surfaces of the blocks 78 and 79, and it is constantly urged toward the front of the machine by a spring 82 tensioned between upstanding pins 83 and 84 carried by the slidable bar 74 and the bearing plate 81, respectively. The front end of the slidable bar 74 is provided with a roller 86, and, by means of the spring 82, the roller is maintained in constant engagement with the left cam-shaped end of a longitudinally extending cam bar 87. The left end of the cam bar 87 is enlarged and provided with an inclined cam face 88 against which the roller 86 rotates from its Fig. 7 position to its Fig. 8 position and return, as the cam bar 87 is moved to the right and then to the left.

The cam bar 87 is slidably supported along the front edge of the machine in grooves formed in spaced bearing blocks 89 and 90 (Figs. 1 and 2),

the bearing block 89 being fixed and secured to the bed 10 and the bearing block 90 being movable and secured to the forward end of the needle holder bar 56. Closure plates 91 and 92 secured to the bearing blocks 89 and 90, respectively, serve to maintain the cam bar 87 within the respective grooves thereof. The cam bar 87 is constantly urged to the left by a spring 93 tensioned between an upstanding pin 94 carried on the cam bar 87 and an upstanding plate 96 secured to the upper surface of the fixed bearing block 89. Near the right end of the cam bar 87 there is secured a collar 97 having a slot 97a providing for restricted longitudinal adjustment thereof along the cam bar 87. The collar 97 is so positioned on the cam bar 87 that it will be engaged by the slidable bearing block 90 carried by the needle holder 56 as the actuating lever 63 approaches its extreme right-hand position, and upon continued movement thereof to final position, the cam bar 87 will also be moved to the right to its Fig. 8 position causing rearward, transverse movement of the cross bar 74.

The cross bar 74 is provided with four spaced depending pins 98 (Fig. 4) which are adapted, upon rearward movement of the cross bar, to engage the tapes 19 and pull them from their engaged positions with the hooked ends of the needles 31, this disengagement of the tapes occurring therefore when the actuating lever approaches its extreme position to the right.

To set up the machine initially for continuous operation the free ends of the four rolls of flat tape 19 are first pulled out to the right from the tape holders 18 and then passed under the roller 20 through the four grooves 23 from which they are threaded through the four tape doubling guides 24 so as to be doubled over upon themselves. In doubled-over condition the tapes are then passed under the pickup bar 26 through the grooves 27 and up in front of the respective rollers 29 in a vertical position over the tape pick-up bar holes 30 to the extent shown in Fig. 5 of the drawings. When the tapes have been placed in their initial operational positions, the machine may thereafter be continuously operated until the rolls of tape 19 in the tape holders 18 are exhausted.

In operation of the machine, the operator first places a book 100 to be bound in the magazine 39 which has previously been adjusted therefor. The book 100 prior to its insertion in the magazine 39 has been drilled adjacent its back or closed edges to provide four spaced holes which will be in alignment with the holes 40a and 41a of the magazine jaws 40 and 41 when placed therein with its closed edges in engagement with the bed 10 and with its opening edges directed upwardly. After the holes of the book 100 are properly aligned with those of the magazine 39, the actuating lever 63 may be moved to the left, thus effecting movement of the needles 31 in the same direction by means of the cross bar 66, the slides 59 and 60, and the needle holder 56. As the needles 31 are moved to the left they pass through the adjustable jaw 41, the book 100, the stationary jaw 40, the jaw supporting angle plate 43 until they reach the upstanding end portions of the tape 19. Continued movement of the needle holder 56 by further actuation of the lever 63 to the left, causes the needles 31 to force the tape end portions against the mouths of the holes 30 of the pickup bar 26 and then to pierce the tapes and pass on into the holes 30 toward the inner ends thereof. Engage-

ment of the ends of the needles 31 with the ends of the holes 30 and their consequent damage is prevented by engagement of the lever 63 with the stop 72. The construction of the tape pick-up assembly is such that hooked engagement of the tapes 19 by the needles 31 is made positive and the chances of failure are practically eliminated.

After the needles 31 have pierced the tapes 19 and the actuating stroke to the left has been completed, the level 63 may be returned to the right. As it does so, the needles 31 are withdrawn from the holes 30 and because of their hooked construction the tapes 19 are prevented from slipping therefrom during the remainder of the return stroke until detached by the mechanism specially provided therefor. Upon continued return movement to the right the needles 31 are retracted, thus pulling the tapes 19 through the holes in the angle plate 42 and the stationary and adjustable jaws 40 and 41 until lengths thereof extend beyond and to the right of the magazine jaw 41.

As the actuating lever 63 nears its extreme right-hand position, the slidable cam bar bearing 90 on the needle holder 56 engages the fixed collar 97 on the right end of the cam bar 87, and continued movement thereof causes the cam bar 87 to be moved to the right, thus camming the cross bar 74 rearwardly away from the operator. When the cross bar 74 is so moved the depending pins 98 engage the tape as shown in Fig. 8 and pull it from engagement with the needles 31. Movement of the needles 31 to the right is limited by engagement of the actuating lever 63 with the stop 73.

When the return stroke to the right has been completed, and the tape 19 has been threaded through the book 100, the operator then may force the cutting blade 33 downwardly against the urge of the spring 37 and sever the four tapes 19 against the shear plate 32, thus leaving lengths of tape of substantially equal extent on each side of the magazine jaws 40 and 41. The book 100 may then be removed from the magazine 39 by the operator, the loose ends of the tapes 19 freely pulling through the holes 43*a*, 40*a* and 41*a* of the angle plate 43 and the stationary and movable jaws 40 and 41, respectively, without becoming withdrawn from the book 100. Upon withdrawal, the ends of the tapes 19 may be secured as disclosed in the said Kint patent.

When the tapes 19 are severed by the cutting blade 33, the short free ends thereof extending over the rollers 29 in their folded or doubled condition, because of their inherent resiliency, spring upwardly and to the left so as to assume a vertical position in front of the mouths of the openings 30 in the pickup block 26 and hence in the paths of movement of the needles 31. These tape ends assume their operable positions without any act of the operator who, as a result, in the operation of the machine, need only insert and remove the books 100, actuate the lever 63 in both directions, and lower the cutting blade 33. Although the machine disclosed in the drawings is manually operated, it has a high productive capacity, which could be further increased by the provision of and adaptation thereto of power driven means.

In Figs. 9 to 12, inclusive, of the drawings there is illustrated a modified form of tape pick-up mechanism which differs primarily from the first form by the substitution of pivoted and positively spring urged tape supporting and guiding members 120 instead of the guiding rollers 29 of the first form. These members 120, shown in detail in Fig. 11 of the drawings, are each pivoted in a pair of spaced bearing members 121 on the right vertical wall of a pickup block 122 and they are urged in a counterclockwise direction by springs 123 tensioned between the top of the guiding members 120 and upstanding pins 124 on the top of the block 122. The pickup block 122 is similar in most respects to block 26 of the first form having a plurality of longitudinally extending channels 126 and needle receiving holes 127. But the block is also provided with a pair of spaced holes 128 in its right vertical face above and on each side of the needle receiving holes 127. These pairs of holes 128 are adapted to receive pairs of small, spaced tape confining pins 129 carried by the tape guiding members 120 on each side of relatively narrow U-shaped slots 130 formed therein, there being two of such slots in each guide member 120. The slots 130 are in alignment with the needles 31 and the pickup block holes 127 and they are of sufficient width to permit only the passage of the needles 31 therethrough as they are projected into the needle receiving holes 127 and to prevent the passage of the tapes 19 therethrough.

In operation, the needles 31 are projected through the book and magazine 39, through the U-shaped slots 130, the tapes 19 and into the needle receiving holes 127, the guide members 120 being in vertical position and the tapes 19, as shown in Fig. 12, extending from the channels 126 upwardly in front of the block wall between the pins 129 and in front of the needle receiving holes 127. When the needles 31 are retracted with the tapes 19 engaged on the hooked ends thereof, the guide members 120 are caused to pivot in a clockwise direction since their U-shaped slots 130 are too restricted in size to permit the ends of the needls 31 and the tapes 19 to be pulled therethrough. The guide members 120 are thus caused to assume a substantially horizontal position in which they are held by the tautness of the tapes 31. After the tapes 19 have been fully pulled through the book they may be severed by the cutting blade 31, as above described, and thereupon the free ends thereof will be positively carried to the left and upwardly in front of the needle receiving holes 127 by return movement of the guide members 120 under the urge of the springs 123. The spring actuated guide members 120 thus serve to positively position the tapes in needle piercing position and have particular utility, where the tapes 19 may lack sufficient inherent resiliency to accomplish their own return to vertical position.

Although there has been described above and illustrated in the drawings one embodiment of the present invention together with a modified form of tape pickup mechanism, it is to be understood that changes and modifications may be made in the various elements without departing from the spirit and scope of the appended claims.

I claim:

1. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising vertical spaced plates for supporting a book in vertical position on a side edge thereof, a plurality of needles mounted in parallel, spaced relationship in a horizontal plane on one side of said book supporting means

with their same respective ends free and adapted to be reciprocated in a horizontal direction through and beyond said book and return in a direction at right angles to the plane of the pages thereof, means for reciprocating said needles, and a tape pickup member mounted in a horizontal position on the other side of said book supporting means in spaced relation therefrom and adapted to position end portions of the tapes in angular relation to the path of movement of said needles, said needles being adapted to extend into said member upon movement of the needles horizontally through and beyond said book whereby to pierce the angularly disposed portions of the tapes.

2. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and adapted to be reciprocated through and beyond said book and return in a direction at right angles to the plane of the pages thereof, means for reciprocating said needles, a tape pickup member mounted on the other side of said hook supporting means in spaced relation therefrom and comprising means supporting said tapes in angular relation across the path of movement of said needles and being adapted to receive said plurality of needles upon movement of the needles through and beyond said book and through said tapes into relation therewith, and means for feeding a plurality of tapes in spaced relationship to said tape pickup mechanism.

3. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free end formed with tape engaging elements and adapted to be reciprocated through and beyond said book and return in a line of movement at right angles to the plane of the pages thereof, means for reciprocating said needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom comprising a block member arranged across the path of movement of said needles and having a plurality of spaced holes in its wall facing said book supporting means and in alignment with said plurality of needles for reception thereof, a plurality of tape guiding channels extending through said block in vertical alignment with but in a different plane than said holes and in angular relation to said block wall, and guiding means arranged adjacent said block wall and in front of said channel openings for supporting and directing said tapes in front of said spaced holes, whereby said needles are caused to pierce said tapes as they are projected into said pickup member holes and to pull said tapes through said book as they are returned to normal position.

4. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and formed with tape engaging elements and adapted to be reciprocated through and beyond said book and return in a line of movement at right angles to the plane of the pages thereof, means for reciprocating said needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and having a plurality of spaced openings in alignment with said plurality of needles for reception thereof, tape doubling means through which said tapes are fed and adapted to turn said tapes back upon themselves prior to their being fed to the tape pickup member, and means for feeding and positioning said tapes in their doubled over condition adjacent said pickup member in front of said openings.

5. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and formed with tape engaging elements and adapted to be reciprocated through and beyond said book and return in a line of movement at right angles to the plane of the pages thereof, means for reciprocating said needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and having a plurality of spaced openings in alignment with said plurality of needles for reception thereof, a plurality of guiding clips having restricted openings of lesser extent than said tapes through which said tapes are fed and serving to turn said tapes back upon themselves prior to their being fed to the tape pickup member, and means for feeding and positioning said tapes in their doubled over condition adjacent said pickup member in front of said openings.

6. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and formed with tape engaging elements and adapted to be reciprocated through and beyond said book and return in a line of movement at right angles to the plane of the pages thereof, means for reciprocating the needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and having a plurality of spaced openings in alignment with said plurality of needles for reception thereof, tape guiding means mounted out of the path of movement of said needles and adapted to direct and support the free ends of the tapes adjacent said pickup member in front of said openings, and cutting means for severing the tapes after said needles have engaged and pulled said tapes through the book on their return stroke mounted between said book supporting means and said tape pickup member and operating in such proximity to said pickup member that the free ends of the severed tapes beyond the tape guiding means extend over and beyond the needle openings of the pickup member for the next threading stroke.

7. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel spaced relationship on one side of said book supporting means with their same respective ends free and formed with tape

engaging elements and adapted to be reciprocated through and beyond said book and return in a line of movement at right angles to the plane of the pages thereof, means for reciprocating the needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and adapted to facilitate interengagement of said plurality of needles with a plurality of tapes upon movement of the needles through and beyond said book into operable position therewith, and tape detaching means mounted on said one side of said book supporting means and adapted to be moved angularly across the path of movement of said needles upon their return stroke and to engage and pull said tapes from said needles.

8. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and formed with tape engaging elements and adapted to be reciprocated through and beyond said book and return in a line of movement at right angles to the plane of the pages thereof, means for reciprocating the needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and adapted to facilitate interengagement of said plurality of needles with a plurality of tapes upon movement of the needles through and beyond said book into operable position therewith, and tape detaching means mounted on said one side of said book supporting means and comprising a reciprocal bar adapted to be moved angularly relative to the direction of movement of said needles upon their return stroke and having a plurality of spaced projecting pins adapted to engage and pull said tapes from the needles.

9. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising a bed, means for supporting a book in operable position on said bed, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and adapted to be reciprocated through and beyond said book and return in a direction at right angles to the plane of the pages thereof, a needle holder securing the other respective ends of said needles, reciprocal slide means mounted on said bed and supporting said needle holder, actuating means operably connected with the slide means and adapted to reciprocate said slide means to effect threading movement of the needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and adapted to facilitate interengagement of said plurality of needles with a plurality of tapes upon movement of the needles through and beyond said book into operable position therewith and tape detaching means on said one side of said supporting means and operably connected with and actuated by said slide whereby said tapes are detached from said needles upon return movement of said slide.

10. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising a bed, means for supporting a book in operable position on said bed, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and adapted to be reciprocated through and beyond said book and return in a direction at right angles to the plane of the pages thereof, a needle holder securing the other respective ends of said needles, reciprocal slide means mounted on said bed and supporting said needle holder, actuating means operably connected with the slide means and adapted to reciprocate said slide means to effect threading movement of the needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and adapted to facilitate interengagement of said plurality of needles with a plurality of tapes upon movement of the needles through and beyond said book into operable position therewith and tape detaching means mounted on one side of said book supporting means and comprising a reciprocal bar adapted to be moved angularly relative to the direction of movement of said needles upon their return stroke, a plurality of spaced, projecting pins adapted to engage and pull said tapes from the needles and a cam bar adapted to engage said reciprocal bar and effect movement thereof and adapted to be actuated upon return movement of said needle holder.

11. A machine for threading a plurality of tapes through books, catalogs or the like, or portions thereof, comprising means for supporting a book in operable position, a plurality of needles mounted in parallel, spaced relationship on one side of said book supporting means with their same respective ends free and formed with tape engaging elements and adapted to be reciprocated through and beyond said book and return in a line of movement at right angles to the plane of the pages thereof, means for reciprocating the needles, a tape pickup member mounted on the other side of said book supporting means in spaced relation therefrom and having a plurality of spaced openings in alignment with said plurality of needles for reception thereof, and tape guiding and positioning means pivotally mounted adjacent said pickup member and adapted to direct and support the free unthreaded end of the tapes adjacent to and in front of said needle receiving openings, said guiding and positioning means having a plurality of slots of restricted size to permit passage of only the needles therethrough and to prevent passage of the tapes and being adapted to be pivoted in one direction to permit passage of the tapes upon retraction of said needles and to be pivoted in the other direction upon severance of the tapes to restore the unthreaded free ends of the tapes to proper pickup position in front of said needle receiving openings.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,554,436	Kint	Sept. 22, 1925
1,980,267	Gould	Nov. 13, 1934
2,401,535	West	June 4, 1946
2,420,705	Harrison	May 20, 1947

FOREIGN PATENTS

Number	Country	Date
123,092	Great Britain	Aug. 28, 1919