

July 16, 1929.

P. E. KLEINEBERG
BOOK SQUEEZING MECHANISM

1,720,680

Filed May 6, 1926

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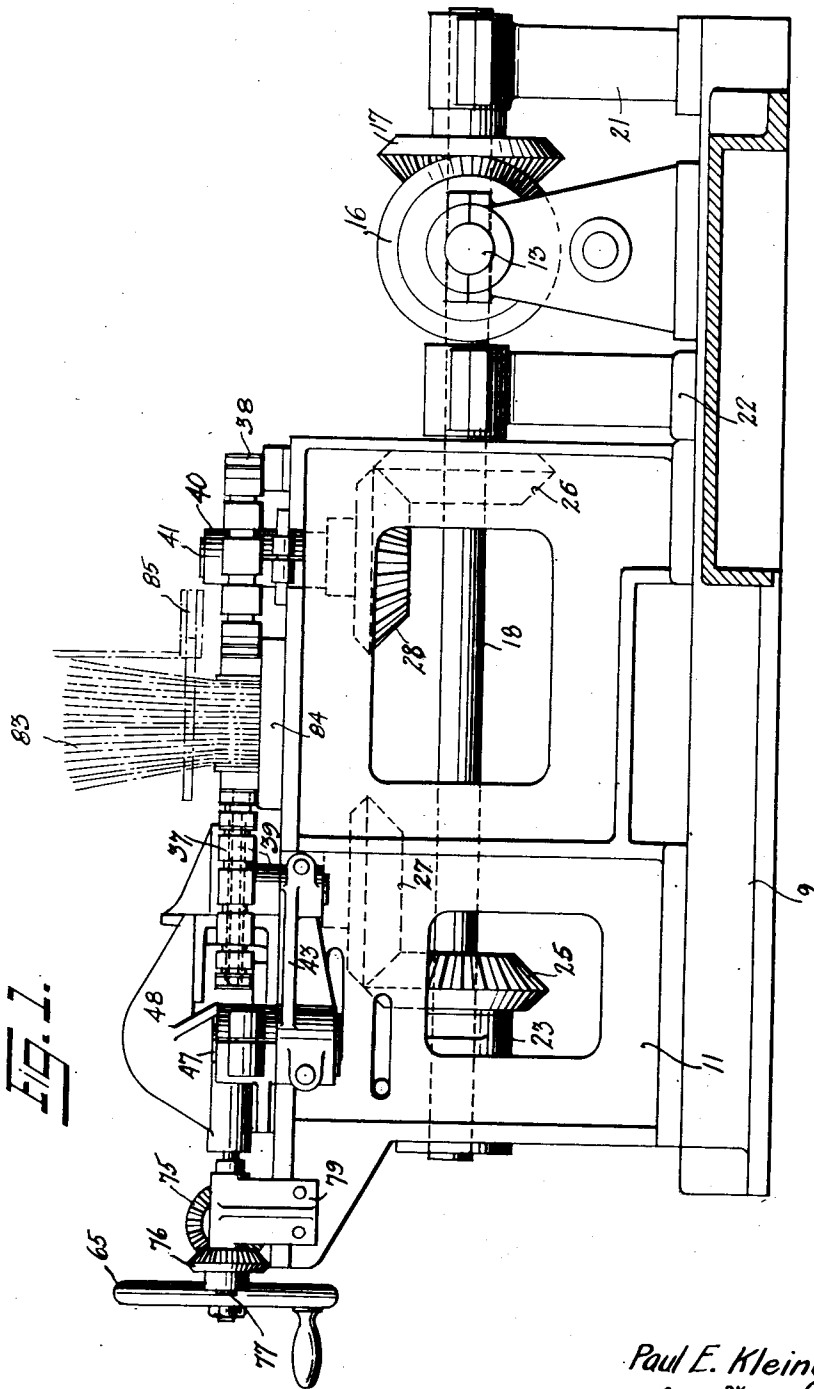


FIG. 1.

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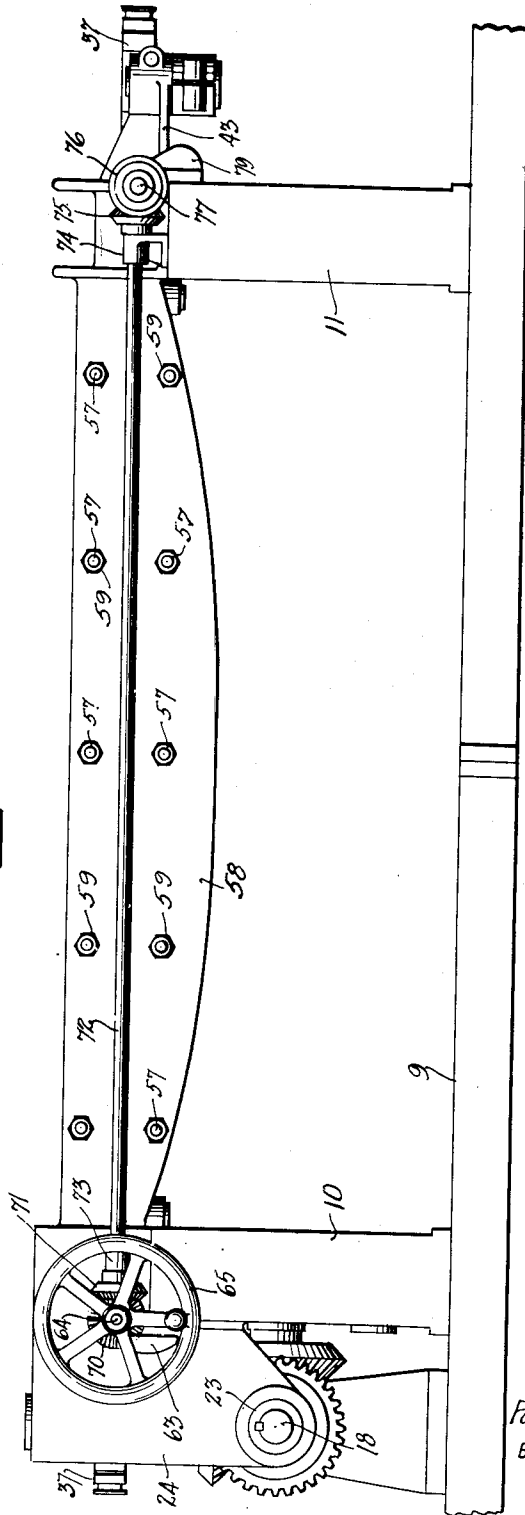
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Fig. 2.



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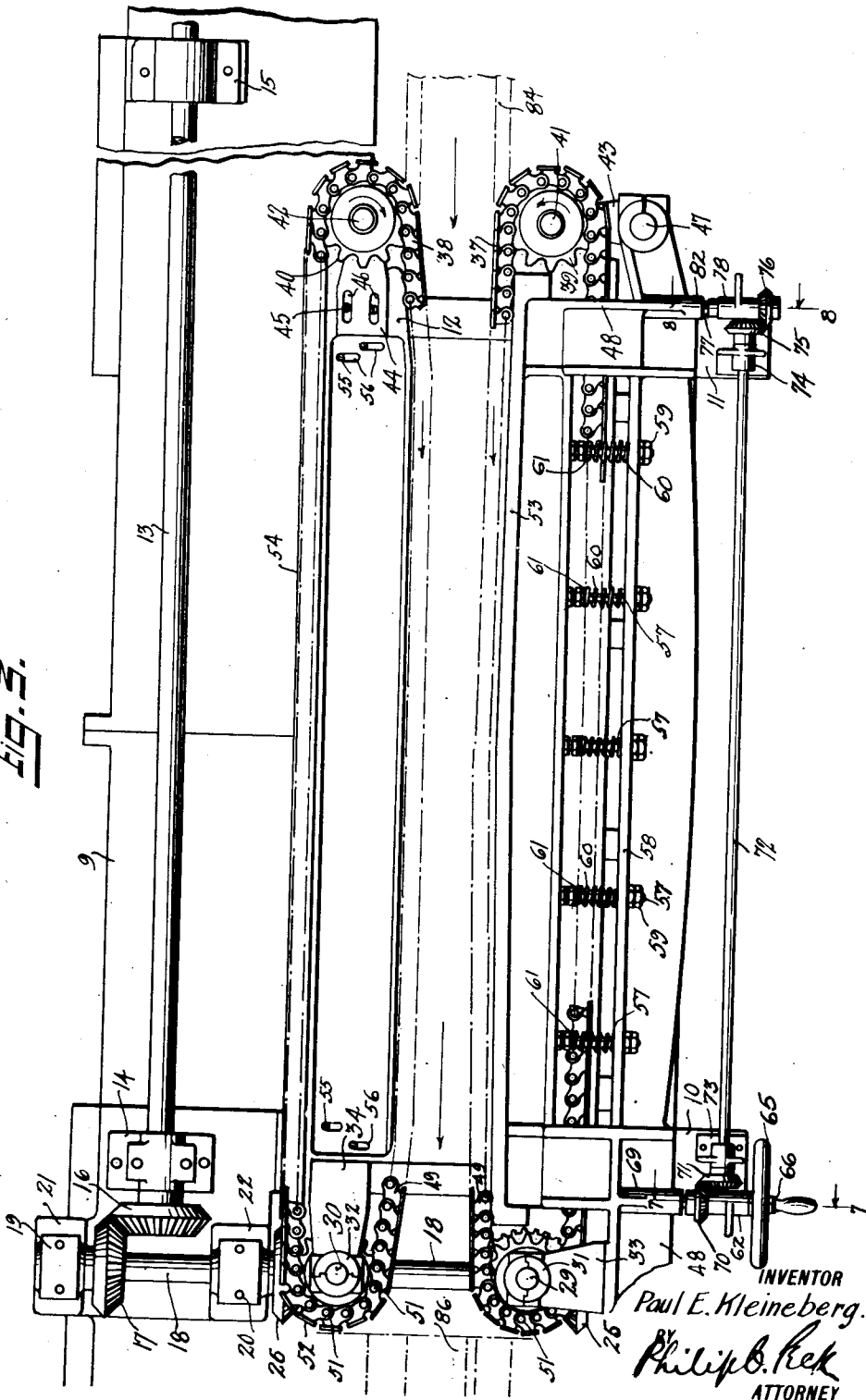
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FIG. 3.



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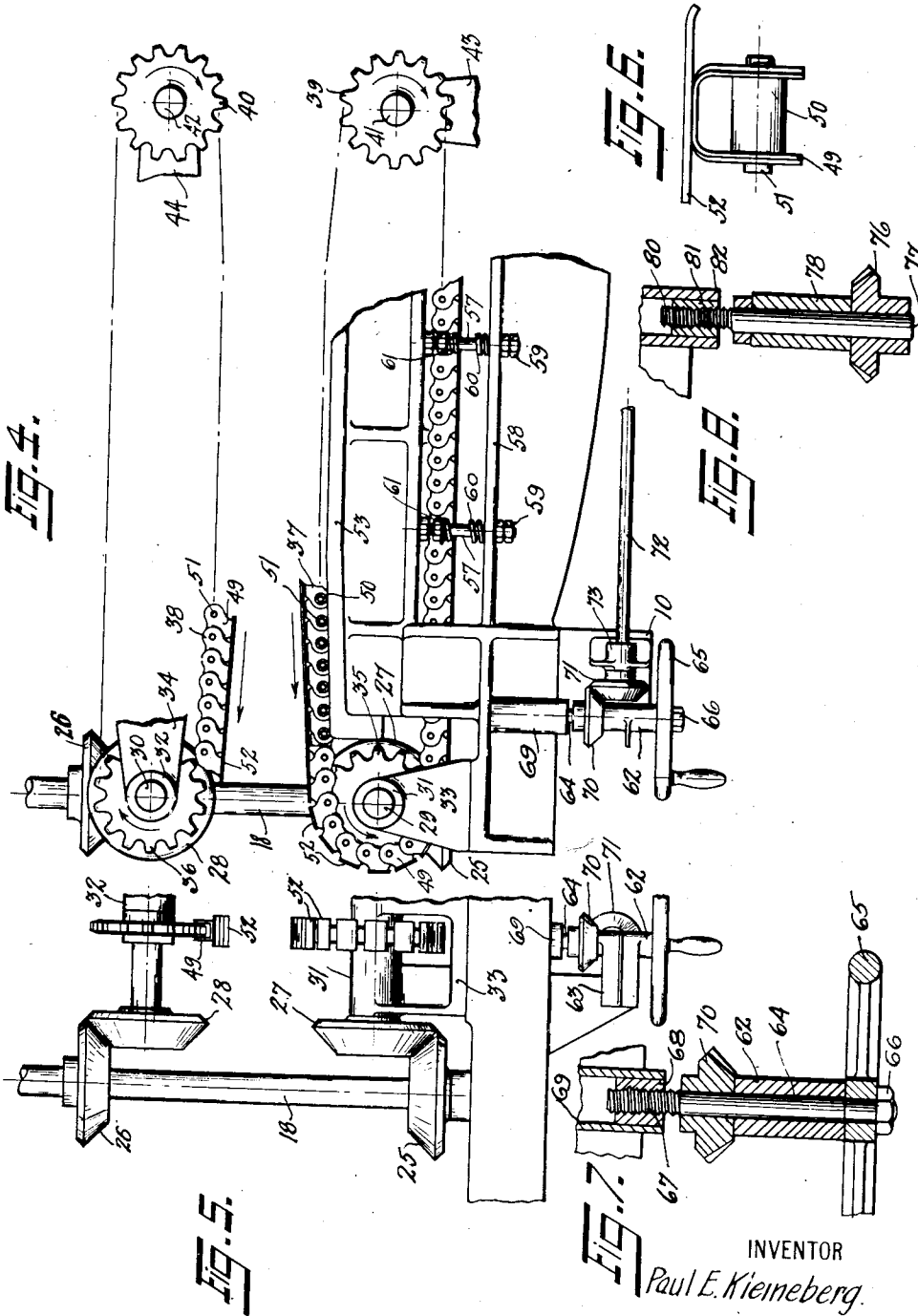
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4 Sheets-Sheet 4



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BOOK-SQUEEZING MECHANISM.

Application filed May 8, 1926. Serial No. 107,053.

My invention relates to improvements in signature gathering and bookbinding machinery, and particularly relates to improved mechanisms or attachments for squeezing the gathered signatures in vertical alinement as assembled books along their opposite sides adjacent the backs either before or after the book covers have been applied thereto.

The objects of my invention are, among other things, to provide an improved and simplified mechanism of this character which will shape the assembled signatures or book and also express or squeeze out the air adjacent the back occluded between the successive folds in the gathered signatures either before the book covers are applied or thereafter, while such book or assembled signatures are continuously advanced through my improved mechanism, coupled with novel means for yieldingly applying lateral spring pressure to such books or assembled signatures carried in vertical position and also for suitably adjusting the relative positions of the book-conveyors to books of different thicknesses all while the mechanism is in operation.

With these and other objects in view which will be hereinafter described, my invention also comprises the novel combination, construction and arrangement of the various parts embodied in my improved book squeezing mechanism, all of which will be set forth and then particularly pointed out in the appended claims, the drawings illustrating a preferred embodiment of my invention in which—

Fig. 1 is an end elevation of my improved mechanism looking from the right in Fig. 3;

Fig. 2 is a side elevation;

Fig. 3 is a top plan view;

Fig. 4 is a detail top plan view of parts shown in Fig. 3;

Fig. 5 is an end view looking from the left of Fig. 4;

Fig. 6 is an enlarged end view of a chain unit; and

Figs. 7 and 8 are enlarged sections, taken on the lines 7—7 and 8—8 respectively in Fig. 3.

Similar numerals refer to similar parts throughout the several figures.

Referring more particularly to Figs. 1, 2

and 3, the base 9 supports the two side-frames 10 and 11 to which is fastened the top-frame 12 extending horizontally between the frames 10 and 11. The drive-shaft 13 (Fig. 3) is journaled in the bearings 14 and 15 secured to the base 9 and is rotated in the proper direction from any suitable source of power (not shown). Mounted on the forward end of the shaft 13 is the bevel gear 16 coacting with the bevel gear 17 fastened to the cross-shaft 18 journaled in the bearings 19 and 20 carried by the standards 21 and 22 respectively as shown in Figs. 1 and 3, the front end of the cross-shaft 18 being journaled in the bearing 23 fastened to the bracket 24 as shown in Fig. 2. Keyed to the cross-shaft 18 are the bevel gears 25 and 26 which mesh respectively with the bevel gears 27 and 28 fastened to the front and rear upright studs 29 and 30 journaled in the bearings 31 and 32 carried by the brackets 33 and 34 respectively, the brackets being fastened to the top-frame 12 (Fig. 3). Mounted on the studs 29 and 30 are the two horizontally-disposed front and rear drive sprockets 35 and 36 respectively for the endless, looped front and rear conveyor or book-carrier chains 37 and 38.

The two conveyor chains 37 and 38 pass around the front and rear idler sprockets 39 and 40 mounted respectively on the upright studs 41 and 42 which are fastened to the horizontal front and rear brackets 43 and 44 respectively (Figs. 1, 3 and 4). As shown in Fig. 3, the rear bracket 44 is longitudinally slidable on the top-frame 12 by having screwbolts 45 project upwardly through the slots 46 formed in the bracket 44 so as to take up any slack in the rear conveyor chain 38, the bolts 45 carrying any suitable means (as wingnuts) to hold the bracket 44 firmly in any predetermined position on the top-frame 12. The front bracket 43 is adjustably clamped to the stub-shaft 47 mounted in the cam-plate carrier 48 extending longitudinally of the machine and in parallelism with the top-frame 12 as shown in Fig. 3. The front bracket 33 for the front stud 29 carrying the front drive sprocket 35 is also fastened to the carrier 48 as shown in Figs. 3 and 4.

The associated link structure of the conveyor chains 37 and 38 is substantially simi-

lar and a description of one chain construction unit will suffice for both. Each chain comprises a continuous series of inverted U-shaped links 49 which are riveted together with the rollers 50 journalled on the pins 51. Each link unit carries the outer flat face plate 52 welded or otherwise secured to the link 49 as shown in Fig. 6. The rollers 50 are adapted to engage the four sprockets 35, 36, 39 and 40 as shown in Figs. 3 and 4, and the face plates 52 abut against one another to form a substantially unbroken flat surface when the chains 37 and 38 are travelling in parallelism. The rollers 50 between the sprockets on the forward runs of the chains 37 and 38 are adapted to ride on the front and rear cam-plates 53 and 54 respectively, the outer surfaces of the cam-plates 53 and 54 lying between the tips of the links 49 and engaging the rollers 50 as shown in Figs. 3 and 4.

The rear cam-plate 54 is horizontally adjustable in the top-frame 12 by having screw-bolts 55 project upwardly through transverse slots 56 formed at either end of the plate 54 (Fig. 3) by which the rear cam-plate 54 may be clamped in any predetermined position relatively to the cam-plate 53. This rear cam-plate 54 is illustrated in its extreme forward position in Fig. 3.

The front cam-plate 53 is horizontally and yieldingly movable with respect to the carrier 48 by mechanism best shown in Figs. 2, 3 and 4: Projecting laterally from the rear of the cam-plate 53 are double sets of spring-rods 57 (ten being shown in Fig. 2) suitably spaced apart as shown in Figs. 3 and 4, the front ends of the rods 57 passing through holes cut in the web 58 of the carrier 48 and carrying the nuts 59 screw-threaded on such rod ends (Figs. 3 and 4). Coiled about each rod 57 is the compression spring 60 one end of which bears against the web 58 while the other end bears against the spring seats 61 screw-threaded on the rod 57 as shown in Fig. 4. By shifting such spring seats 61 along the rods 57, the pressure of the springs 60 in forcing the cam-plate 53 inwardly on the chain 37 may be varied at will; such springs 60 normally force inwardly the cam-plate 53 to the limit determined by the position of the nuts 59 adjustably threaded on the rods 57, such limit being adjustable by shifting the nuts 59 on rods 57 as will be readily understood.

Means are provided for advancing or retracting the carrier 48 and cam-plate 53 along with the front conveyor chain 37 according to different thicknesses of the books or assembled signatures passing through the machine. Referring to Figs. 3, 4, 5, 7 and 8, the bushing 62 secured to the bracket 63 attached to the side-frame 10 (Fig. 5) rotatably carries the adjusting screw-shaft 64

the outer end of which has fastened thereto the hand wheel 65 by the screw-nut 66 (Fig. 7). The screw-threaded end 67 of the shaft 64 coacts with the adjusting screw-nut 68 fitted into the outer end of the hollow bracket 69 integral with the carrier 48 as shown in Figs. 4 and 7. Adjacent the bushing 62 and fastened to the shaft 64 is the bevel gear 70 meshing with the bevel gear 71 secured to the cross-shaft 72 journalled in bearings 73 and 74 mounted on the side-frames 10 and 11 respectively (Figs. 2 and 3). Secured to the cross-shaft 72 adjacent the bearing 74 is the bevel gear 75 meshing with the bevel gear 76 fastened to the outer end of the adjusting screw-shaft 77 (Figs. 1, 3 and 8). The shaft 77 is journalled in the bushing 78 carried by the bracket 79 fastened to the side-frame 10, while its inner screw-threaded end 80 coacts with the adjusting screw-nut 81 fitted into the outer end of the hollow bracket 82 integral with the carrier 48 (Figs. 1, 3 and 8). The operator by turning the hand wheel 65 in either direction may advance or retract the carrier 48 and cam-plate 53 as a unit when required for thinner or thicker books, and while the mechanism is in operation.

Referring to Figs. 1 and 3, the assembled signatures or book 83 is conveyed in the direction of the arrows along the horizontal book-support 84 by any form of endless conveyor 85 shown diagrammatically in dot and dash outline in Fig. 1 and such books 83 are thereafter deposited on the delivery-board 86 shown on the left end of Fig. 3.

The operation of my improved book squeezing mechanism is substantially as follows: As the successive books 83 pass onto the support 84 from the run-way of the gathering machine (not shown), the backs of the books are seized on opposite sides between the converging parts of the conveyor chains 37 and 38 as shown in Fig. 1 and are carried between the parallel runs of the chains travelling at a uniform speed under yielding pressure from the cam-plate 53 until deposited on the delivery-board 86 as the chains 37 and 38 separate to pass around the sprockets 35 and 36 (Fig. 3). The shape of the cam-plates 53 and 54 where the hooks 83 are seized at the right end of Fig. 3 is such that a gradually increasing pressure is imparted by said plates 53 and 54 through the chairs 37 and 38 against the sides of the books along their backs whereby the folds of the gathered signatures are flattened and the air expelled from such folds to make a compact book of even thickness when delivered on the delivery-board 86. Should it be necessary either to increase or diminish the yielding spring-pressure imparted by the springs 60 to the books from the cam-plate 53, the operator may either advance or retract the carrier 48 by

revolving in either direction the hand-wheel 65 which permits of fine adjustments being made at both ends of the carrier 48, while the machine is in operation either for varying thicknesses in the books conveyed or for increasing or diminishing the spring pressure on the books derived from the cam-plate 53. The pressure from the individual compression springs 60 may also be varied by shifting the several spring seats 61 on the screw-rods 57 as herein explained. The books 83 may be fed from the signature gatherer continuously and in rapid succession between the chains 37 and 38 which ride easily along their respective cam-plates 53 and 54 due to the separate chain links having a rolling contact from the rollers 50 with the faces of the cam-plates 53 and 54, while the abutting flat face plates 52 of the chain links 49 enable the books 83 to be firmly grasped without leaving injurious impression marks of the separate links along the sides of the books.

Various changes or modifications may be made in the form of the structural parts of my mechanism without departing from the principle and scope of my invention or sacrificing its chief advantages.

I claim as my invention:

1. A book squeezing mechanism comprising two endless positively-driven converging conveyors travelling in unison in the same horizontal plane to seize the opposite sides of the book adjacent the back edges and carry same therebetween with an increasing pressure, means for holding one of said conveyors throughout its book-engaging length with a yielding pressure against one of said opposite sides of the book during its passage between said conveyors, and a single manually-operated mechanism for uniformly shifting said conveyor holding means laterally to vary said pressure on said conveyor while in contact with the book.

2. A book squeezing mechanism comprising two endless positively-driven converging conveyors travelling in unison in the same horizontal plane to seize the opposite sides of the book adjacent the back edges and carry same therebetween with an increasing pressure, means for holding one of said conveyors throughout its book-engaging length with a yielding pressure against one of said opposite sides of the book during its passage between said conveyors, and a single manually-operated mechanism for uniformly shifting said conveyor holding means laterally to vary said pressure on said conveyor during its engagement with the book and while the machine is in operation.

3. A book squeezing mechanism comprising two endless positively-driven converging conveyors travelling in a horizontal plane at a uniform speed to seize the opposite sides of the book adjacent the back edges and carry

same therebetween with an increasing pressure, means for holding one of said conveyors throughout its book-engaging length with a yielding pressure against one of said opposite sides of the book during its passage between said conveyors, and a single manually-operated mechanism for uniformly shifting said conveyor holding means laterally to vary said pressure on said conveyor during its engagement with the book and while the machine is in operation.

4. A book squeezing mechanism comprising two endless positively-driven conveyors travelling in horizontal alinement, oppositely-disposed cam-plates over which said conveyors travel, means for yieldingly holding one of said cam-plates in predetermined alinement with the other cam-plate, and a single manually-operated mechanism for advancing or retracting said yieldably-held cam-plate in uniform lateral alinement with the other.

5. A book squeezing mechanism comprising two endless positively-driven conveyors travelling in horizontal alinement, oppositely-disposed cam-plates over which said conveyors travel, means for yieldingly holding one of said cam-plates in predetermined alinement with the other cam-plate, and a single manually-operated mechanism for advancing or retracting said yieldably-held cam-plate in uniform lateral alinement with the other while the machine is in operation.

6. A book squeezing mechanism comprising two endless positively-driven link conveyors to seize and carry the book therebetween, the links having flat faces brought into uniform abutting alinement when engaging the book during the straight-line runs of the conveyors, means for yieldingly forcing one of said link conveyors against the book, and a single manually-operated mechanism for advancing or retracting said conveyor as a unit in lateral alinement with the other while the mechanism is in operation.

7. A book squeezing mechanism comprising two endless positively-driven link conveyors travelling in horizontal alinement to seize and carry the book therebetween, the links having flat faces brought into uniform abutting alinement when engaging the book during the straight-line runs of the conveyors, oppositely-disposed cam-plates over which said conveyors travel throughout their book-engaging length, spring-pressed means for yieldingly forcing one of said cam-plates against the book in lateral alinement with the other cam-plate, and manually-operated means for advancing or retracting said spring-pressed cam-plate uniformly with respect to the other while the machine is in operation.

8. A book squeezing mechanism comprising two endless positively-driven link con-

veyors travelling in horizontal alinement to seize and carry the book therebetween, the links having flat faces brought into uniform abutting alinement when engaging the book during the straight-line runs of the conveyors, spring-pressed means for yieldingly forcing one of said link conveyors against the book, and a single manually-operated mechanism for advancing or retracting said conveyor as a unit in lateral alinement with the other while the mechanism is in operation.

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