

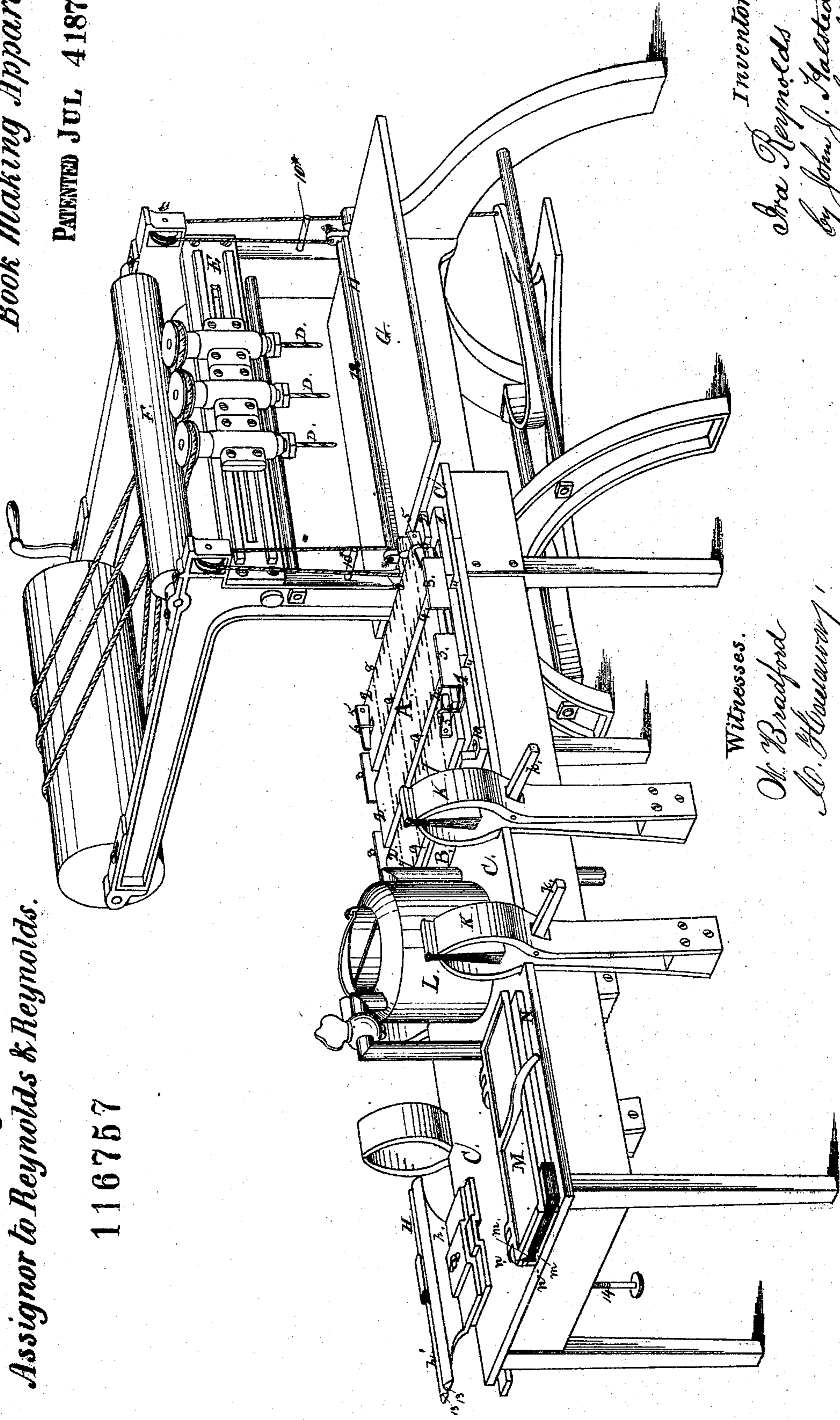
Ira Reynolds,
Assignor to Reynolds & Reynolds.

Book Making Apparatus.

PATENTED JUL 4 1871

116757

Fig. 1.



Witnesses.

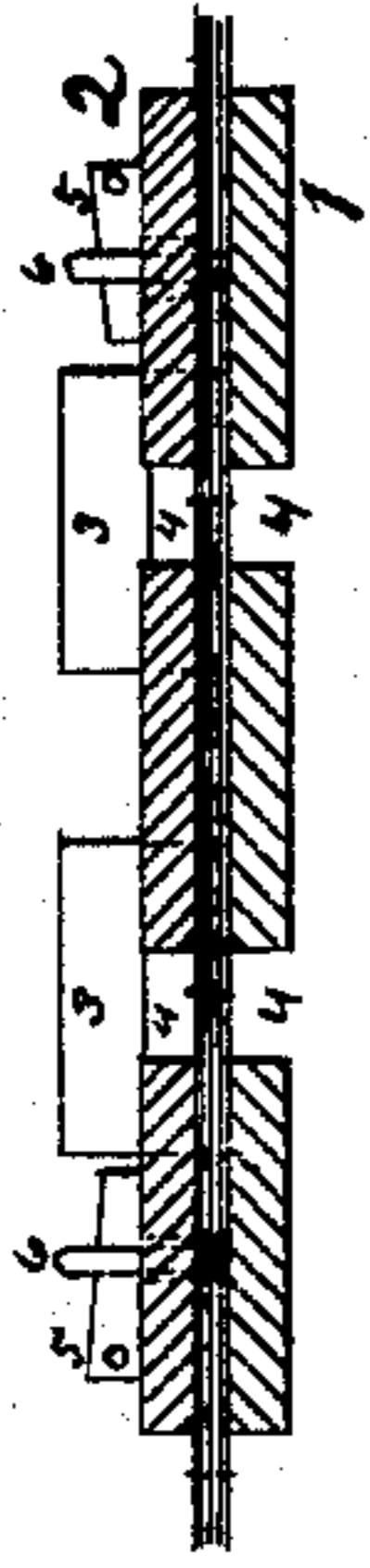
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W. H. Hurlaway

Inventor.

Ira Reynolds
by John J. Halsted
his Atty.

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Fig. 6.



2 Sheets,
Sheet 2.

Book Making Apparatus.

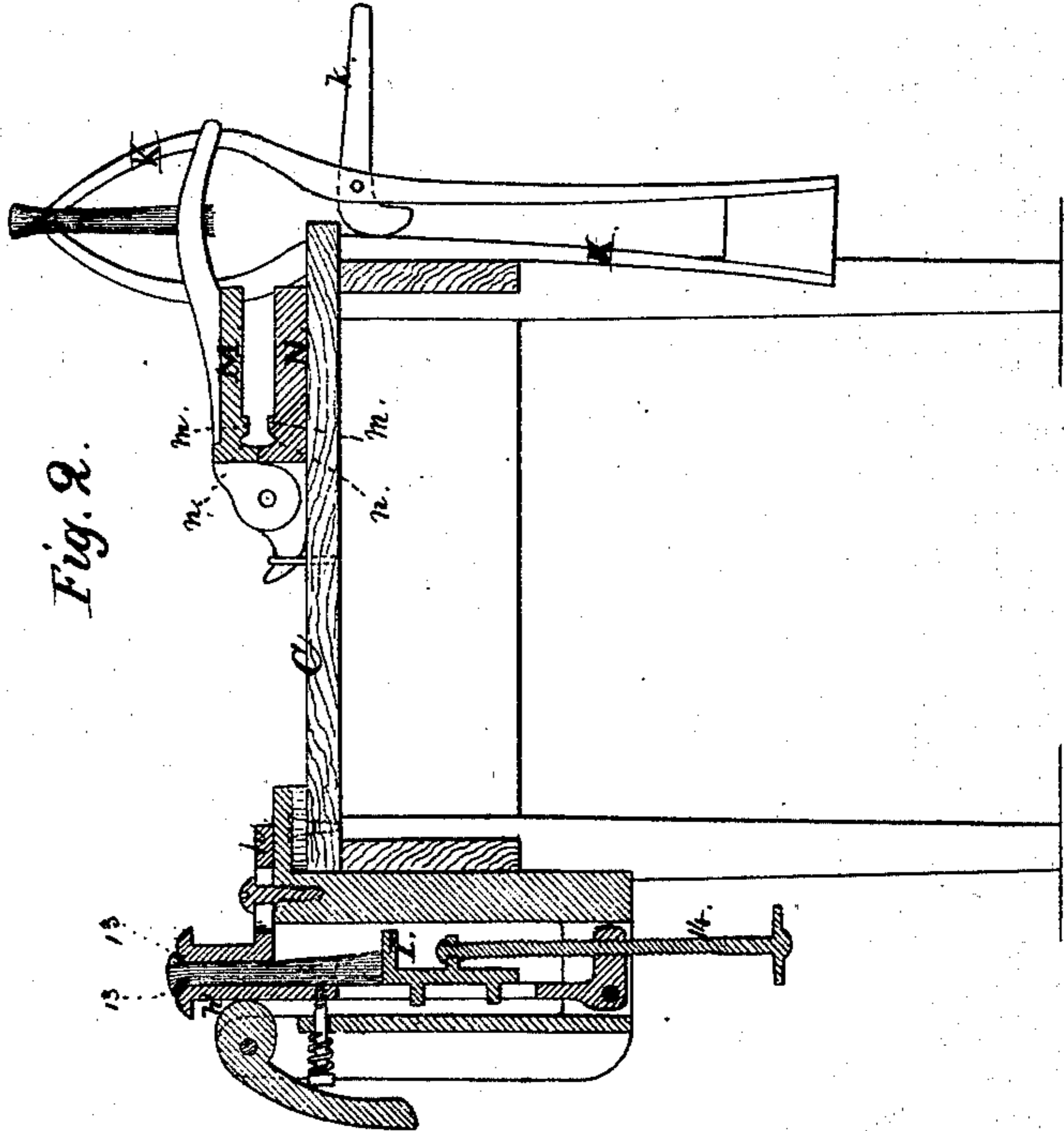


Fig. 2.

Fig. 4.

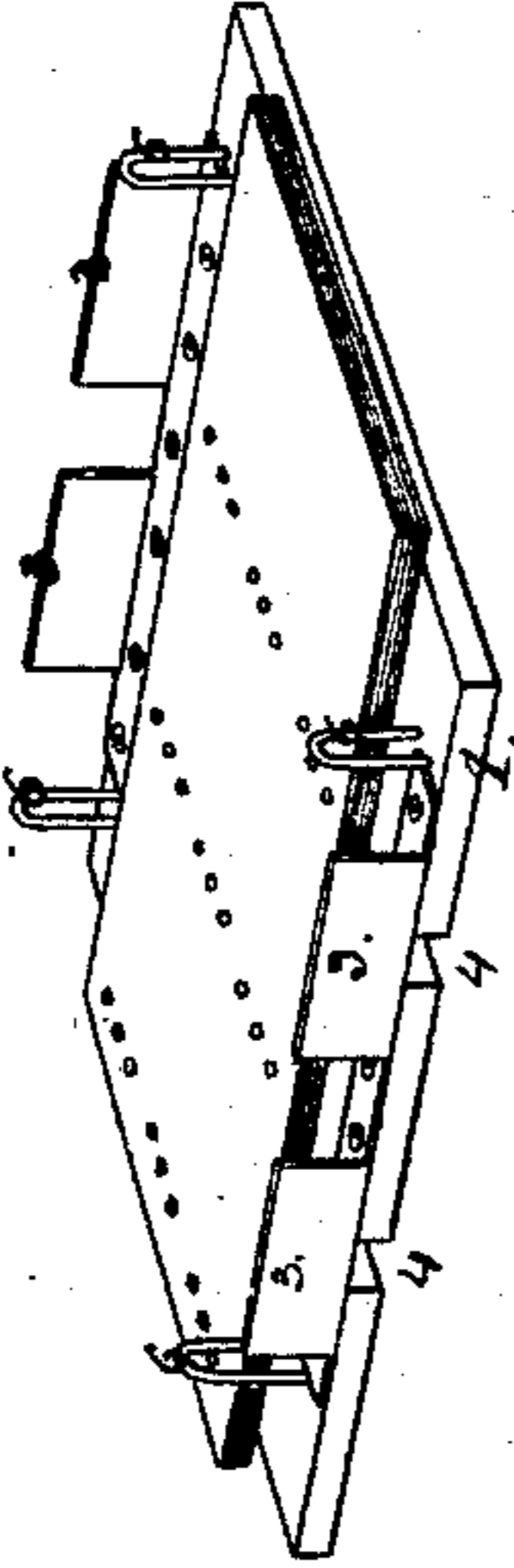


Fig. 5.

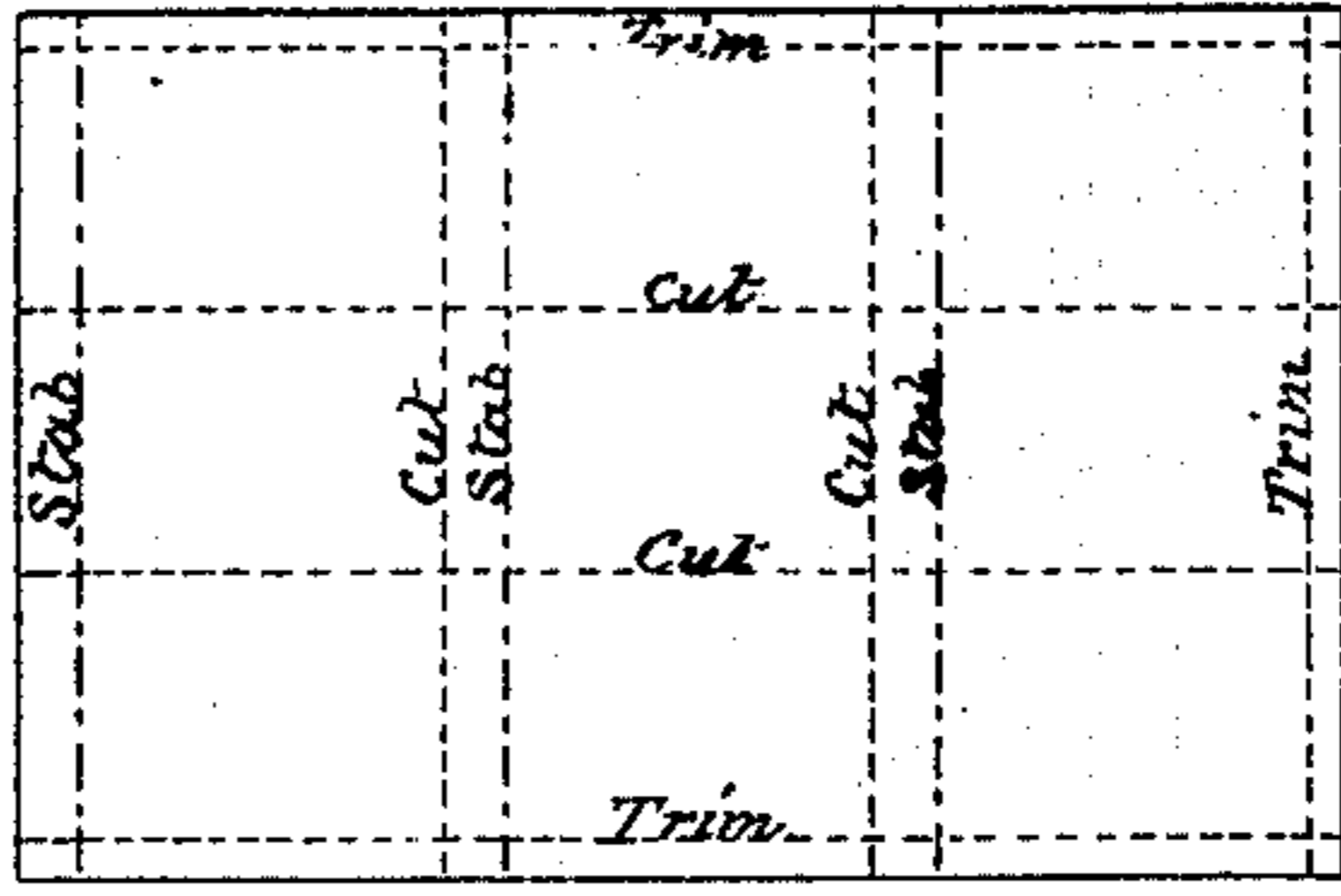
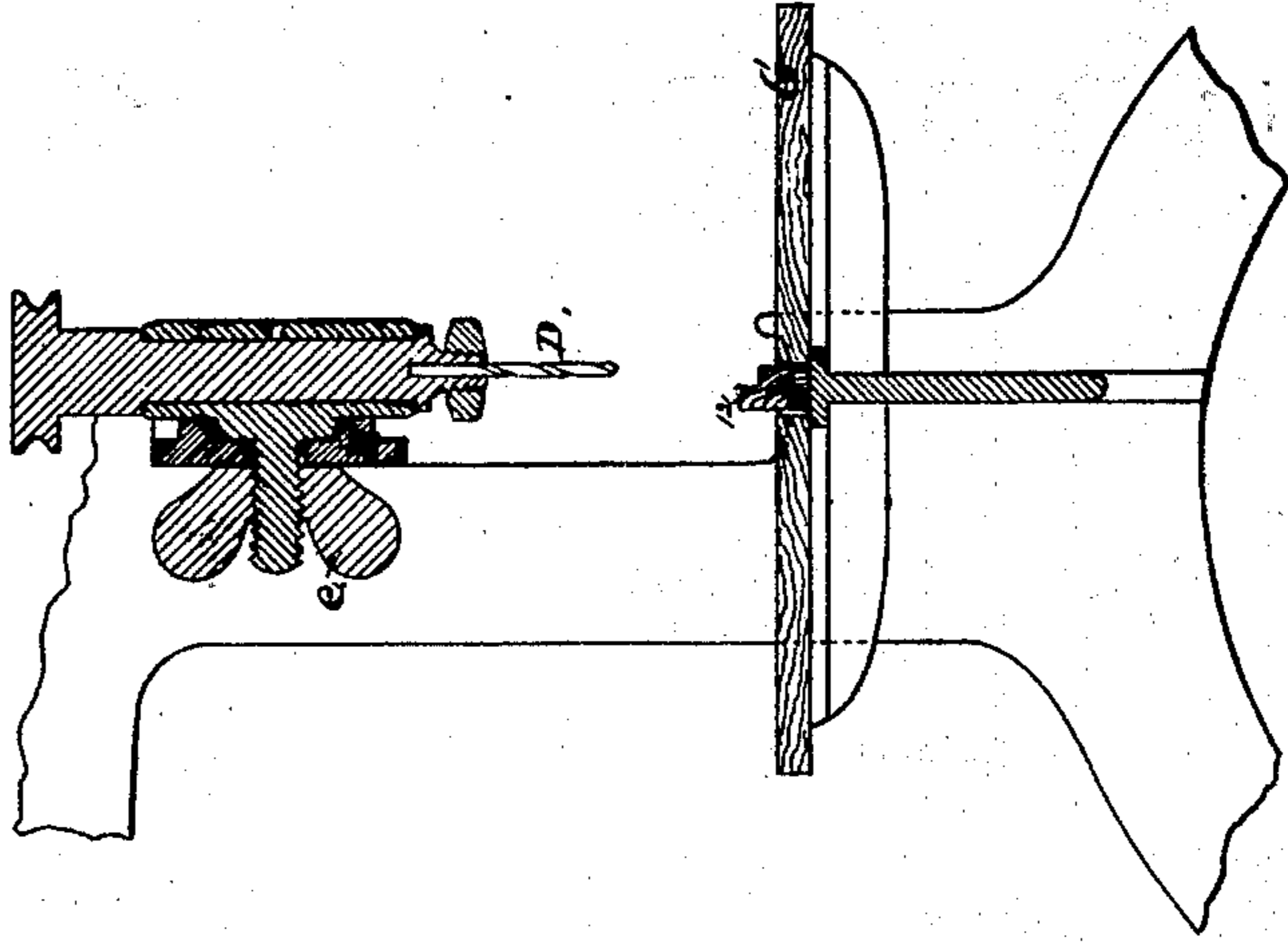


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

IRA REYNOLDS, OF DAYTON, OHIO, ASSIGNOR TO REYNOLDS & REYNOLDS, OF
SAME PLACE.

IMPROVEMENT IN BOOK-BINDING APPARATUS.

Specification forming part of Letters Patent No. 116,757, dated July 4, 1871.

To all whom it may concern:

Be it known that I, IRA REYNOLDS, of Dayton, in the State of Ohio, have invented a novel method of making books and certain machinery and apparatus for making books preparatory to binding; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention, sufficient to enable those skilled in the art to practice it.

My invention relates to the preparation for binding of blank or other books of any kind which are susceptible of being stabbed and sewed or fastened together without folding the paper; and it consists in the special mechanism which I have contrived for that purpose, the books produced thereby having each a back with ribs, adapted to be slidden into and held tightly by a rigid back of a removable cover, such, substantially, as is shown in my patent No. 98,191, dated December 21, 1869.

In the drawing, Figure 1 is a perspective view of my apparatus. Fig. 2 is a transverse section through the center of the preparatory-shaper and finishing-shaper, and through the table. Fig. 3 is a transverse section through the perforating apparatus and its table and guide-bar or rib. Fig. 4 represents the sheets of paper in the clamping-frame after the paper has been perforated and the upper part of the clamp removed. Fig. 5 is a diagram showing the lines at which the sheets are stabbed or perforated, the lines at which they are severed into rows of books, and also the lines at which the books are trimmed; and Fig. 6 is a cross-section of the clamping-frame and the paper held therein.

A is a clamping-frame, formed, as shown, in two separate parts, 1 2, and of as many sections and spaces as may be desired, to produce any number of books, each section being as wide as the length or width of any book desired to be made, less that portion which is to receive the perforations; or they may be made twice this size, with two lines of holes to be made in the sheets between any two sections of the frame, in which case the books, when severed apart, as herein-after stated, will be cut in a line central between two lines of perforations, and also in a line coinciding with the center of each section of the clamp. Between the two parts of the clamping-frame are

placed, piled one upon another, as many sheets of paper as there are to be leaves in the book, proper guide-pieces, 3 3, serving to bring the two parts in proper relation to each other, and each part having corresponding slots, 4, running transversely, suitable keys or eyes, 5 6, serving to lock together the two parts and the interposed paper. Guide-marks, shown at 7 and 8, and which may be on both parts of the clamp, serve to aid in placing the pile of paper in proper central position, other and smaller marks, 9 9, serving to guide the eye in a subsequent operation of making holes through the books for stitching. To insure the proper position lengthwise of the sheets before they are clamped tight preparatory to having the holes made, a cross-bar or rib B, of special construction, is secured upon the table C. This rib has its front part, 10, of a height about equal to the thickness of the lower part of the clamp A, but its rear part is much higher, and stands back from the front a distance precisely equal to that to which the body of paper is to project, in order that it may receive the drill-holes for the stitches. When the paper is in the clamp the latter is placed upon the table so that the projecting ends of the paper shall be toward the rib. The clamp is slid so as to abut and true itself against the lower part of the rib. The paper is next pushed back until it abuts against and trues itself against the upper or rear part of the rib, and, the sides of the paper being also trued to proper place, the clamp is then tightened up, and the whole is ready to be transferred to the perforating apparatus above named. This part of the apparatus consists of a series of revolving "bits," D, secured in spindles arranged in a slotted cross-piece, E, so that they may be adjusted at any desirable distance to or from each other by means of thumb-screw e, or any appropriate means which will permit their being shifted and secured at the proper positions. Each of these spindles is driven by a pulley, through the medium of a cord or belt driven from a drum, an ordinary guide-roller, F, serving to keep the cords to position on the pulleys. The drill or perforator which I have shown is a bit having a spiral groove therein, and it does not act, like a mere awl or non-revolving pointed instrument or needle, to force its way through the hard mass of paper against great resistance, as is usual in book-making, nor does it, like such implements,

leave a hole somewhat conical nor having a swelled nor raised bur at either side of the book, which is afterward to be reduced to avoid leaving an uneven surface. On the contrary, my perforator drills a clear hole of uniform diameter, leaving the opposite surfaces of the paper smooth about the hole and in perfect condition for the after operations; and this is of great importance, in view of the character of book I make and the necessity of having the back of every book of a given class quite regular and of uniform surface and thickness, that it may properly fit its removable cover in case such cover is wanted. Instead of having a spiral groove, the bit may be what is known as a "pod-bit," or any other revolving bit which will properly drill the hole. The great advantage and economy of this drilling action upon paper grow in a great measure, also, out of the fact that paper, being calendered and also sized, an awl is forced through with great difficulty and much waste of power, only two awls being forced through at one time. With my drills the same amount of power required for two awls will drive twenty drills, besides making far more perfect work and leaving smooth the clean holes and surfaces and largely economizing time. The frame which supports the cross-piece and its revolving bits also supports a vertically-movable table, G, arranged to rise and fall in side ways or guides, and which is connected, by means of cords and pulleys, with a foot-treadle, the latter serving to lift the table when desired, stops 10* limiting its ascent. This table is constructed with a peculiarly-shaped cross-piece or guide-bar, 11, adapted for the application of the slotted clamp before named to the table in proper positions to insure the perforating of the pile of paper at the proper, and only the proper, lines or points at which the stitching is to be put into each book near its back edge. The length of this bar and its greater horizontal thickness are such that it may enter the slot in the clamp and permit the latter, while holding the paper inclosed, to lie flush upon the table. The bar has also a rabbet of such height and depth that when the clamp is first laid upon the table and slid up to the bar a portion of the lower side of the projecting end of the paper will rest upon the top 12 of the bar and be supported by it against the pressure of the drill during the drilling operation, a free space between the highest part of the bar and the end of the clamp being left sufficient to prevent the drill from coming in contact with either. The stops 10* prevent the table from rising, when the drilling takes place, high enough to bring it into contact with, and so as to be damaged by the drills. The clamp and paper being thus adjusted in true position, (the lines or marks before mentioned as being upon the clamp, guiding the eye as to the distance from the sides at which the perforations are to be drilled,) the drills, being put in motion, will of necessity and unerringly make the holes at the exact predetermined distance from the end of the sheets, which end is to be the back of the first row of books to be formed out of the clamped sheets. One set of holes being thus made, the clamp is shifted laterally, but

still in contact with the ledge or guide-bar H, to bring another set of marks in line with the drills, which are then again put in operation, and this operation is repeated until all the holes required for that row of books shall have been made. Next, without unlocking the clamp, it is lifted and put backward until placed over the bar 11, which now lodges in the first cross-slot in the clamp, the latter again lying flush with the table. Everything is now in readiness for the action of the drills to make a similar set of holes in the body of the clamped sheets, and which holes must come unerringly at the precise points previously determined, near that line at which the sheets are to be transversely severed. This operation is again repeated until all the drilling required for all the books the sheets are to make has been done. It will be seen that the clamp and bar being made true and properly used, there is absolute precision in always having every hole perfectly true and at the same exact distance from that line which is to become the back of the book, and that no calculation is needed, no failure can happen, and a child can attend the machine.

The books may be drilled so as to come back to back before being cut, if desired, by a slight adaptation of the parts for that purpose, as, for instance, by having the breadth of the slot made twice as great as the distance that the paper projects from the clamp, and then reversing the clamp after making one set of holes, and repeating the action for another set.

The entire body of paper being thus drilled as required, the clamp and paper are removed from the table and the stitching of the paper together at these perforations is next done by hand. This may be done while in the clamp, or after removing it therefrom, as may be found convenient under different circumstances.

The paper is now cut through both lengthwise and crosswise of the sheet, by hand or any appropriate cutting apparatus, in lines corresponding with the dotted lines in Fig. 5, and the whole body now forms a number of books—as many as the size of the sheets could afford. Except the trimming at one end and two sides of the large sheets, no trimming is required, for the lengthwise and transverse cutting itself leaves finished trimmed edges for each book.

The books are next to be passed to a compressing and forming device for the purpose of having a swell or rib put upon each edge at the back. For this purpose a vise, H, is employed, having at each of its inner top edges a bevel, 13, the remainder of the inner faces of the vise being vertical and parallel. When the books are placed in this vise in the position as shown, the outer jaw is, by means of a hand cam-lever, pressed toward the adjustable but stationary jaw *h*, and the book being compressed to the full extent of the power of the cam, it will reduce the thickness of the book at that point precisely to a predetermined size, while that part of the book which projects beyond the vise will swell and conform itself to the bevels and thus assume approximately the form of ribbed back required. This vise

may be properly styled a "preparatory-former," and it leaves the book in a condition to receive a strip to be pasted upon the back for a purpose to be presently named. The outer jaw *h'*, when released by the cam-lever, is returned by a spring. The inner jaw is made adjustable to any position required by the thickness of the book to be shaped, and, when properly adjusted, a distance is left between the jaws (when the lever has moved the outer one up) exactly to accord with the amount of compression required. A horizontal shelf or rest, *I*, serves to receive and support the lower end of the book or books, and it is made adjustable vertically by means of a screw, *14*, so as to accommodate books of different sizes and to permit the backs of the books to receive any amount of swell desired. While in this vise, or just before placing them there, the backs are moistened, so that they will readily take a "set" to the bevel shape of the jaws, and they are pressed down to shape by a wooden or other rubber passed over the back.

The books are next passed from this preparatory vise to the self-closing spring-clamps *K*, which automatically hold them, as shown, the cam-lever *k* serving to release them. While so held their backs are glued by the attendant, and a strip of paper, having its surface also glued, is applied to the back, such strip with the glue giving additional strength and stiffness to the back, and also concealing the perforations and stitches. As a number of pasters can be kept busy at the same time, I use a number of these clamps upon the same table, and place in convenient reach for all a glue-pot, *L*, heated by a steam-pipe and having an exit drain-pipe to keep the water at the proper elevation.

The books are next removed to the finishing-former *M N*, which serves to give, by compression, the precise proper and uniform size to all parts of the ribbed back; it also finishes, straightens, and gives true parallel lines to all the sides of the back, reducing any inequality which may

be left in them after coming from the first former and from the rubbing and gluing operations. The two ribs *m m* on the finishing-former also set and clamp the glued strip compactly and closely to the paper, while the two grooves *n* and *n* in the two parts of the former (making, when it is closed, a connected channel-way) likewise press true, and align the back and fasten the glued strip thereto. That portion of the inner faces of the finishing-former which is forward of the rib *m* is cut away so as not to press upon the book. This former is made of a size adapted to a book of a given size, while the jaws of the preparatory-former are adapted for books of any size. The lower part *N* of the finishing-former I secure to the table, and the upper part I have shown hinged to it, a handle serving to give compression by leverage. The upper part may, however, be arranged to slide vertically and act as a drop.

I claim—

1. The clamping-frame *A*, made in two parts, each part having cross-openings corresponding with those in the other, and having marks to indicate the points at which the sheets are to be perforated, substantially as shown and described.

2. Such clamping-frame, in combination with the table *C* and its rabbeted cross-bar *B*, or with the table *G* and its cross-bar *u*, substantially as shown and described.

3. The combination, in a book-making apparatus, of the adjustable revolving bits, a work-supporting table, and the clamping-frame *A*, substantially as shown and described.

4. The preparatory forming-jaws *h h'*, each formed with a bevel at its upper inner surface, combined with the vertically-adjustable book-rest, substantially as shown and described.

IRA REYNOLDS.

Witnesses:

WILMER BRADFORD,
WILLIAM FITCH.