UNITED STATES PATENT OFFICE.

MARTIN CHRISTENSEN, OF RACINE, WISCONSIN, ASSIGNS TO CHRISTENSEN MACHINE COMPANY, OF RACINE, WISCONSIN, A CORPORATION OF WISCONSIN.

BOOK-STITCHING MACHINE.

1,344,441.


Application filed August 2, 1918. Serial No. 247,946.

To all whom it may concern:

Be it known that I, MARTIN CHRISTENSEN, a citizen of the United States, and resident of Racine, in the county of Racine and State of Wisconsin, have invented new and useful Improvements in Book-Stitching Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The invention relates to book stitching machines and more particularly to the mechanism for adjusting and operating the stitching mechanism, and is fully described and explained in the specification and shown in the accompanying drawings, in which:

Figure 1 is a plan view of the device embodying the invention;
Fig. 2 is a front elevation view;
Fig. 3 is a section taken on the line 3-3 of Fig. 2;
Fig. 4 is a section taken on the line 4-4 of Fig. 2;
Fig. 5 is a section taken on the line 5-5 of Fig. 1;
Fig. 6 is a section taken on the line 6-6 of Fig. 3;
Fig. 7 is a section taken on the line 7-7 of Fig. 3.

In the drawings the numeral 8 designates the frame of the machine carrying horizontally disposed flat supports 9 and 10. Mounted transversely of said supports are the frames 11 for the staplers 12 on the support 10, and frames 13 for the clenchers 14 on the support 9, said staplers and clenchers constituting the stitchers and being of well known construction. An angle bar 15 is also secured to the support 9.

In the form of stapler employed a lug 14 is operatively connected to the staple-forming and driving mechanism of the stapler, and a lug 15 is operatively connected to the wire-feeding means of the stapler. In the form of clencer here employed a lug 16 is secured to the clencer operating mechanism.

The stapler frames 11 are each provided with a lug 17 slidably mounted in a longitudinally extending guideway 18 in the support 10 and with a groove 19 in which the outer edge 20 of the angle bar 15 is slidably mounted. Thus each of the stapler frames may be adjusted lengthwise of the support 10 and be secured in different adjusted positions by means of a clamping screw 21 which passes through a longitudinally extending slot 22 in the support 10. The staplers being secured to the frames 11 their position is determined by the adjustment of said frames.

The clenchers are each mounted upon a block 23 which is adjustably clamped to a T-head lug 24 which is lengthwise slidably movable in a T-slot 25 in the clencer support bar 26 so that the clenchers may be adjusted lengthwise of the machine to line them up with the cooperating staplers.

While the books are being fed past the stitching mechanism they must be properly guided and to accomplish this I have provided a trough consisting of a side plate 27 secured by brackets 28 to the bar 26, interchangeable blocks 29, interchangeable blocks 30, and portions of the stapler frames 11. The forward part 31 of each frame 11 forms a section of the bottom of the trough and a projection 32 forms a section of the side of the trough. The blocks 29 have a portion 33 forming a section of the bottom and a part 34 forming a section of the side of the trough and are disposed between the staplers to complete that side of the trough, the blocks being of various sizes so that different adjustments between the staplers may be obtained. Each block 29 has a headed lower end 35 engaging the bar 15, and a bar 36 movably mounted on pins 37 in the support 9 locks said blocks in position.

The blocks 30 are of a width corresponding to the blocks 29 and are provided with lugs 38 insertible in the slot 25 and serve to fill in the space between the clenchers and between the plate 27 and bottom of the trough.

To provide for the use of different sized staples for books of different thickness, and also for changing the width of the trough, I have means for simultaneously adjusting the position of the clencer blocks 23 and the feed control lug 15 of the stapler consisting of a bar 39 having a longitudinally extending recess 40 therein, in which blocks 41 are mounted, the bar 26 previously described and means for simultaneously moving said bars 39 and 26 toward or away from each other. Each block 41 is adjustably secured to the lug 15 of its stapler by means of screws 42 passing through a slot
The means for moving the bars 39 and 26 consist of parallel shafts 44 each mounted in bearings on the frame and having a right screw threaded portion 45 and a left screw threaded portion 46 which engage in properly threaded apertures in the ends of the bars 39 and 26 respectively, said shafts being rotated together through a chain and sprocket connection 47 on the turning of the handwheel 48.

Since the plate 27, clencher blocks 25, and blocks 30 are all secured to the bar 26, the side of the trough opposite the stapler will be moved toward or away from the stapler on the movement of the shafts 44.

From the foregoing description it will be observed that the construction is such as to permit of the adjustment of the stitchers with respect to each other lengthwise of the table and such as to permit of the adjustment of the guiding means and the wire feeding means for stitching books of different thicknesses.

The staple forming and driving mechanisms are actuated by a reciprocating bar 49 having a slot 50 in which the lugs 14' of the staplers are adjustably mounted, said bar being actuated on the rotation of the drive shaft 51 through an eccentric 52, eccentric rod 53, arms 54, rod shaft 55, levers 56 and links 57.

In case no book is presented to the stitchers, means are provided for preventing the operation of the staplers consisting of a clutch for disconnecting the eccentric 52 from the shaft, and book-controlled means for controlling said clutch.

The eccentric 52 is loosely mounted on the shaft 51 and has a dog or pin 58 slidably mounted therein and normally moved by a spring 59 within the eccentric into one of the pockets or recesses 60 in a collar 61 secured to the shaft 51. This pin 58 is adapted to be moved out or held out of register with the recesses 60, by a block 62 slidably mounted within a bracket 63 secured to the frame of the machine and having a cam face 64 engaging a cam face 65 at one end of a recess 66 in the pin 58. The block 62 is normally moved toward the pin 58 by a spring 67 connected to said block and bracket. The construction above described is commonly known as a "pin clutch" and the block 62 normally moved toward the pin 58 causes it to be held out of engagement with the recess 60 in the collar 61 and against the action of the spring 59 by the engagement of the cam 64 with the cam 65. When, however, the block 62 is moved outwardly, the pin 58 is moved by its spring 59 into engagement with the recess 60 in the collar 61. The eccentric is normally held in out of driving relation position with the shaft 51 by the pin clutch above described.

The book-controlled means for throwing in the clutch, consists of a book-engaging dog 68 mounted on a pin 69, said dog having a part 70 movable to a position in the trough in the path of books passing therethrough, and a part 71 movable into engagement with a vertically movable control rod 72. The rod 72 is pivotally connected to a crank arm 73 carried by a rock shaft 74 to which a finger 75 is secured, which engages a pin 76 on the block 62. A crank arm 77 is also secured to the shaft 74 and carries a roller 78 adapted to be held against a cam 79 on the shaft 51 by a spring 80. The cam 79 is provided with a depression 81 into which the roller 78 drops on every revolution of the shaft 51 when the books are being presented to the stitchers and when said roller moves into said depression the finger 75 moves the block 62 away from the way of the book and permits said pin to engage the collar 61 and thus lock the eccentric 52 for rotation with the shaft 51. The movement of the finger 75 is effected by reason of the book striking the dog 68 and thereby releasing it from engagement with the control rod 73, whereby the spring 80 rocks the shaft 74 to move the finger 75 to throw in the clutch. After one operation of the stitcher the continued rotation of shaft 51 causes the cam 79 to move the arm 77 upwardly, thereby rocking the shaft 74 upwardly, moving the finger 75 downwardly so that the block 62 throws out the clutch, and moving the rod 72 upwardly so that it is again engaged by the dog 68 which is normally moved toward the trough by a spring 82, see Fig. 2. Thus when the dog 68 is moved out of the trough the control rod 72 is free to reciprocate, but if for any reason no book should be presented to the first stitcher the dog 68 will be held in engagement with said rod and thus the rock shaft 74 will be held against movement, and the clutch will not be thrown in to cause operation of the stitchers.

The clencher mechanisms are actuated by a reciprocating bar 83 having a groove 84 therein in which the lugs 16 of the clencher are adjustably mounted, said bar being actuated on the rotation of the drive shaft 51 through levers 85, rock shaft 86, crank 87 which is normally moved by a spring 88 to hold the bar 83 in operative position and which is moved to rock by the shaft 51 to operate the clencher by means of a link 89 operatively connected at one end to said crank 87 and having a forked end 90 which is slidably movable transversely of the shaft 51, and carries a roller 91 which engages a cam 92 on the shaft 51, said mechanism being timed to operate the clencher at the time the staplers are operating. The rock shaft 86 is journaled in a bearing on a lever 93 carried by a bracket 94 so as to provide
for straight line movement of the clencher mechanism.

What I claim as my invention is:

1. In a book stitching machine, the combination with a frame, of stapler and clencher mechanisms carried thereby, a trough whose sides are formed of members connected to said stapler mechanism and clencher mechanism respectively, and means to simultaneously adjust said stapler and clencher mechanisms and the trough sides carried thereby toward and from each other.

2. In a book-stitching machine, the combination with a frame, of a plurality of stitchers, each consisting of a stapler and clencher, means for adjusting the positions of said stitchers on the frame at varying distances with respect to each other, a book guide formed in part by guiding means carried by the stitchers, interchangeable blocks of different sizes and a plate also forming a part of said book guide, and means for operating the stitchers.

3. In a book stitching machine, the combination with a frame, of a plurality of staplers and clencher mechanisms carried thereby, a movable bar upon which said clencher mechanisms are mounted, a movable bar connected to the staplers, shafts having right and left handed threaded portions in respective engagement with said bars, means for rotating said shafts for simultaneous movement of said bars toward or away from each other, and a trough having its sides adjusted toward and from each other by moving the stapler and clencher bars toward or away from each other to accommodate books of different thicknesses.

4. In a book stitching machine, the combination with a frame, of a plurality of staplers and clencher mechanisms carried thereby, a movable bar upon which said clencher mechanisms are mounted, a movable bar connected to the staplers, shafts having right and left handed threaded portions in respective engagement with said bars, means for rotating said shafts for simultaneous movement of said bars toward or away from each other, and a trough having its sides adjusted toward and from each other to accommodate books of different thicknesses.

5. In a book stitching machine, the combination with a frame, of a plurality of stitchers, a plurality of section members separating the stitchers, a trough for guiding a book past the stitchers, said trough having its sides formed by said stitchers and said sectional members, and means for adjusting the positions of the stitchers with respect to each other lengthwise of the frame.

6. In a book-stitching machine, the combination, with a frame, of a plurality of stitchers, means for adjusting the stitchers with respect to each other lengthwise of the frame, and an adjustable sectional trough including removable trough forming members forming trough sections between the stitchers.

In testimony whereof, I affix my signature.

MARTIN CHRISTENSEN.