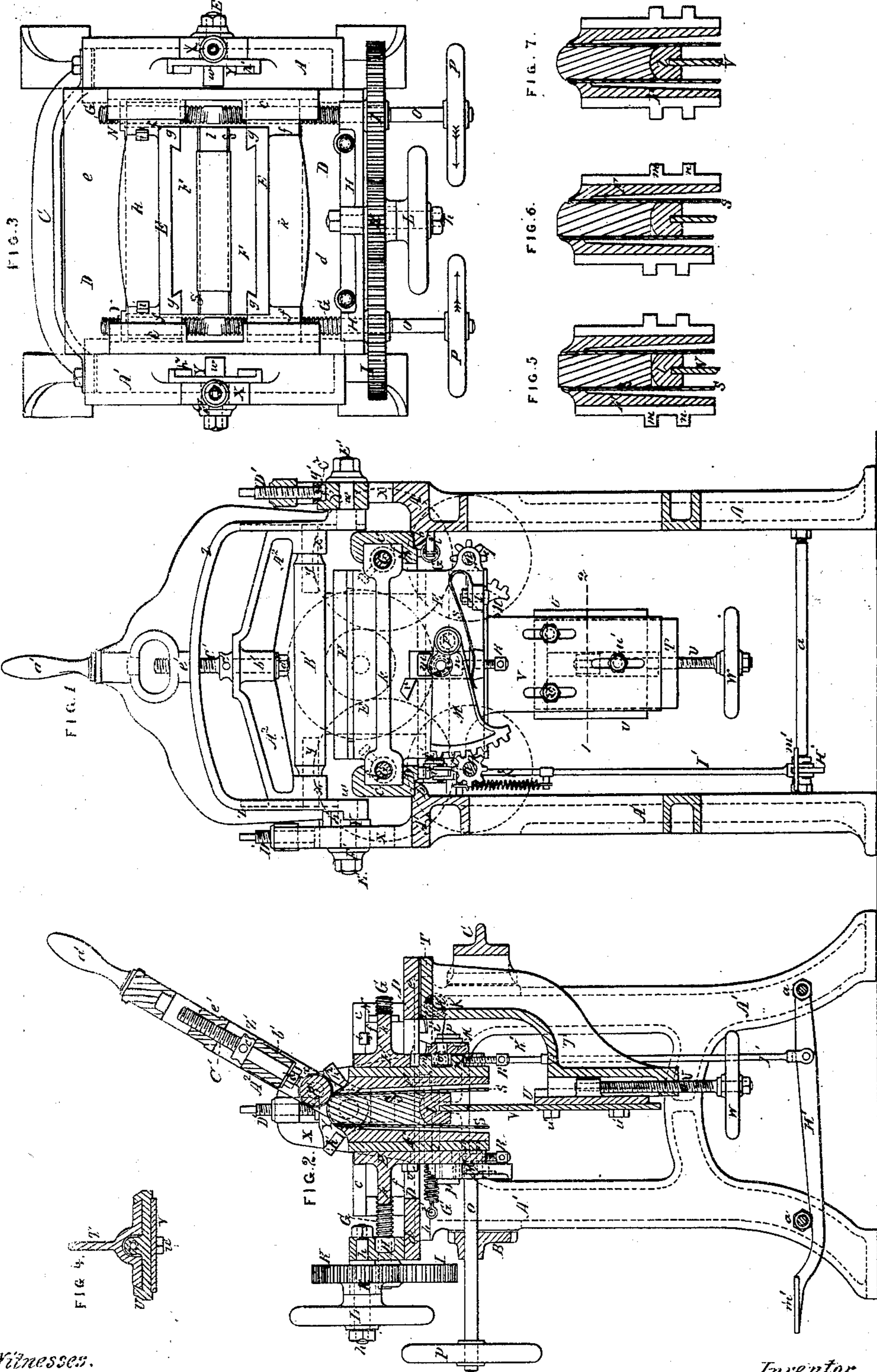


*T. Bergner.*  
*Book Binding Mach.*

*N<sup>o</sup> 17,480.*

*Patented Jun. 9, 1857.*



Witnesses.  
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Inventor.  
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# UNITED STATES PATENT OFFICE.

THEODORE BERGNER, OF PHILADELPHIA, PENNSYLVANIA.

MACHINE FOR ROUNDING AND BACKING BOOKS.

Specification of Letters Patent No. 17,480, dated June 9, 1857.

*To all whom it may concern:*

Be it known that I, THEODORE BERGNER, of the city of Philadelphia and State of Pennsylvania, have invented a new and Improved Machine for Rounding and Backing Books; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification, and in which the same letters of reference allude to similar parts throughout the several views.

Figure 1 is a front elevation of my improved machine for rounding and backing books, with part of it shown in section; Fig. 2 is a sectional side view of the machine; Fig. 3 is a plan of the same; Fig. 4 is a section on the line 1—2 (Fig. 1); Figs. 5, 6 and 7 are detached sectional views of the rounding apparatus, showing the book in the different states of treatment.

A and A' are the two frames or standards of the machine, connected together at the top by the crosspiece B (Fig. 2) in front, and by the crosspiece C at the back, the round rods *a a* serving as additional stays near the bottom. These frames are near the top on their insides provided with projections *b, b*, extending horizontally the entire length of the frames for the purpose of supporting and guiding the sliding frame D. This frame is of an oblong square form and consists in two parallel side pieces *c, c*, the front crosspiece *d* and backpiece *e*, leaving a square opening in the middle.

E and E' are two vertical plates, which by means of projections *f, f* are suspended and guided in corresponding grooves in the side-pieces *d, d* of the frame D; these plates are recessed on their faces to receive by means of dovetails *g, g* (Fig. 3) the clamping plates F, F which are thus allowed to slide vertically in the plates E, E', (for a purpose hereafter fully described.) It being requisite, that the center of the book, whether thicker or thinner, should always, when the book is confined between the clamps F, F, remain in the same place, these clamps and the plates E, E' are made to close or separate at equal speed by means of right and left hand screw threads on the spindles G, G, working in corresponding threads in the projections *f, f* of the plates E, E'. The screwspindles have their bearings in the stand H (secured

on the front of frame D) and through the spur-wheels I, I receive their motion from the pinion K, which is keyed to the hub of the handwheel L and with the latter turns loosely on the stud *h*; this stud is secured to the middle of the stand H and somewhat elevated above the centers of the screw spindles. For the purpose of facilitating the proper setting of the clamps F, F, so that their faces will stand parallel, the lugs *f, f* of the backplate E' are bored out large enough to receive the nuts N, N, which can be turned around until the desired position of the two clamps is obtained, and then made secure by the setscrews *i, i*. The plates E, E' are strengthened by ribs *k, k*, running horizontally across their backs and terminating in the projections *f, f*.

The book, with its face and ends cut smooth and its back glued in the usual manner, is placed between the clamps with its face downward and, resting on the block *l* in the manner shown at Fig. 5, subjected to a moderate pressure between the clamps by means of the handwheel L. The first operation, that of rounding its back and giving the face a corresponding concave shape is next performed by giving the clamps F, F the required downward movement, to impart to the face of the book the shape of the rounding of block *l*. This downward movement of the clamps is obtained in the following manner: The backs of the clamps F, F are each provided with two projections *m* and *n*, which to admit the plates E, E' are cut out in the manner shown at Fig. 1. A roller *o*, of sufficient diameter to fill the space between the projections *m* and *n* turns on a pin at the side of the segment M, which works on a stud *p* and receives motion through pinion *q*; these pinions are keyed to shafts O, O, which besides their journals in the projections *r, r* (Fig. 1) of plates E, E' have additional bearings in the crosspiece B, and which at their outer ends are provided with handwheels P, P. It will be easily seen, that by turning these handwheels in the direction of their arrows (Fig. 3) the rollers *o* will by their pressure against the projections *n* cause the clamps F to move downward. Springs *s*, fastened to projection *t* on the plates E, E' will push up the clamps by their pressure against the bottom of segments M, M, when the pressure against the book is released,

and bring them back into the position shown at Fig. 5. The segments M, M, by coming in contact with the projections *u*, prevent the clamps from rising beyond this limit. By means of set screws R, R the termination of the downward movement of the clamps is limited and regulated to suit different size books. The great end pressure of the face of the book against the block, which would be unavoidable by moving both clamps down simultaneously, is obviated by bringing them down in succession. The thin plates S, S are attached to the upper face of clamps F, F, and are made elastic enough to yield upon coming in contact with block *l*, when the upper part of the book is subjected to additional pressure, before the backing is performed.

To the bottom of the back crosspiece *e* of the sliding frame D is bolted the bracket T, on the face of which works the dovetailed slide U. (See Fig. 4.) To this is by means of screws *v* secured the plate V, which receives and supports the block *l*, the latter being at its lower side provided with a groove, corresponding with the thickness of the plate. The block can therefore be readily removed and another put in its place, as books of various thicknesses shall require. *v* is a screw spindle which works in a corresponding thread at the bottom of bracket T and with its upper end fits into a projection on the back of slide U. It is turned by means of the handwheel W and serves to regulate and vary the height of the blocks for different size books.

The main standards A and A' are each on their top provided with frames X, X for receiving the sliding boxes Y, Y. To these boxes are fitted the pins *w*, *w*, on the inner projections of which vibrates the frame Z. The two arms of this frame are on their inner sides provided with grooves into which are fitted by means of corresponding tongues the ends of the crosshead A<sup>2</sup>; into its round bosses *x*, *x* are tightly fitted the pins *y*, *y*, on which works the roller B'. By imparting a vibrating motion to the frame Z (which the operator does by means of handle *a'*) the roller B' is caused to pass with considerable pressure over the back of the book in the manner shown at Fig. 2, thus performing the "backing," which consists in lapping over the outer portions of the back for the reception of the covers. For the purpose of altering the distance of the roller from the center of vibration of frame Z, to describe greater or smaller arcs, (as the difference in the thickness of books may call for) the crosshead A<sup>2</sup> is made adjustable by means of the spindle C'. This spindle turns with its lower part freely in the eye *b'* of the crosshead, the collar *c'* and nut *d'* forming shoulders against the latter, while the upper portion of the spindle

screws into the boss *e'* of frame Z. By turning the spindle in the required direction, the crosshead and roller may therefore be elevated or lowered, as desired. To further allow the regulating and setting of the whole swing-frame, the boxes Y, Y, with their journal pins *w*, *w*, are so arranged in the frame X X, that by means of screws D', working through the round parts in the top of the frames, they may with frame Z be raised or lowered, as desired. The round heads *c*<sup>2</sup> at the lower end of screws D' are confined in the top of the boxes by means of followers *g'*, the screws being allowed to turn freely in their boxes. The nuts E<sup>2</sup> and washers F' on the outside projections of the pins *w* serve to secure the boxes Y firmly to the frames X, when the swing frame Z is properly adjusted. The boxes Y, Y have projections *h'* *h*<sup>2</sup> on their flanges, which, coming in contact with the frame Z, limit the vibration of the latter, which is a little more than  $\frac{1}{4}$  of a circle.

The frame D, resting on projections *b*, *b* of standards A, A' is for the purpose of facilitating the putting in and taking out of the books made movable and is kept in the position required for the proper action of backing roller B' by the catch *i'*, which works on a pin K' near the back of standard A'. The spiral springs G', with their front ends attached to pins *t'* on the standards A, A' and with their other ends connected to the bottom of sliding frame D, serve to pull this frame forward, when the catch *i'* is disengaged. This is effected by a pressure of the operator's foot on the plate *m'* of the foot lever H', which works on the backstay *a* and gives motion to catch *i'* by means of rod I', the lower end of which is connected to the foot lever while its upper end is jointed to the catch. The spiral spring K' has a tendency of pulling the rod I' and lever H' in an upward direction and of throwing in the catch *i'*.

Operation: When a number of books of a certain size are to be rounded and backed, the operator will first set in a block *l* of the required thickness and rounding, and adjust it in such a manner by means of handwheel W, that the back of the book, when resting with its face on the block (as shown at Fig. 5) shall extend sufficiently above the edges of clamps F, F, to allow the required lap for the reception of the covers. The space of movement, which is required for the clamps F, F, to impart to the face of the book the shape of block *l*, is next regulated and limited by means of the setscrews R, R. When further the swing frame Z and its roller B' are adjusted in the manner before described, the machine will be ready for operation. While the catch *i'* is disconnected and the table D pulled forward by the spiral springs G', the book is placed between the clamps

F, F with its face downward, and, resting on  
 the block *l* in the manner shown at Fig. 5,  
 subjected to a moderate pressure by means  
 of handwheel L. The book is then rounded  
 5 by turning the handwheels P, P successively  
 in the direction of their arrows (Fig. 3,)   
 thus actuating by means of pinions *g, g* and  
 segments M, M the clamps F, F in the man-  
 ner above described. By an additional turn  
 10 of handwheel L the book is next compressed  
 tighter between the clamps, whereupon the  
 sliding table D is pushed back and the cen-  
 ter of the book held vertically with the cen-  
 ter of motion of the swing frame Z by the  
 15 throwing in of catch *i'*. A vibration of the  
 swing frame and the consequent pressure of  
 roller B' over the whole surface of the back  
 of the book will perform the backing (as  
 shown at Fig. 2). This being done, the  
 20 swing frame is allowed to rest against the  
 stops *h*<sup>2</sup>, while at the same time the catch *i'*  
 is disengaged by a pressure of the foot on  
 the plate *m'* of the lever H', when the spiral  
 springs G' will pull the sliding table for-  
 25 ward, thus allowing a ready removal of the  
 finished book, when by means of the hand-  
 wheel L the pressure of the clamps is re-  
 leased. Upon the release of this pressure  
 the springs *s, s* will by their action against  
 30 the lower edges of segments M, M cause the  
 clamps F, F to rise and resume the position

shown at Fig. 5, in which they are ready to receive the next book.

Having now described the nature of my  
 invention, I wish it to be understood, that I 35  
 am aware, that a roller and swing frame are  
 employed in the backing machine of John  
 A. Elder, patented July 26, 1853; I there-  
 fore do not claim these parts exclusively,  
 but 40

What I claim and desire to secure by Let-  
 ters Patent is:

1. Giving a sliding motion to the clamps  
 F, F by means of segments M, M and pin-  
 ions *g, g*, or any equivalents to the same 45  
 substantially in the manner and for the pur-  
 pose specified.

2. I claim the sliding table D, plates E,  
 E', and clamps F, F in combination with  
 the swing frame Z and roller B', the whole 50  
 being constructed and operating substan-  
 tially in the manner and for the purpose set  
 forth.

3. I claim the employment, in combina-  
 tion with the sliding clamps, of adjustable 55  
 blocks *l* substantially in the manner and for  
 the purpose described.

THEODORE BERGNER.

Witnesses:

COLEMAN PELEN,  
 Jos. B. HOUGH.