

C. W. MEARS.  
MACHINE FOR TREATING PAPER.  
APPLICATION FILED FEB. 23, 1912.

1,062,108.

Patented May 20, 1913.

3 SHEETS-SHEET 1.

FIG. 1

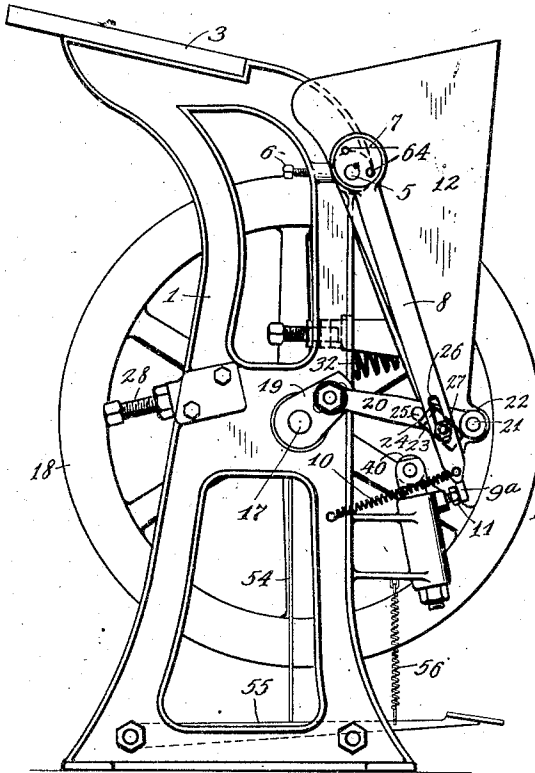
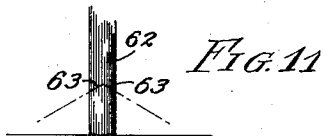
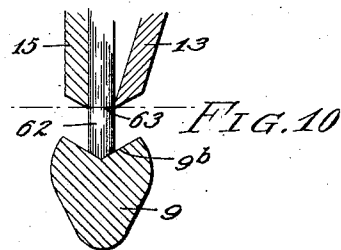
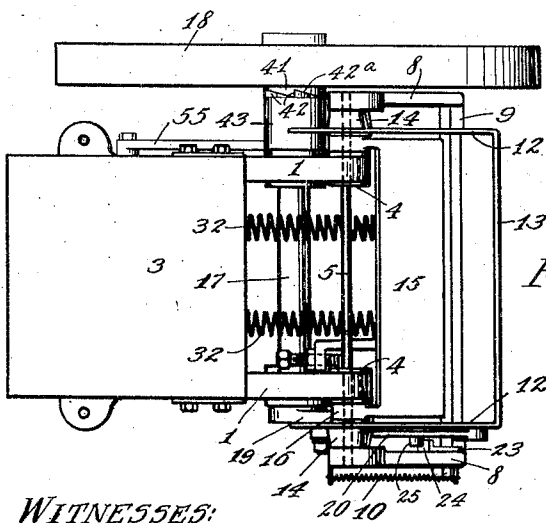
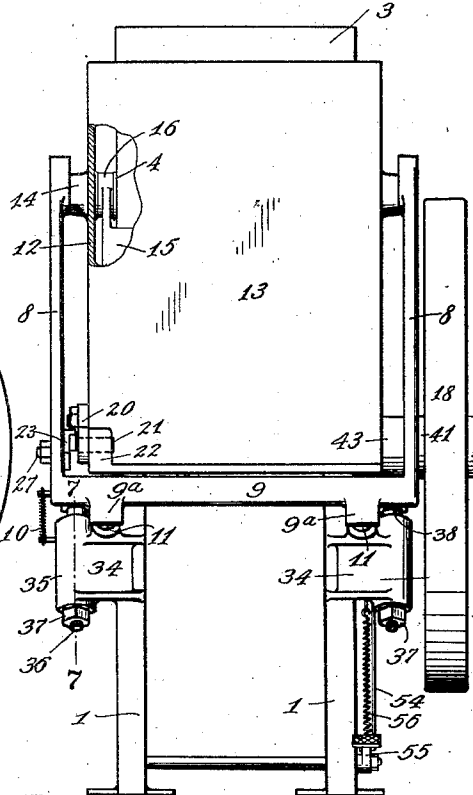


FIG. 2



WITNESSES:

Brennan West  
Chas. Watt

INVENTOR,

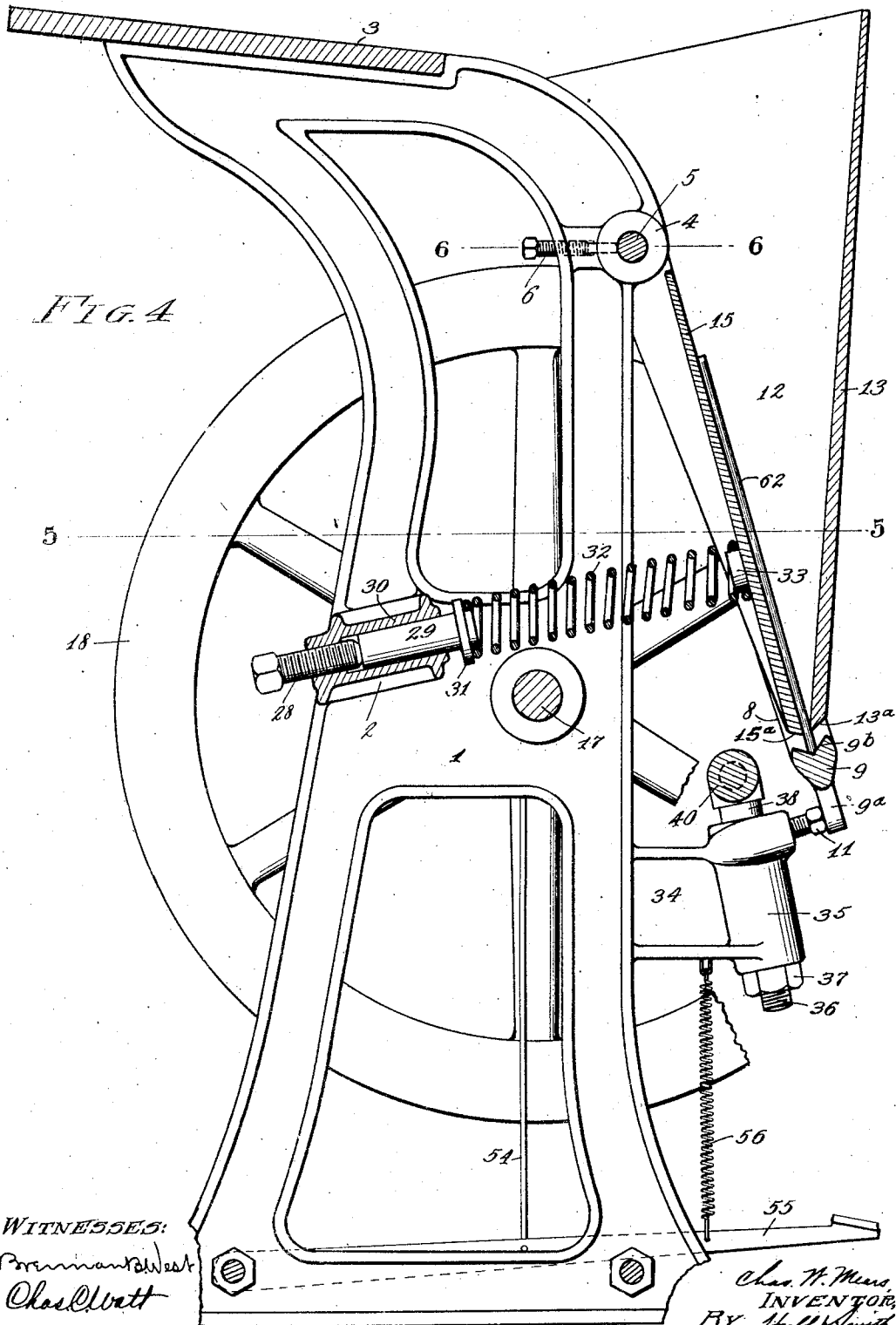
Charles W. Mears  
BY Hull Smith  
ATTY'S.

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3 SHEETS-SHEET 3.

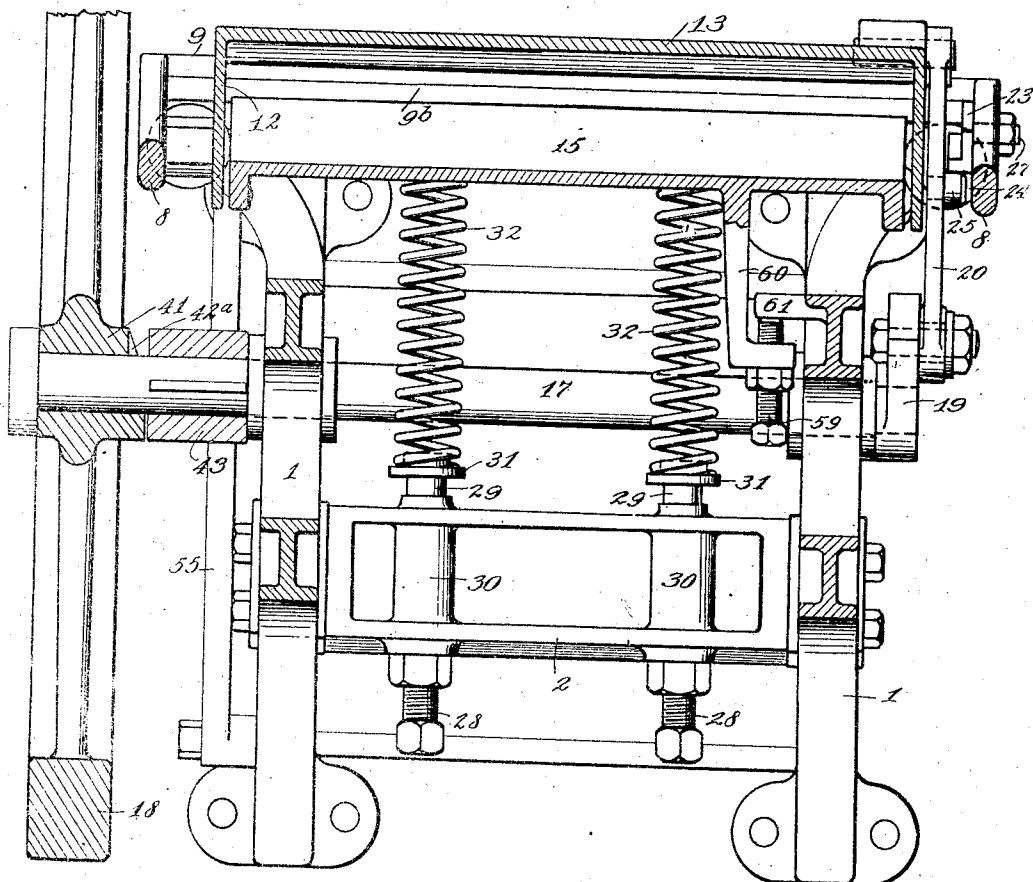


FIG. 5

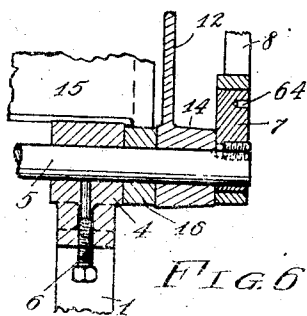


FIG. 6

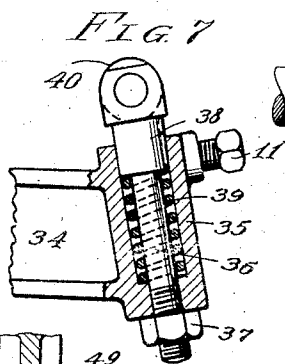


FIG. 7

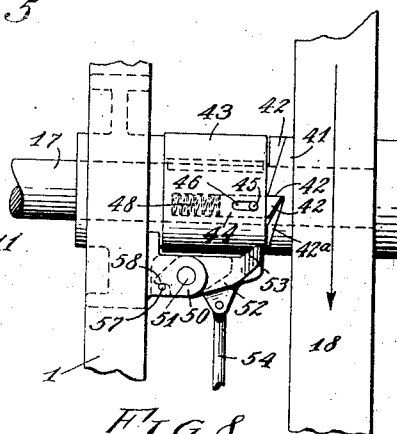


FIG. 8

WITNESSES:  
Brennan & West  
Chas. Elvatt

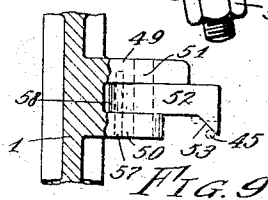


FIG. 9

INVENTOR:  
Charles W. Mears  
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ATTY'S.

# UNITED STATES PATENT OFFICE.

CHARLES W. MEARS, OF CLEVELAND, OHIO.

MACHINE FOR TREATING PAPER.

1,062,108.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed February 23, 1912. Serial No. 679,359.

*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 Machines 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 machines for bending or flexing sheets of paper for the purpose of producing definite bending lines or hinges, and more especially to machines in which a multiplicity of sheets, assembled to form one or more signatures, for instance, are simultaneously bent or flexed. The machine shown herein is of the type shown in my Patent No. 1,004,181, issued September 26, 1911.

Among the general objects of my invention are the production of a machine which is extremely efficient in operation for the purposes above set forth, which is particularly adaptable for a power-drive, and which is adapted to automatically discharge the hinged sheets after the flexing operation.

With the foregoing objects in view, the invention may be described further as consisting of the combinations of elements embodied in the claims hereto annexed and illustrated in the drawings forming part hereof, wherein—

Figure 1 represents a side elevation of a machine constructed in accordance with my invention; Fig. 2 a front elevation, and Fig. 3 a plan view of the aforesaid machine; Fig. 4, an enlarged vertical sectional view through said machine; Fig. 5 a sectional view corresponding substantially to the line 5—5 of Fig. 4, certain of the clutch parts being shown in section; Figs. 6 and 7, sectional details corresponding to the lines 6—6 and 7—7 of Figs. 4 and 2 respectively; Fig. 8 a detail in elevation of the clutch mechanism by which the machine may be driven by power; Fig. 9 a detail of one of the parts of said mechanism; Fig. 10 an enlarged sectional detail illustrating the manner in which the ends of the leaves are supported by the gage, and Fig. 11 an enlarged detail view showing the manner in which the hinges are formed in each batch of leaves or signatures flexed or bent by the aforesaid machine.

Describing the various parts herein by

reference characters, 1 represents generally a pair of vertical side frames connected by a transverse frame 2 intermediate of the top and bottom and a transverse, slightly inclined plate 3 at the top, forming a platform. Each vertical side frame is provided, near the top and at the front portion thereof, with a bearing 4 in which there is mounted a shaft 5, each frame being provided with a set screw 6 adapted to extend through the bearing and clamp the shaft in any desired position. The shaft 5 is provided, near each end thereof, with an eccentric 7, and on this eccentric there is mounted a substantially U-shaped yoke comprising the substantially vertical supporting arms 8 and a bottom transversely extending bar 9, the bar 9 forming a gage for supporting the bottom ends of the leaves prior to the clamping and flexing operations. A spring 10 connected to the yoke, preferably near the bottom, and to one of the vertical frames 1, resists the forward movement of the bottom of the yoke and normally holds the projections 9<sup>a</sup> at the bottom of the gage bar 9 in contact with the stop-screws 11, which are shown as threaded into members projecting from the side frames 1, and which will be described more particularly hereinafter.

I provide a combination chute and clamp for the paper until the end of the flexing operation, said chute consisting generally of a pair of jaws or clamping members rotatably supported on the shaft 5. One of these jaws or clamping members is substantially U-shaped in section and comprises a pair of side plates 12 connected by a front plate 13, the side plates being pivoted upon the shaft 5 by means of journals 14. The other jaw or clamping member 15 is also pivotally supported upon the shaft 5 by means of hubs or journals 16 (see Figs. 2 and 3). The construction of the parts 12 to 16, inclusive, provides a downwardly extending chute having an enlarged hopper-like opening at the top, said hopper-like opening being located adjacent to the platform 3 on which the paper to be treated may be conveniently stacked.

17 denotes a shaft which is journaled in the frames 1 and is provided at one end with a drive pulley 18 and at its other end with a crank arm 19. 20 denotes a link which is connected to the crank arm 19 at one end and to the front jaw or clamping member of the chute at its other end, such connection being conveniently made through a pin

21 pivotally connecting the front end of the link with a projection 22 at the front and near the bottom of said clamping member. 23 denotes a plate having an inclined or cam surface 24 thereon adapted to be engaged by a pin 25 carried by the link 20. This plate is adjustably mounted in one of the arms 8 by means of a slot 26 in said arm and a bolt 27 extending through said slot and connecting the plate to the arm. 28 denotes a pair of screws which are adjustably mounted in the transverse plate 2, each screw bearing at its front end against a plunger 29 mounted in a tubular guide 30 into which the front end of the screw 28 projects, the tubular guide being carried by and preferably formed integrally with the frame 2. Each plunger 29 has an abutment 31 near its front end against which the rear end of a helical spring 32 is adapted to bear, the front ends of said springs surrounding projections 33 carried by the plate 14 and bearing against said plate, whereby the plate 15 is pressed forwardly or toward its cooperating plate 13.

Reference has been made to the projections, carried by the frames 1, which support the screws 11. These projections are shown at 34 and are conveniently formed as brackets projecting forwardly and laterally from each of the vertical frames 1. Each bracket is provided with a barrel 35 (see Fig. 7) in which there is mounted a bolt having a reduced body 36, projecting through the lower end of the barrel and having a nut 37 thereon, and an enlarged portion 38 within said barrel forming an abutment for the upper end of a spring 39. This spring surrounds the reduced portion of the bolt, bears at its lower end against the bottom of the barrel and at its upper end against the abutment formed by the enlargement 38. The spring-pressed bolts carry at their upper ends a roller 40. This roller, it will be observed, is located in such position that, when the clamp comprising the parts 12 to 16, inclusive, is oscillated through the rotation of the shaft 17, the lower end of this clamp will swing across and just clear the roller. As will appear more particularly from Fig. 4, the lower ends of the clamping plates 13 and 15 are beveled reversely from the opposed faces thereof, as shown at 13<sup>a</sup> and 15<sup>a</sup>, and allow the projecting ends of the plies or sheets to be flexed or bent at an angle at least as great as 90 degrees with respect to the bodies of the plies or sheets.

The hub 41 of the pulley 18 is provided with a plurality of shoulders 42 connected by inclines 42<sup>a</sup>, providing in effect a series of ratchet teeth projecting inwardly from the hub.

43 denotes a collar which is keyed upon the shaft 17 and is provided with a longitudinal bore extending inwardly from

the outer surface thereof. Within this bore there is mounted a plunger 44, said plunger being provided with a pin 45 projecting through a slot 46 in the collar 43. The outer end of this plunger is beveled, as shown at 47, and is adapted to be thrust out into the path of the shoulders 41 by means of the spring 48.

49 and 50 denote a pair of lugs projecting from the side frame 1 and supporting a pin 51 to which there is pivoted a finger 52. The outer end of the finger 52 is provided with an inclined surface 53, which is adapted to engage the pin 45 and move said pin and the plunger 44 inwardly.

54 denotes a rod which is pivotally connected at one end to the finger 52 and at its other end to a treadle lever 55, said lever being normally held elevated by means of a spring 56 connected thereto and to any convenient part of the machine, as the bracket 34. The spring 56 thus normally holds the finger 52 in such position that the inclined surface 53 is in the path of the pin 45, and the pin 57 carried by the lugs 49 and 50 is adapted to engage a shoulder 58 on the finger 52 and limit the extent of the movement of said finger toward the collar 43 by the spring 56. In order to protect the finger 52 against the thrust of the pin 45, one of the lugs is extended a sufficient distance to form a backing or support for the outer portion of the finger.

While the springs 32 tend to push the clamping plate or jaw 15 forwardly, the amount of forward movement of this jaw or plate will be limited. In the embodiment shown herein, this limitation is effected by means of a screw 59 which is threaded into a bracket 60 projecting rearwardly from the plate 15 and engaging at its front end a fixed projection or bracket 61 carried by one of the side frames 1.

With the parts arranged as described and illustrated herein, the operation will be as follows: The sheets of paper to be treated will be supported in any convenient position, as on the platform 3. When the machine is inactive (when the pulley 18 is disconnected from the shaft 17), the parts will be in the position shown in Fig. 4; that is, with the gage bar 9 located below the bottom of the clamping plates 13 and 15 and said plates separated at their bottom a sufficient distance to permit of the easy insertion of the desired number of sheets or leaves 62 therebetween. The amount of the opening between the bottom of these clamping plates may be varied as desired by merely adjusting the screw 59. The gage bar 9 is provided with a substantially V-shaped groove 9<sup>b</sup>, the apex of this groove being located below the center of the space between the lower ends of the clamping plates 13 and 15. The leaves being in position, the

treadle lever 55 is depressed against the action of the spring 56, which results in withdrawing the finger 52 from the path of the pin 45, whereupon the plunger 44 is thrust out into the path of the ratchet teeth carried by the hub 41. The plunger being engaged by the first ratchet tooth, the rotation of the pulley causes a revolution of the shaft 17, and this revolution of the shaft moves the plate 13 toward the plate 15, clamps the paper between the plates, and rocks or oscillates the combined clamp and chute across the roller 40, through the crank 19 and arm 20. As the crank arm 19 passes the front center, the front clamping plate is moved away from the rear clamping plate, which is prevented from moving with the front clamping plate by the engagement of the stop-screw 59 with the projection 61. As the clamping plates move forwardly, the gage bar moves with them through the engagement of the pin 25 with the inclined surface of the plate 23. When the clamping members are separated, the pin rides off the inclined surface of the plate 23 and the spring 10 snaps the gage bar rearwardly and the paper being neither clamped between the plates 13 and 15 nor supported by the gage-bar, is discharged by gravity from the chute.

Attention has been invited heretofore to the fact that the cross-bar or arm 9 forms a gage to determine the amount of projection of the lower ends of the sheets 62 beyond the clamping plates 13 and 15, and that the upper surface of this arm or cross-bar is V-shaped. The purpose of this construction will be apparent from Figs. 10 and 11. In Fig. 10, it will be seen that this manner of supporting the lower ends of the sheets or plies 62 causes the lower ends to project a distance which, with single or unfolded sheets increases from the sides toward the inner or center plies or sheets. When the lower ends of the sheets or plies are alined, as shown in Fig. 11, the distance of the hinges or bending lines 63 from the back of the group or signature increases progressively from the sides of the group of leaves or signature toward the center of the same, and this arrangement of the hinges greatly facilitating the flat opening of the leaves when bound into a book. In the case of signatures, the gage accurately centers these signatures with respect to the clamping device and, the gage being adjustable, this insures absolute accuracy in the distance between the gage and the clamping device.

Reference has been made to the eccentrics 7. The purpose of these is to enable the gage bar or cross arm 9 to be adjusted toward and from the lower ends of the clamping members to vary the amount of projection of the sheets or plies of paper. This adjustment can readily be made by a span-

ner wrench applied to the apertures 64 in the eccentrics. By rotating these eccentrics, the distance of the bar from the ends of the clamping members may be varied.

While the machine disclosed herein, is shown as one to which the paper is supplied by an operator and from which the hinged paper is discharged without reference to any subsequent treatment, it is contemplated that such machine may be used in connection with printing machines, folding machines and gathering machines and, generally wherever it may be deemed advisable or expedient to employ the same.

Having thus described my invention, what I claim is:—

1. In a machine of the character set forth, the combination of a clamping device comprising a pair of members adapted to receive and clamp therebetween a plurality of sheets or plies of paper with their ends projecting therebeyond, a gage for limiting the amount of projection of such ends, said gage having a substantially V-shaped surface adapted to engage such projecting ends, the apex of the V being located substantially opposite the center of the opening between the members of the clamping device, a device adapted to engage the projecting ends of the paper, and means for reciprocating one of said devices with reference to the other.

2. In a machine of the character set forth, the combination of a pair of clamping members arranged to form a downwardly extending chute therebetween and to clamp a plurality of plies or sheets of paper with their ends projecting therebelow, a gage located beneath the lower ends of said clamping members, a device for engaging the projecting ends of the paper to flex the same, means for reciprocating one of said devices with respect to the other to flex the projecting ends of the sheets or plies of paper, means for separating said clamping members, and means for moving the gage out of operative relation to said members.

3. In a machine of the character set forth, the combination of a pair of downwardly directed clamping members arranged to clamp a plurality of plies or sheets of paper with their ends projecting therebelow, a device for engaging the projecting ends of the paper to flex the same, means for reciprocating one of said devices with respect to the other to flex the projecting ends of the sheets or plies of paper, and means for separating said clamping members.

4. In a machine of the character set forth, the combination of a clamping device comprising a pair of downwardly extending clamping members arranged to form a chute and to clamp a plurality of sheets or plies of paper with their ends projecting, a gage below the lower ends of said clamp-

ing members arranged to engage the projecting ends of the sheets or plies of paper, means for adjusting said gage toward and from the lower ends of said members, a device arranged in the path of the projecting ends of the paper and adapted to engage and flex the same, means for reciprocating the clamping device across the last-mentioned device, means for moving the gage out of the path of the lower ends of the sheets or plies of paper, and means for separating the clamping members.

5. In a machine of the character set forth, the combination of a pair of members adapted to clamp a plurality of sheets or plies of paper therebetween with their ends projecting, a spring tending to force one of said members toward the other, means for limiting the movement of the former member by the spring, a device for engaging the projecting ends of the paper, and means connected with the second clamping member for moving both members across said device.

6. In a machine of the character set forth, the combination of a pair of members adapted to clamp a plurality of sheets or plies of paper therebetween with their ends projecting, means tending to force one of said members toward the other, means for limiting the movement of the former member, a device for engaging the projecting ends of the paper, and means connected with the second clamping member for moving both members across said device.

7. In a machine of the character set forth, the combination of a pair of pivotally supported clamping members arranged to form a downwardly directed chute, one or more springs arranged to force one of said members toward the other, a shaft, a connection between said shaft and the second member for reciprocating the lower ends of both members, a paper-engaging device cooperating with the lower ends of said members, and stops arranged to limit the movement of the first member toward the second member.

8. In a machine of the character set forth, the combination of a pair of downwardly extending clamping members arranged to form a chute therebetween, a shaft on which the upper portions of said members are pivoted, a yoke comprising a gage bar located below the lower ends of the clamping members and a pair of arms, a pair of eccentrics on said shaft on which said arms are mounted, a spring forcing one of said members toward the other, means connected with the second member for reciprocating both members, a paper flexing device in operative relation to the lower ends of said members, a spring operatively connected to said yoke, a stop adapted to be engaged by said yoke, means operative

through the reciprocation of said members for moving the gage plate out of operative relation to the lower ends of said members, and means for rotarily adjusting said shaft.

9. In a machine of the character set forth, the combination of a clamping device comprising a pair of downwardly extending clamping members, a paper flexing device in operative relation to the lower ends of said members, means for moving one of said devices across the other, and means for discharging the paper by gravity from between said members.

10. In a machine of the character set forth, the combination of a pair of clamping members, a gage adjacent to said members adapted to limit the projection of the ends of the sheets or plies of paper beyond said members, a device adapted to be engaged by the projecting ends of the sheets or plies of paper to flex the same, a shaft, a connection between said shaft and said clamping members for moving the latter across the said paper flexing device, means including said shaft for separating said members, and means including said shaft for moving the gage from operative relation to said members.

11. In a machine of the character set forth, the combination of a shaft, a pair of clamping members mounted on said shaft and depending therefrom, a pair of eccentrics on said shaft, a yoke comprising a gage bar extending across the lower ends of the clamping members and arms mounted on said eccentrics and supporting said bar, a paper flexing device in operative relation to the lower ends of the said clamping members, means for moving the clamping members across said device, and means whereby said shaft may be rotated.

12. In a machine of the character set forth, the combination of a pair of clamping members, a pair of eccentrics, a yoke comprising a gage bar extending across the ends of the clamping members and having arms mounted on said eccentrics, a paper flexing device in operative relation to the ends of the said clamping members, means for moving the clamping members across said device, and means whereby said eccentrics may be rotated.

13. In a machine of the character set forth, the combination of a frame, a shaft mounted therein, a pair of clamping members pivotally supported near their upper ends and projecting downwardly and forming a chute, a yoke comprising a gage bar and pivotally supported arms, a spring connected to the frame and tending to force the lower end of the yoke inwardly or toward the frame, a stop limiting the movement of the yoke, a paper flexing device, a crank carried by said shaft, a link connect-

ed to said crank and to the clamping member remote from the shaft, a spring forcing the other clamping member toward the former clamping member, means limiting the movement of the second member toward the first member, and a breakable connection between the yoke and the link.

14. In a machine of the character set forth, the combination of a frame, a shaft mounted therein, a pair of clamping members pivotally supported near their upper ends and projecting downwardly and forming a chute, a yoke comprising a gage bar and pivotally supported arms, a spring tending to force the gage bar from beneath the clamping members, a paper flexing device in operative relation to said members, means connecting the shaft and the clamping members to reciprocate the same, means connecting the yoke and the shaft during part only of the rotation of the shaft, and means for separating the clamping members when the shaft and yoke are disconnected.

15. In a machine of the character set forth, the combination of a pair of clamp-

ing members, means pivotally supporting said members, a shaft, a pulley thereon, means for driving said pulley, means for connecting the pulley to the shaft to reciprocate the clamping members, and a paper flexing device across which said clamping members may reciprocate.

16. In a machine of the character set forth, the combination of a pair of clamping members, means pivotally supporting said members, a shaft, a pulley thereon, means for driving said pulley, means for connecting the pulley to the shaft to reciprocate the clamping members, a paper flexing device across which said clamping members may reciprocate, and means for disconnecting the pulley from the shaft after such reciprocation.

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

CHARLES W. MEARS.

Witnesses:

J. B. HULL,

BRENNAN B. WEST.