

C. W. MEARS.
MECHANISM FOR TREATING PAPER.
APPLICATION FILED APR. 24, 1911.

1,004,181.

Patented Sept. 26, 1911.

2 SHEETS—SHEET 1.

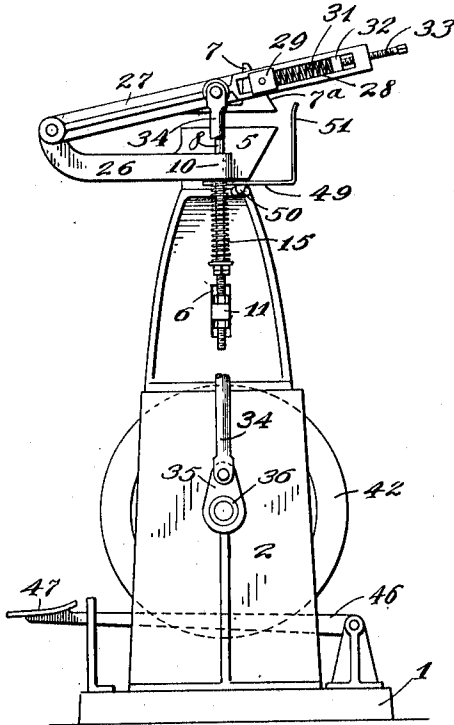


FIG. 1

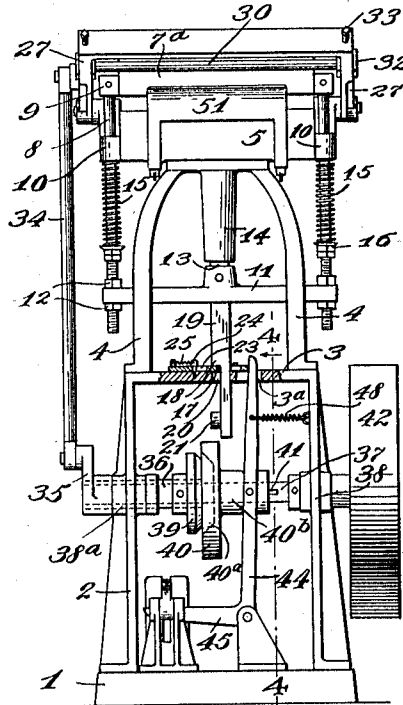


FIG. 2

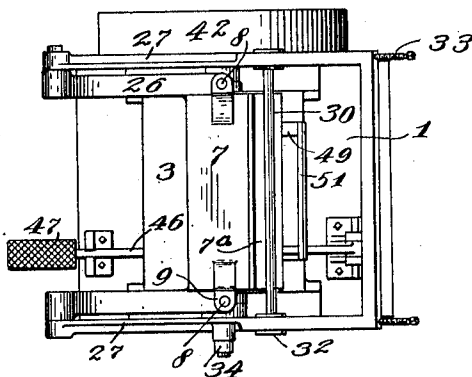


FIG. 3

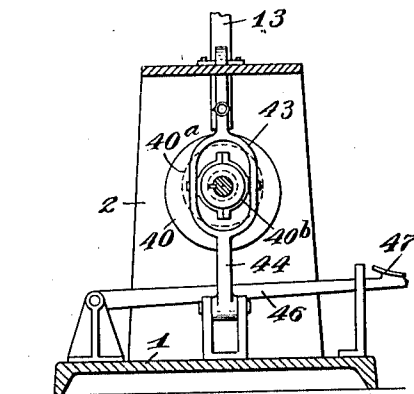


FIG. 4

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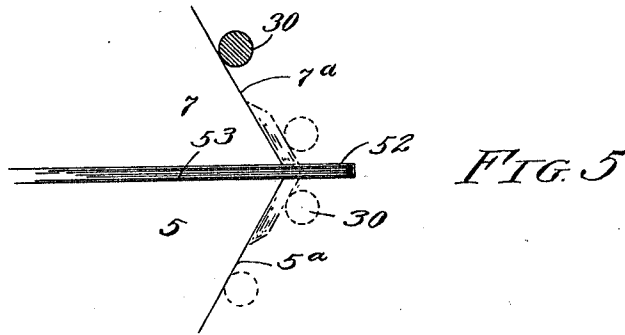


FIG. 5

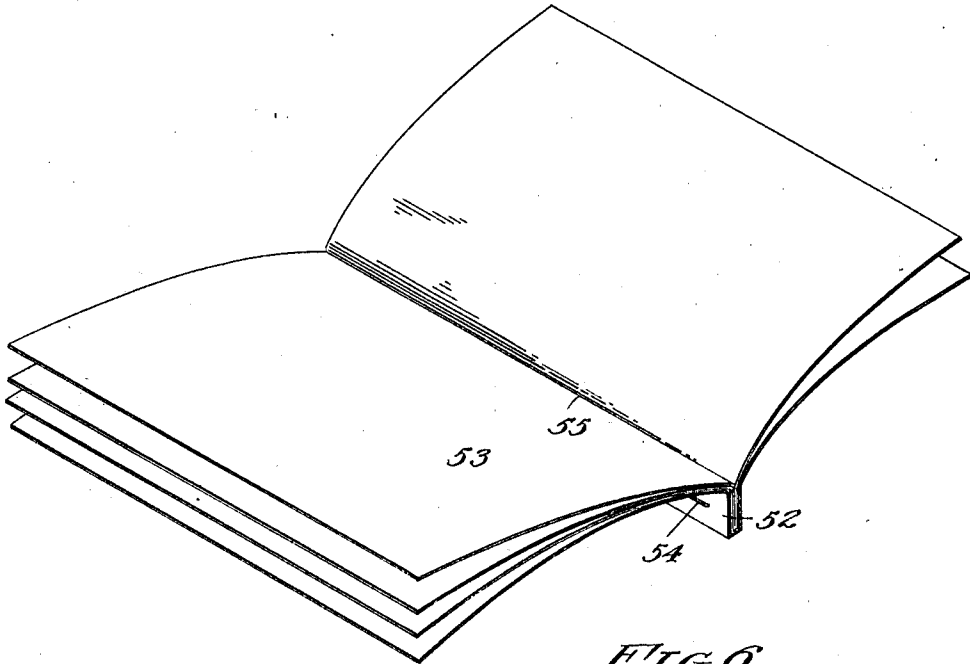


FIG. 6

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MECHANISM FOR TREATING PAPER.

1,004,181.

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To all whom it may concern:

Be it known that I, CHARLES W. MEARS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Mechanism for Treating Paper, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to mechanism for treating paper so as to produce books in which a multiplicity of forms are gathered and secured together by means of side staples, the leaves being hinged, whereby they will open flat, without exposing the stitching, as is the case with sewed books.

In producing a book by my mechanism, a plurality of leaves or plies (one or more forms) are simultaneously bent along substantially the same plane, the bending or flexing operation being repeated a sufficient number of times to break the sizing along such lines and, if necessary, render the body of the paper itself pliable along such lines.

In the drawings forming part hereof, Figure 1 represents a side elevation of a machine constructed in accordance with my invention for the purpose of bending or flexing leaves along certain definite lines. Fig. 2 represents a front elevation of such machine, certain parts being broken away; Fig. 3 represents a top plan view; Fig. 4 a sectional view corresponding to the line 4-4; Fig. 5, an enlarged diagrammatic detail showing the manner in which the leaves of a single form are flexed or bent and Fig. 6 a perspective view of a book as made up from the leaves operated upon by my machine.

Describing by reference characters the various parts of the machine, 1 denotes a base having mounted thereon a pair of vertical side frames 2. The upper of the side frames are connected by means of a horizontal table 3. This table in turn supports a pair of upwardly extending frames 4 carrying at their upper ends the combined lower jaw and supporting base 5 for the paper forms. The frames 4 are provided each with a vertically extending slot 6, for a purpose to be described hereinafter.

Coöperating with the combined base and jaw 5 is an upper jaw or clamping member 7. This jaw is held elevated, when the machine is out of commission by the following construction:—8 denotes a pair of rods, each

connected at its upper end to a lug 9 projecting from the jaw, said rods extending downwardly through guides 10 conveniently formed with the lower jaw or supporting base 5. The lower ends of the guides 10 extend through a cross bar 11, the ends of which project through the slots 6 and are adjustably connected to said cross bar by means of nuts 12. The cross bar is guided in its vertical movement by the slots 6 and by an upwardly projecting rod or stem 13 which is mounted in a sleeve 14. On each rod there is mounted a spring 15, each spring bearing at its upper end against a guide 10 and at its lower end against a nut 16 threaded on the rod. By the foregoing construction, it will be apparent that the upper clamping member or jaw 7 tends to engage the lower jaw 5, not only by gravity but by the action of the springs 15. When the machine is out of commission the jaw 7 is held in elevated position by means of a sliding latch plate 17 mounted upon the table 3 and engaging a shoulder 18 on a vertical projection 19 depending from the cross bar 11, the lower end of the projection 19 extending through a slot 20 in the table 3 and having near its lower end a projection 21, preferably a roller. The latch plate 17 is shown as a slide having an elongated slot 22 for the reception of the projection 19 and a second slot 23 which receives a screw 24 mounted in the table, there being a spring connecting the latch and the screw and tending to move the latch into engagement with the projection 19, beneath the shoulder 18.

26 denotes a pair of arms carried by the upper end of the machine and conveniently cast with the base 5. These arms extend rearwardly from the base and have their rear ends projected upwardly. To each of these arms there is pivotally connected an arm 27. Each of these arms is provided with an elongated slot 28 in the front part thereof and in each slot there is slidably mounted a journal box 29, the journal boxes supporting a roller 30. This roller, when the machine is inoperative or out of commission, extends across the upwardly inclined face 7^a of the jaw 7, in yielding contact therewith, such yielding contact being secured by means of springs 31, mounted one in each of the slots 28 and interposed between a journal box 29 and an abutment 32 which is adjustably mounted in the slot 28, the adjustment being secured by means

of a screw 33 mounted in the front end of the arm 27 and engaging said abutment.

For the purpose of operating the roller, a connecting rod 34 is pivotally connected to one of the arms 27 and has its other end connected with a crank arm 35 projecting from a sleeve 36 which is mounted upon a shaft 37. This shaft is journaled at one end in the sleeve and at its other end in a bearing 38 carried by one of the side frames 2, the sleeve being journaled in like manner at 38^a. The sleeve is provided with a conical friction clutch member 39, the opposite or complementary member 40 being keyed upon the shaft 37, as indicated at 41. The shaft 37 is provided with any convenient driving means, a large pulley 42 being shown. In order to connect the shaft with the sleeve, the yoke 43 is provided, said yoke being carried by the vertical arm 44 of an angle lever, the horizontal arm 45 of which extends across and beneath an arm 46 having a treadle 47 thereon. The clutch member 40 is constructed as an eccentric having a tapered or conical seat 40^a therein for the corresponding surface of the clutch member 39 (see dotted lines Figs. 2 and 4). The yoke 43 is pivotally connected to the neck 40^b of said clutch member. The upper end of the arm 44 projects through a slot 3^a in the table 3 and is in proximity to the sliding latch plate 17. A spring 48 normally holds this arm in the position shown in Fig. 2,—with the clutch members 39 and 40 separated.

When it is desired to operate the machine, one or more forms of paper, each comprising a multiplicity of leaves or plies, are inserted between the upper and lower clamping members or jaws 5 and 7 in the manner shown in Fig. 5. To conveniently determine the amount of projection of these sheets and the bending lines, a suitable gage is provided. This gage is shown as an angle plate having at its bottom a pair of legs 49 by which the stop may be adjustably supported, as by means of thumb screws 50 extending through slots (not shown) in said legs and threaded into the lower jaw or base 5. The upwardly extending portion of the stop comprises a plate 51 extending across the space formed between the jaws. The upper end of the plate is flared outward slightly to permit the roller to enter therein when the plate is close to the jaws. One or more forms of paper having been placed upon the lower support or jaw 5, each with its folded edge in contact with the gage plate 51, the treadle 47 is depressed, clutching the sleeve 36 to the shaft 37 and causing the shaft to rock the arms 27. The movement of the arm 44 by the treadle, however, has thrown the latch plate 17 so as to allow the upper jaw or clamping member 7 to descend under the influence of gravity and the action of the springs 15, thereby clamping

the sheets of paper in place. The rotation of the shaft 37 causes the roller 30 to engage the projecting ends 52 of the leaves or plies 53 in the manner shown in Fig. 5. The roller 30, through its manner of support in the arms 27, will, as the arms oscillate, keep in contact with the inclined faces 7^a and 5^a of the clamping jaws, except as the paper plies may be temporarily imposed between these inclined surfaces and the roller. By beveling the faces of the upper and lower clamping members adjacent their meeting or clamping edges, the paper may be flexed more than 90°, which will be sufficient to crack or break loose any sizing that may be thereon and to establish a definite bending line at the point where clamped. It will be obvious that the roller 30 may be oscillated as long as desirable or necessary by merely keeping the treadle depressed. The amount of flexing will vary with the kind of paper treated and the number of plies, a single oscillation of the roller being sufficient for some kinds of paper. When the paper ends have been flexed or bent as much as necessary or desirable, the treadle 47 is released, whereupon the spring 48 will break the driving engagement between the shaft 37 and the sleeve 36. The eccentric 40 will, by its rotation with the shaft 37, engage the roller 21 and lift the projection 19 until the shoulder 18 is above the table 3, whereupon the spring 25 will bring the sliding latch plate 17 beneath this shoulder.

In Fig. 6 there is shown a booklet made up from paper treated in accordance with my invention, the booklet illustrating the advantages of the invention. The projecting portions 52 of the leaves or plies 53 form a backing by which the book may be held for reading and other purposes as well as a portion independent of the leaves proper, for the reception of staples 54. Through this treatment, each leaf is provided with a line or hinge 55 which enables the leaves to lie substantially flat when the book is open. These lines or hinges in a book formed up from a multiplicity of leaves treated as described will lie in substantially a common plane extending across the book. The advantages of a book produced from paper thus treated are, briefly, that the book may be permanently bound, while allowing the page to open flat, without exposing the stitching, as is the case with sewed books: a back is provided, from a portion of the leaves, by means of which the book may be readily held in one hand while the other hand is used in turning the leaves: the book may be produced much more economically than is the case with sewed books, which books, however, realize only partially the flat-leaf effect obtainable by my method of construction. Furthermore, owing to the permanency of binding,

secured by the side-stapling, there is no danger of the leaves dropping out, as is the case with saddle-stitched books.

Having thus described my invention, what I claim is:

1. In mechanism of the character set forth, the combination of a device for clamping a plurality of sheets or plies of paper with their ends projecting, a device adapted to engage the projecting ends of said sheets or plies, and means for reciprocating one of said devices to cause the projecting ends of the sheets or plies to be flexed or bent by the second device.

2. In mechanism of the character set forth, the combination of a clamping device adapted to clamp a plurality of sheets or plies of paper with their ends projecting beyond such device, a roller, and means for reciprocating said roller across the projecting ends of the sheets or plies to flex the latter in reverse directions.

3. In mechanism of the character set forth, the combination of a clamping device comprising a pair of jaws adapted to receive and clamp therebetween a plurality of leaves or plies of paper, each of said jaws being beveled rearwardly from its front clamping edge, a roller, means for moving said roller across the projecting ends of the leaves or plies, and means yieldingly holding said roller in substantial engagement with the front faces of said jaws.

4. In mechanism of the character set forth, the combination of a clamping device comprising a pair of jaws adapted to receive and clamp therebetween a plurality of leaves or sheets of paper, each of said jaws being beveled rearwardly from its front clamping edge, a paper engaging member, means for moving said member across the projecting ends of the sheets or leaves, and means yieldingly holding said member in substantial engagement with the front faces of said jaws.

5. In mechanism of the character set forth, the combination of a pair of clamping jaws, a gage adjustable toward and from said jaws and located in front of said jaws, a paper flexing device movable across the front of said jaws, between the same and said gage, and means for so moving said device.

6. In mechanism of the character set forth, the combination of a fixed jaw, a movable

jaw, means tending to move the latter jaw into clamping relation with the former jaw, a member movable across the space between said jaws, means for oscillating said member, and connections whereby said means will render operative the jaw moving means.

7. In mechanism of the character set forth, the combination of a pair of jaws adapted to clamp a plurality of sheets or plies of paper with their ends projecting, a device reciprocable across said jaws, and means for so reciprocating said device.

8. In mechanism of the character set forth, the combination of a pair of clamping members adapted to receive and clamp therebetween a plurality of leaves or plies of paper with their ends projecting beyond such members, a device reciprocable across said members and adapted to engage opposite sides of the projecting ends of the paper, and means yieldingly holding said device in substantial engagement with the faces of said members through which such ends project.

9. In mechanism of the character set forth, the combination of a pair of jaws adapted to receive and clamp therebetween a plurality of leaves or plies of paper with their ends projecting, a pair of pivotally supported arms extending in front of said jaws, a paper engaging device slidably mounted in said arms and adapted to engage the projecting ends of the leaves or plies by the oscillation of said arms, and springs arranged to force said device rearwardly, to maintain the same in substantial engagement with the front faces of said jaws during the oscillation of said arms.

10. In mechanism of the character set forth, the combination of a device for clamping a plurality of sheets or plies of paper with their ends projecting, a device adapted to engage the projecting ends of said sheets or plies, means yieldingly holding said devices in substantial engagement, and means for reciprocating one of said devices to cause the projecting ends of the sheets or plies to be flexed or bent by the second device.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

CHARLES W. MEARS.

Witnesses:

J. B. HULL,

HAROLD B. ANDERSON.