

L. A. STRAUBEL.
MACHINE FOR INTERFOLDING SHEETS OF PAPER.
APPLICATION FILED MAR. 22, 1919.

1,326,987.

Patented Jan. 6, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

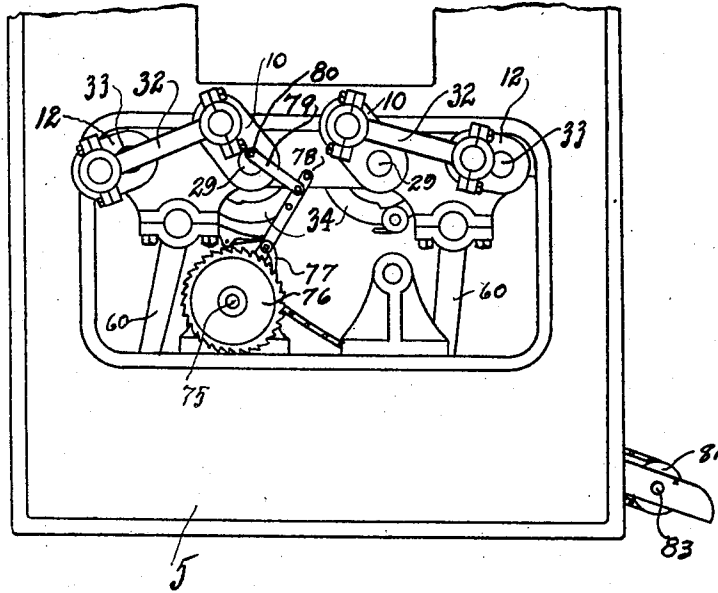
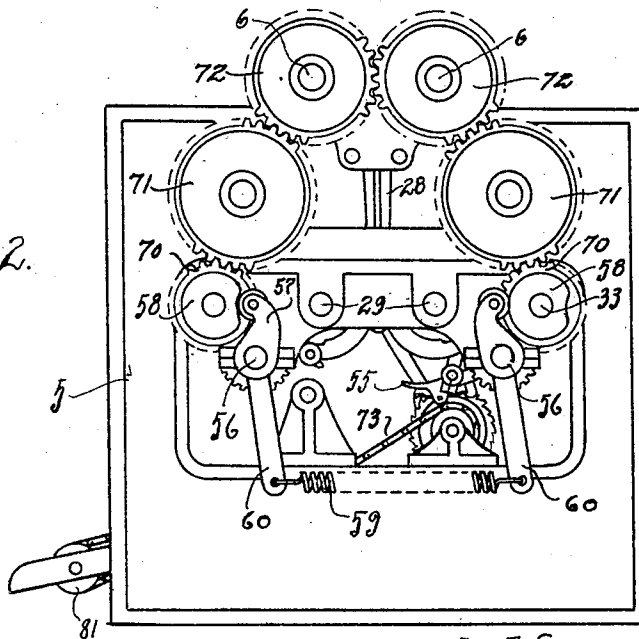


Fig. 2.



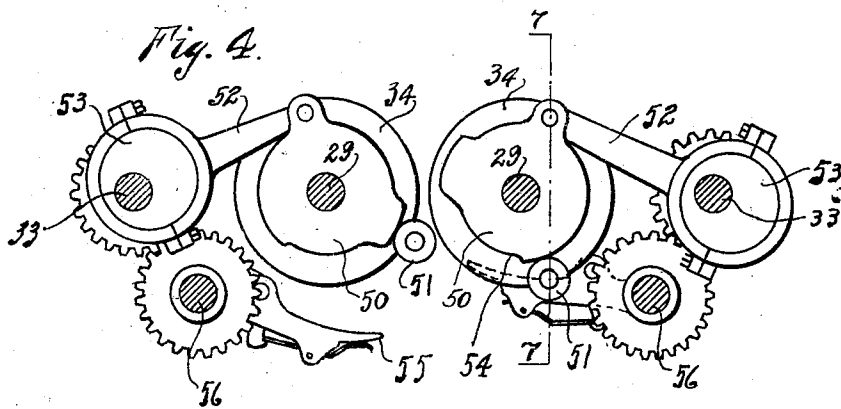
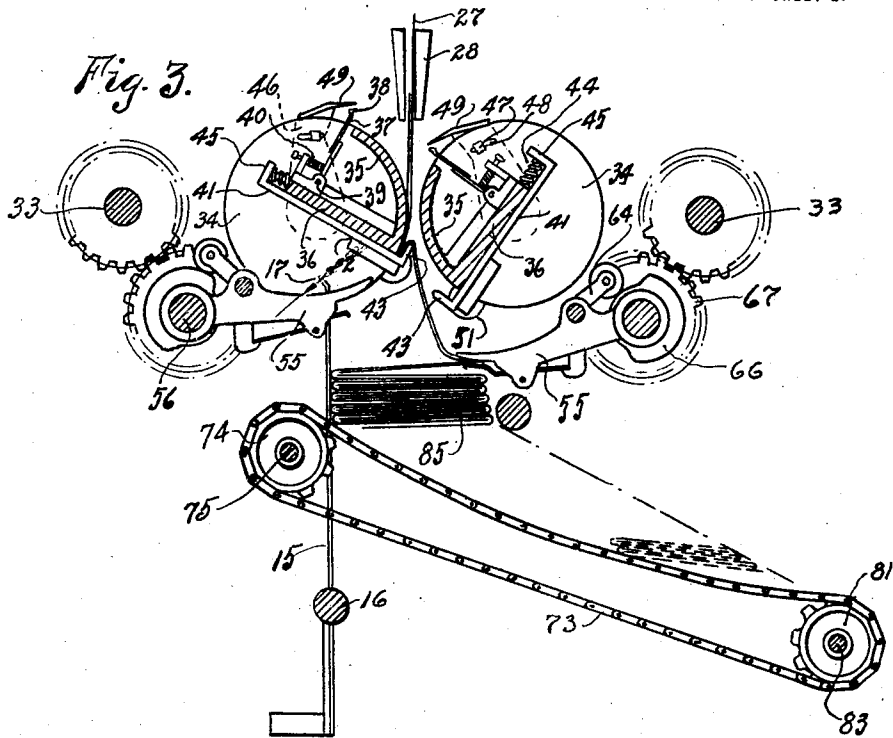
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3 SHEETS—SHEET 2.



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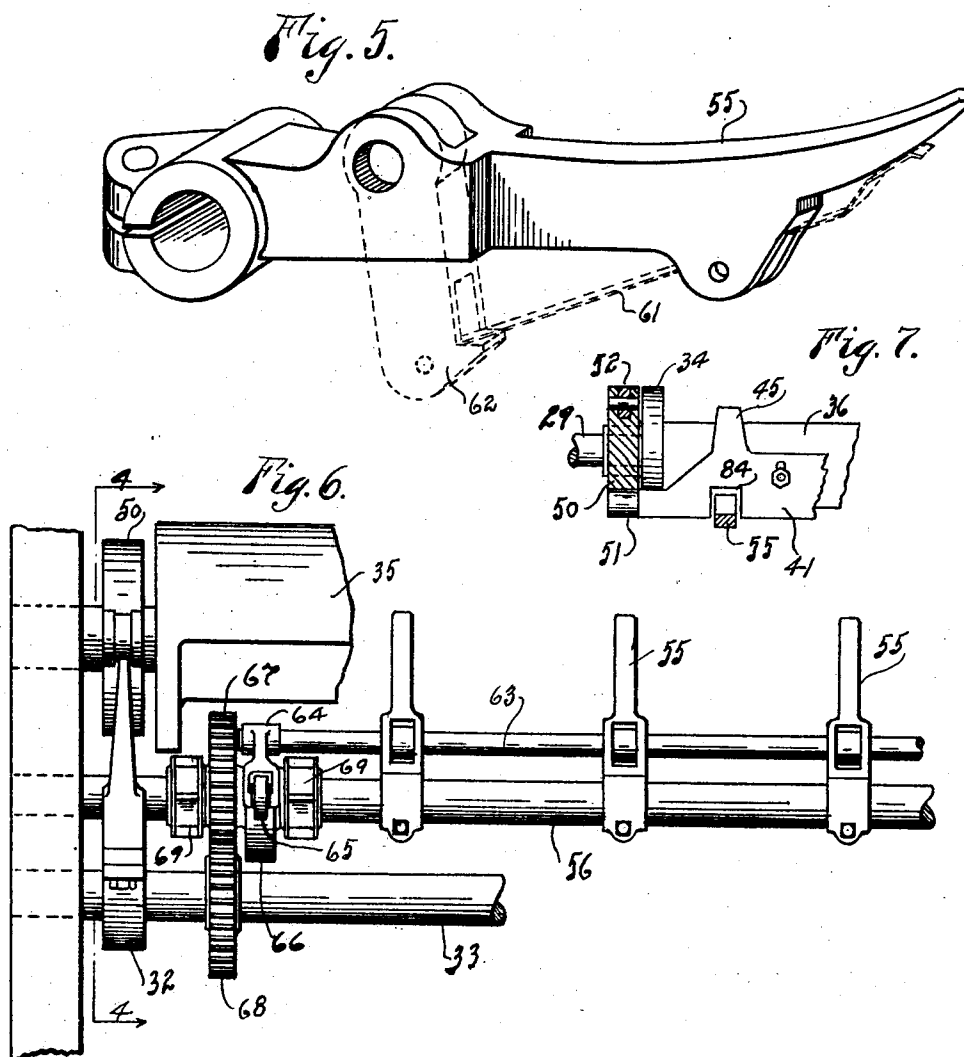
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

LOUIS A. STRAUBEL, OF GREEN BAY, WISCONSIN.

MACHINE FOR INTERFOLDING SHEETS OF PAPER.

1,326,987.

Specification of Letters Patent.

Patented Jan. 6, 1920.

Original application filed May 23, 1918, Serial No. 236,117. Divided and this application filed March 22, 1919. Serial No. 284,252.

To all whom it may concern:

Be it known that I, LOUIS A. STRAUBEL, a citizen of the United States of America, residing at Green Bay, in the county of Brown and State of Wisconsin, have invented certain new and useful Improvements in Machines for Interfolding Sheets of Paper, of which the following is a specification, reference being had therein to the accompanying drawing.

The invention relates to new and useful improvements in a machine for cutting a plurality of webs of paper transversely to form a continuous web of overlapped sheets and interfolding the sheets.

The invention is a division of the application serially numbered 236,117, filed May 23, 1918.

It is an object of the invention to provide in conjunction with the bending ledge on each folding member and the coacting clamping lips, an adjustable tucking blade for forming a fold of the material between said clamping lips and its folding member, whereby the depth of the tuck can be adjusted.

A further object of the invention consists in providing the stripper fingers entering transverse alining grooves of the clamping lips and folding members with gripper springs adapted to clamp the work material to said fingers and to transfer the same to a stack or pile.

It is also an object of the invention to provide a jogger member controlled by the clamping lip of the folding member whereby the stack of folded paper is straightened.

With these and other objects in view, which will become apparent upon perusal of the following specification, the invention consists in the means hereinafter fully described and particularly pointed out in the claims. The annexed drawings and the following description set forth in detail an embodiment of the invention which, however, constitutes but one of the various ways in which the principle of the invention may be utilized.

In said drawings:

Figure 1 is a fragmentary end elevation of the machine constructed in accordance with my invention;

Fig. 2 is a view of the machine from the opposite end to that shown in Fig. 1;

Fig. 3 is a transverse sectional view taken through the oscillating folding members;

Fig. 4 is a section taken on the line 4—4 of Fig. 6;

Fig. 5 is a perspective view of the stripper finger with associated and coacting parts shown in dotted lines;

Fig. 6 is a detail view of one side of the machine, and

Fig. 7 is a section on the line 7—7 of Fig. 4.

Referring to the drawings, 5 designates the main frame of the interfolding machine, which serves as a support for the improved folding means presently to be described. As is indicated in Fig. 2, a pair of shafts 6 are journaled in bearings mounted on the machine frame 5 and extend transversely of the machine. The shafts 6 are in parallel arrangement and spaced from one another to carry body rolls (not shown) upon which the mutually overlapped sheets or webs of paper 27 are trained to be conducted downwardly to the folding mechanism. The sheet material 27 is fed downwardly to the folding mechanism and is guided in the passage by means of suitable guides 28, as indicated in Figs. 2 and 3. A pair of stub-shafts 29 are journaled in the main frame 5 below the body roll shafts 6 and are extended at one end beyond the frame to receive crank arms 10, which at the free end are pivotally secured to a pitman 32, articulated at the other end with crank arms 12 respectively secured to longitudinal shafts 33, journaled in the frame outwardly of the stub-shafts 29.

The continuous rotation of the shafts 33 will, by virtue of the crank and pitman arrangement, result in a rocking motion of the stub-shafts 29, and as indicated the parts are so arranged that the stub-shafts 29 are oscillated toward or away from each other. Each stub-shaft 29 carries a folding drum comprising circular end plates 34 secured to the stub-shaft and interconnected by an arcuate wall 35, at the periphery of the circular end plates and by a radially extending wall 36 formed integral with the arcuate wall 35. The free end of the latter serves as an abutment to limit the movement of a fin-

ger 37, the outer end of which is formed to provide a bending ledge 38 while its inner end is pivoted, as at 39, to the wall 36 and is placed under the influence of a spring 40, normally urging said finger against the free edge of the arcuate wall 35. The end plate 34, the arcuate wall 35, and the radial wall 36 are preferably formed integral as a single casting.

A plate 41 reciprocates in slots 42 provided in the end plate 34 and is slidably maintained on the outer face of the radial wall 36. The outer end of these plates 41, which clamp the overlapped sheets to the appertaining folding drum, has a lug directed toward the arcuate wall 35 to form a clamping lip 43, adapted to coact with said wall. The clamping lip 43 is normally urged into clamping engagement by a series of extensible springs 44 interposed between the wall 36 and lugs 45 formed at the inner end of the plate 41.

The ends of the clamping lips 43 are adapted to cooperate with the bending ledge of the opposite folding drum to clamp the paper therebetween whereby a fold in the paper is provided, which fold is received between the clamping lip 43 and its wall 35. An arm 46 is pivoted to each stubshaft 29 and is secured in position by a bolt 47 extending through a slot 48 in said arm, and entering into threaded engagement with the end plate 34. Each pair of arms carry at the outer ends a transverse blade 49 adapted to force the fold between the wall 35 and the lip 43. From the foregoing it is obvious that by virtue of the adjustability of the plate 46 the depth of the tuck formed by the blade 49 may be regulated within certain limits.

The movement of the clamping plates 41 is effected independently of the folding drums by cam disks 50 (Fig. 4), loosely mounted on the stub-shaft 29 at the ends of the folding members and controlling rollers 51 carried on the ends of the clamping plates 41. To the cam disks 50, links 52 are pivotally secured and the latter embrace at the other ends cams 53 on the shafts 33.

The bending ledge 38 comes in contact with the opposite clamping lip before the same reaches its upper limit and thereby stretches the paper before the opposite clamping lip releases the paper. The bending ledge therefore does not only bend the paper prior to being acted on by the tucking blade, but it also prevents the paper on the main sheet from dropping or sagging.

The folding members are continuously rocked approximately through one quarter of a revolution and the upper limit of oscillation of the bending ledges 38 and clamping lips 43 lies substantially in a horizontal plane passing through the axis of oscillation of the folding members. The lower limit of

oscillation of the clamping lip is at a vertical plane passing through the axis of oscillation of the folding members so that the folds held by the clamping lips are disposed horizontally when released.

As the inner side of a folding member rocks upwardly its clamping lip 43 will move into the recess of the bending ledge 38 of the coacting folding member to bend the paper and prepare the same for the action of a tucking blade 49 above the ledge 38. The tucking blade 49 moves then downwardly between its appertaining ledges 38 and the wall 35 of the drum and forces the fold of a paper between the lip 43 and the wall 35. The tucking blade is then moved upwardly and the clamping plate 41 moves inwardly, whereby its lip 43 clamps the fold against the wall 35.

When the fold carrying member reaches its lower limit of oscillation the fold of the sheet is released by engagement of the rollers 51 of the plate 41 with portions 54 of the cams 50. This release occurs when the clamping lip 43 of the plate 41 is above the side edge of an endless conveyor belt 73, adapted to receive the interfolded sheets. The entire operation described is repeated alternately with respect to the folding members.

To properly arrange the sheet material on the delivery means a plurality of stripper fingers 55 are disposed at each side of the folding drums on shafts 56, each of which is rocked by means of an arm 57 and carried by said shaft, and holding a roller in engagement with a cam 58 on the corresponding shaft 33. A spring 59 interconnects the lower ends of arms 60 secured to the shafts 56, whereby the fingers 55 are held by the cam in engagement with the folded sheet material. The fingers are all raised only mutually by the cam incidentally to the releasing movement of the clamping plates. In the raised position the fingers enter grooves 84 (Fig. 7) formed in the wall of the folding members to engage the upper face of the sheet material.

The stripper fingers 55 are provided with flat gripper springs 61 pivotally mounted to said fingers intermediate their ends and maintained in position by arms 62 secured to a transverse shaft 63, which extends through all of the stripper fingers of one set (Fig. 6). At the outer end of this shaft 63 an arm 64 is provided, which is bifurcated at its outer end to carry a roller 65 in engagement with the cam 66 loosely maintained on the shaft 56. Integral with the cam 66 or secured thereto is a gear 67 meshing with a gear 68, keyed to the shaft 33. Set collars 69 are placed laterally of the gear 67 and the cam 66 to prevent displacement thereof. The rotation of the cam 66, as is obvious, is independent of the revo-

lution of the shaft 56 on which it is loosely mounted. The action of the gears and cam is so timed as to bring the gripper spring 61 against the underside of the stripper fingers 55 when the same are in the upward position to receive a folded sheet. When the clamping lip 43 carries a folded sheet around toward the bottom the edges of the sheet will be received between the spring 61 and the finger 55 and subsequently released by drawing the spring 61 backwardly over an incline as indicated in Fig. 5.

In order to provide for the vertical alinement of the pack of folded sheets, a spring 15 is secured to a shaft 16 and adapted to aline the upper end of the stack 85 arranged on the endless conveyer 73. The spring 15 at its upper end is deflected, as at 17, which deflected portion is engaged by the clamping lip 43 upon the downward oscillation of the folding member, whereby the spring 15 is brought out of engagement with the stack and immediately upon release springs back into position whereby the layers of the stack are straightened.

The drive to the various parts of the machine is obtained from one of the shafts 33 which is rotated by any source of power. Gears 70 (Fig. 2) of the shafts 33 mesh with other gears 71, which actuate gears 72, keyed to the shaft 6.

The conveyer belts 73 are trained around sprocket wheels 74 mounted on a shaft 75, journaled in the main frame 5. One end of the shaft carries a ratchet wheel 76, which is engaged by a pawl 77 of a lever 78 loosely mounted on the shaft 75. The upper end of the lever 78 is interconnected by a pitman 79 to a crank pin 80 on the outer end of one of the shafts 29. Upon rotation of the shafts 29 an intermittent movement is imparted to the shaft 75. The remote end of the conveyer chains encompasses sprocket wheels 81 on a shaft 83, also secured to the main frame.

The drawings illustrate the preferred embodiment of the invention by way of example. It is understood, however, that a large number of alterations and modifications will suggest themselves to those versed in the art, and I therefore do not intend to limit myself to the structure precisely as shown, but want to avail myself of any changes constituting departures within the scope of my invention as defined in the appended claims.

I claim:

1. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the members

to releasing position, and means on said fingers to grip the fold of work material and transfer the same to a stack or pile.

2. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members and engageable against the faces thereof, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the fingers to releasing position, and gripper springs arranged on said fingers adapted to clamp the work material to said fingers and to transfer the same to a stack or pile.

3. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members and engageable against the faces thereof, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the members to releasing position, gripper springs pivotally secured to said stripper fingers, and means for arranging said springs in work engaging and releasing position respectively.

4. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members and engageable against the faces thereof, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the members to releasing position, gripper springs pivotally secured to said stripper fingers, a shaft projecting through said stripper fingers, means for interconnecting said shaft with said springs, and means for imparting to said shaft a rocking motion.

5. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members and engageable against the faces thereof, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the members to releasing position, gripper springs pivotally secured to said stripper fingers, a shaft projecting through said stripper fingers, links connecting said shaft to said springs, a cam, and an arm of said shaft controlled by said cam.

6. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members and engageable against the

faces thereof, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the members to releasing position, means on said fingers to grip the fold of work material and transfer the same to a stack or pile, and means for straightening said stack.

7. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members and engageable against the faces thereof, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the members to releasing position, means on said fingers to grip the fold of work material and transfer the same to a stack or pile, and resilient means for straightening said stack.

8. In a machine of the character described, a pair of folding members, means for oscillating said members simultaneously in opposite directions, clamping lips carried by said members and engageable against the faces thereof, said clamping lips and folding members being provided with alined transverse

grooves, stripper fingers entering said grooves upon movement of the members to releasing position, means on said fingers to grip the fold of work material and transfer the same to a stack or pile, and means actuated by the clamping lip of one of said folding members for straightening said stack.

9. In a machine of the character described, a pair of folding members, means for oscillating said member simultaneously in opposite directions, clamping lips carried by said members and engageable against the faces thereof, said clamping lips and folding members being provided with alined transverse grooves, stripper fingers entering said grooves upon movement of the members to releasing position, means on said fingers to grip the fold of work material and transfer the same to a stack or pile, and a spring normally in engagement with said stack and temporarily displaced by the clamping lip of one of said folding members to exercise upon return movement a straightening effect upon the stack.

In testimony whereof I hereunto affix my signature.

LOUIS A. STRAUBEL.