

May 12, 1931.

L. A. STRAUBEL

1,804,847

PAPER INTERFOLDING MACHINE

Filed Jan. 20, 1930

4 Sheets-Sheet, 1

Fig. 1.

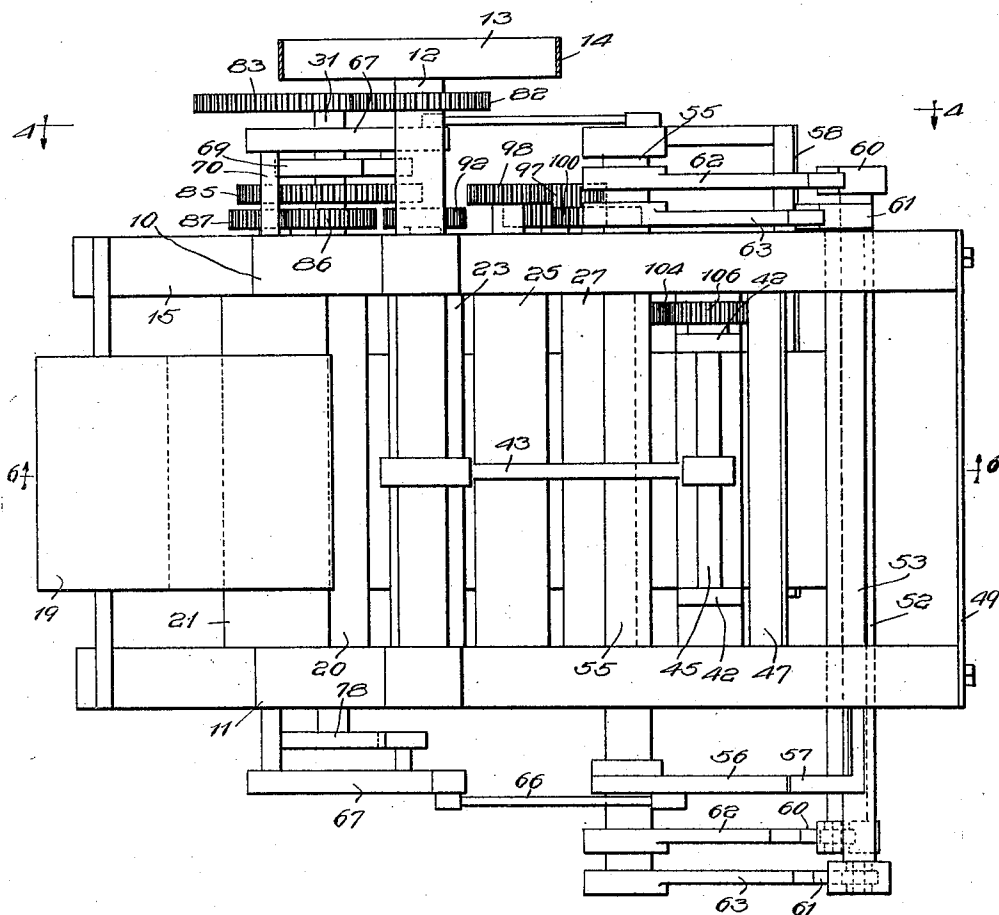
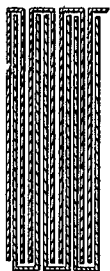


Fig. 2.



Witness:

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May 12, 1931.

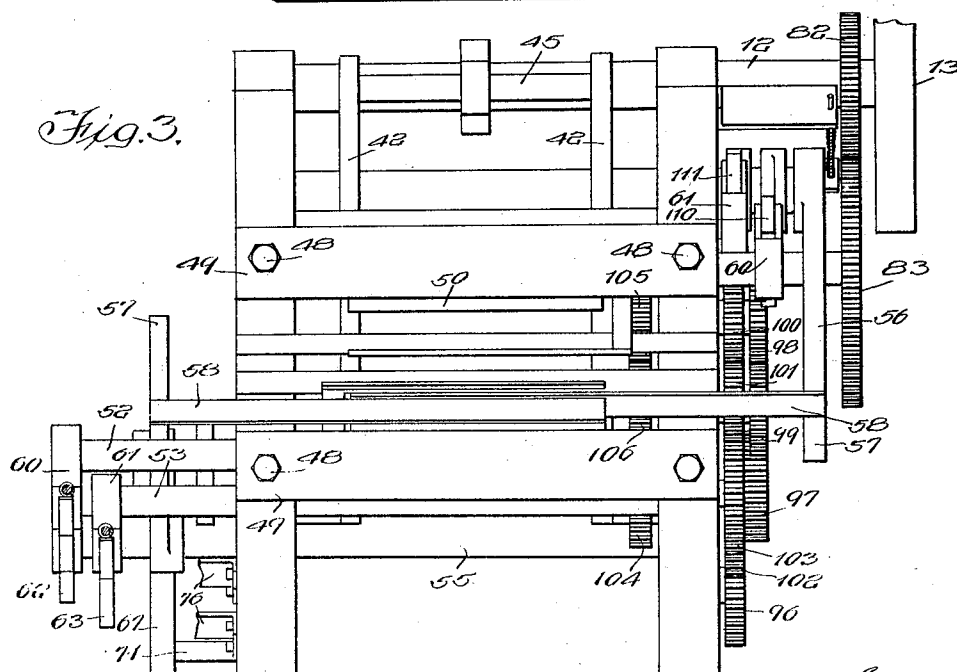
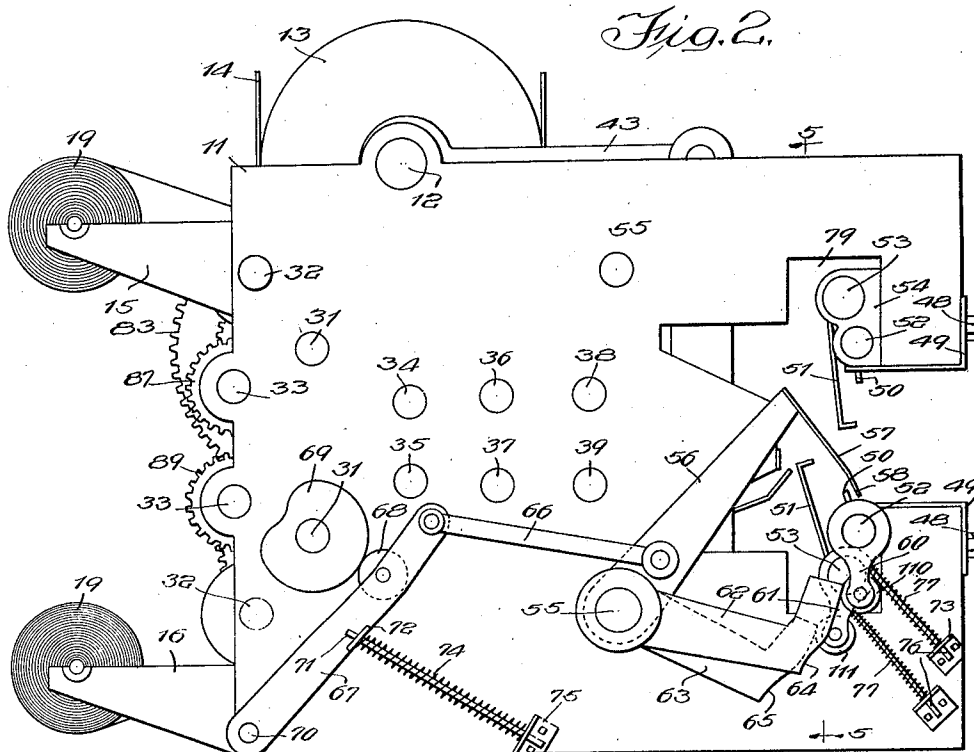
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PAPER INTERFOLDING MACHINE

Filed Jan. 20, 1930

4 Sheets-Sheet. 2



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Attys

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1,804,847

PAPER INTERFOLDING MACHINE

Filed Jan. 20, 1930

4 Sheets-Sheet. 4

Fig. 6.

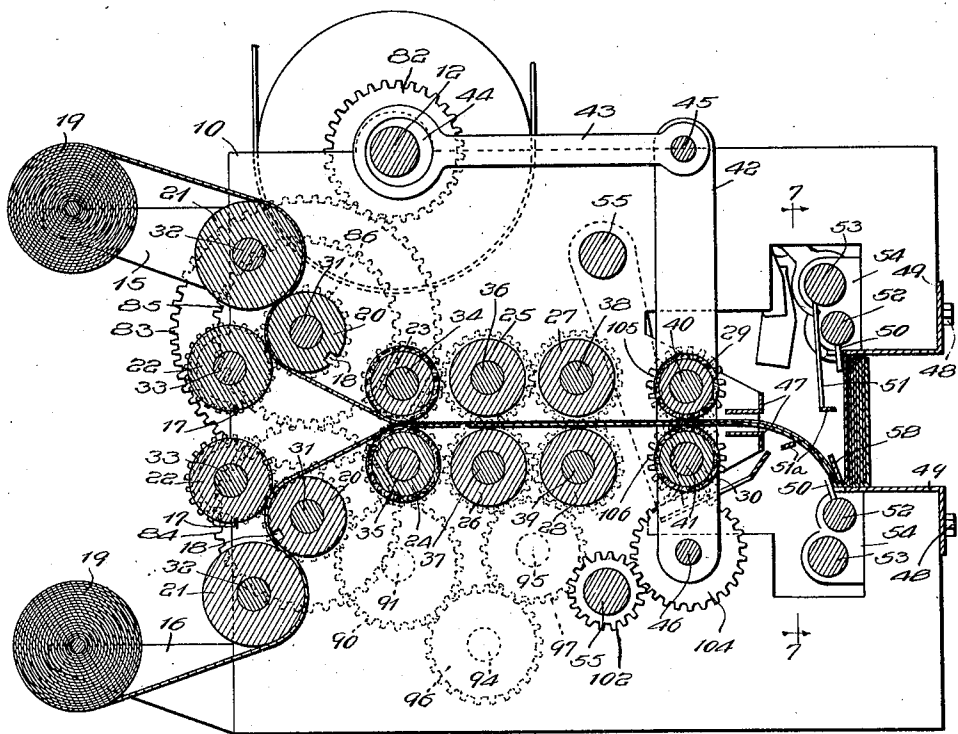
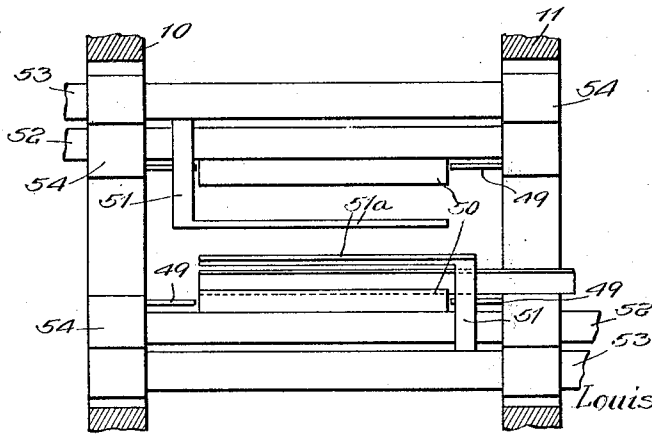


Fig. 7.



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UNITED STATES PATENT OFFICE

LOUIS A. STRAUBEL, OF GREEN BAY, WISCONSIN

PAPER INTERFOLDING MACHINE

Application filed January 20, 1930. Serial No. 422,031.

My invention relates to improvements in paper interfolding machines and more particularly to the type of machines employed in producing packages of material such as toilet paper and paper toweling composed of two leaf units or books, the leaves being interfolded with the leaves of adjacent units or books.

An object, generally, of the invention is to simplify the construction and to increase the capacity of machines of the kind described.

The invention contemplates advancing two sheets of paper in juxtaposed relation, each of said sheets being partially severed along lines midway between the partially severed portion of the adjacent sheet and then feeding such partially severed juxtaposed sheets between a pair of oscillating rollers. The period of oscillation of the rollers is such that each forward movement completely severs one of the advancing sheets and intermittently moves two completely severed overlapping sections forwardly to a point where the forward end of the most advanced section is held stationary by the folding mechanism. The backward movement of the oscillating rollers returns the rearmost of the two overlapping severed portions and closes the gap between it and the following portion of the sheet from which it was originally severed. The advancing end of the adjacent sheet, at the instant of the closing of the gap, is engaged by the oscillating rollers and this sheet, as a result, is in turn severed by the next advance movement of the oscillating rollers, the rollers operating first upon one sheet and then upon the other to completely sever them in turn. The oscillatory motion of the rollers causes the two overlapping completely severed portions to intermittently advance more rapidly than the unsevered portions and then the rearmost of the two severed portions to be retarded until the sheet from which it is severed overtakes it.

In making the folds alternately on top and bottom, the folding device requires the forward movement of the sheets in an intermittent manner as it folds each sheet, and

the oscillating rolls are timed to provide this movement so as to avoid slack at points between the oscillating rolls and the point where the sheets are held stationary by the folding mechanism. Another object of the invention is the provision of improved means for varying the speed with which the work material is advanced and thereby preventing slack in the sheets of work material which would otherwise result from the sheets being held stationary by the folding mechanism.

Still another object of the invention is the provision of an interfolding machine operable to advance two sheets of material in overlapped relation, the sheets being broken and parted while they are in overlapped relation and the opening again closed while the sheets are moving.

A more particular object is the provision of improved folding mechanism in such machines.

Still another object is the provision of novel means for completing the separation of strips of material already partially severed.

A still further object is the provision of a machine of the kind described which is compact, durable, reliable, convenient and satisfactory for its intended purpose.

In the drawings, wherein like reference characters indicate like or corresponding parts,

Fig. 1 is a plan view of a machine embodying my invention;

Fig. 2 is a side elevational view of the machine shown in Fig. 1;

Fig. 3 is an elevational view of the discharge end of the machine;

Fig. 4 is a side elevation and partial sectional view along the line 4—4 of Fig. 1;

Fig. 5 is a sectional view along the line 5—5 of Fig. 2;

Fig. 6 is a longitudinal sectional view along the line 6—6 of Fig. 1;

Fig. 7 is a view along the line 7—7 of Fig. 6; and

Fig. 8 is a fragmentary sectional view through a package of material showing the relative positions and interlocking arrange-

ment of the books or units of material forming the package.

Referring now more particularly to the drawings, the machine comprises side frames 10 and 11, in which a transversely extending drive shaft 12 is journaled. The shaft 12 is driven by a pulley 13. A belt 14 operatively connects the pulley 13 with a source of power (not shown). The machine is adapted for simultaneously operating upon work material comprising two rollers of paper 19 journaled, one upon an upper pair of brackets 15. The sheets of paper comprising the rolls 19 are each advanced partly around and between a felt covered feed roll 21 and a bed roll 20. The bed rolls 20 are each provided with longitudinal recesses 18 for the reception of cutting knives 17. The knives 17 are mounted upon a perforating or cutting roll 22 between which and the feed rolls 20 the sheets of paper pass after leaving the felt covered feed rolls 21. The longitudinal recesses 18 and the cutting knives 17 are so arranged and of such a length as to only partially sever the sheets of paper advancing between the rolls 20 and 22. The sheets of material, upon leaving the rolls 20 in their partially severed condition, meet and are advanced in juxtaposed relation between a pair of felt covered rolls numbered 23 and 24. The knife 17 and the recess 18 of the upper rollers 22 and 20, respectively, are so timed in their relation to the knife 17 and the recess 18 on the rollers 22 and 20, respectively, that the partially severed portions of the upper sheet are positioned midway between the partially severed portions of the underlying sheet. The two sheets of material, upon passing between the rollers 23 and 24 are advanced between upper guide rollers 25 and 27 arranged in pairs with lower guide rollers 26 and 28, respectively. The upper guide rollers 25 and 27 are spaced apart from the corresponding lower guide rollers sufficiently that they serve only as guides and supports and are not provided as a positive drive or feed for the advancing sheets of paper. All of the rollers hereinbefore indicated, are constantly rotating in a direction tending to advance the webs of material, the mechanism for actuating the rollers being hereinafter more particularly described.

The breaker rollers 29 and 30 are caused to oscillate together in the plane of the advancing sheets of material by mounting the rollers upon a pair of rocker arms 42. The arms 42 are pivoted about a shaft 46 and their oscillatory movement is produced by a link 43. The upper ends of the arms 42 are connected by a transversely extending shaft 45, with the mid portion of which one end of the link 43 is pivotally connected. The other end of the link 43 has a cam connection 44 with the drive shaft 12, whereby each

revolution of the shaft 12 imparts one complete oscillatory movement to the arms 42 on which the breaker rollers 29 and 30 are journaled.

The breaker rollers 29 and 30 are positioned in advance of the feed rolls 23 and 24 a distance slightly greater than the distance between the partially cut portions of the individual sheets of paper. As a result, when a partially severed portion of one sheet of paper is leaving the rollers 23 and 24, the partially cut portion of the same sheet immediately in advance, has not yet entered between the breaker rollers 29 and 30. Each forward oscillatory movement of the breaker rollers 29 and 30 completely severs the nearest partially cut portion of the super-imposed sheets of paper advanced therebetween. The upper and lower sheets are thereby in turn completely severed and the severed portion accelerated and retarded alternately by alternate forward and backward movements of the rollers 29 and 30. The lower guide rollers 26 and 28 assist in supporting both the partially severed and the completely severed sections of the two advancing sheets of material. The completely severed portions of the sheets of material are advanced together in overlapping relation between a pair of angle iron guides 47. After passing the guides 47 the overlapping severed sections of material are brought into engagement with the folding mechanism by means of which each completely severed section of material is folded at its mid portion in contact with the adjacent ends of the two completely severed portions of the other sheet, thereby forming each section into a book of two leaves which interlock with the leaves of adjacent books, as is best shown in Fig. 8.

The initial contact of the tucker blades 58 with the middle of the severed portions, for the purpose of folding the same, is at a relatively slow speed which increases rapidly by reason of the construction of the cams 69. The folding operation resulting from the contact of the blades 58 with the material requires that the forward end of the severed portion be retained fixedly in position between the leaves of the previously folded section by the pressure of the adjacent flaps 52, during the folding operation. This folding operation, therefore, requires that the rear half of the section being folded be advanced more rapidly than the main body of the sheet from which it was severed. The forward movement of the oscillating rolls 29 and 30 is so timed as to feed the section being folded at the proper rate and to permit the folding operation to occur with the advance end of the section held stationary. The accelerated movement of the material occasioned by the oscillating rollers 29 and 30 thereby avoid the necessity

for any slack being provided in the paper adjacent the folding mechanism. The return oscillatory movement of the rollers 29 and 30 closes the gap between the end of the severed portion and the forward end of the sheet with which it was originally connected.

The arrangement of the feed rolls 23 and 24, which take the overlapped sheets from both the bed rolls 20 and hold the sheets so that the oscillating rolls 29 and 30 do not break the ties connecting the partially severed portions while the sheets are being partially severed and permits the ties to be broken at a point between the feed rolls and the oscillating rolls where the sheets are in overlapped relation, constitutes an important part of the invention.

A pair of spaced apart angle irons 49 are fastened to the frame of the machine by bolts 48. The inwardly extending legs of the angle irons 49 are spaced apart to permit the interlocking folded sections of material to be pressed outwardly therebetween in vertical position following the folding operation. The lower of the angle irons 49 serves as a support for the material and the upper as a guide, as best shown in Fig. 6.

A drive for the various parts of the machine is obtained through a suitable train of gears mounted upon the various shafts which are journaled in the side frames 10 and 11. Power enters the machine through the belt 14 and the pulley 13, as already described, thereby rotating the main drive shaft 12. A gear 82 is mounted on the shaft 12 in meshing engagement with a gear 83. The gear 83 is fixedly mounted upon and actuates the upper shaft 31, upon which the upper bed roll 20 is mounted. Rotation of the upper shaft 31 actuates a gear 86 which meshes with a gear 87 mounted upon and driving an upper shaft 33 upon which the upper perforating or cutting roll 22 is mounted. The felt covered feed roll 21 is so mounted upon the shaft 32 as to cooperatively engage and be actuated by the upper bed roll 20. Rotation of the feed roll 21 serves to unwind the paper from the roll 19, causing the material to pass over the roll 21 and between the roll 21 and the bed roll 20. The gears 86 and 87 are of the same diameter and thereby cause the rolls 20 and 22 to rotate at the same rate. As a result, the sheet of material passing between the rolls 20 and 22 is partially severed by the knife 17 along transverse lines spaced apart a distance equal to the diameter of the rolls 20 and 22.

A relatively large gear 85 is mounted upon the upper shaft 31 in mesh with a gear 84 of equal diameter mounted on a lower shaft 31. The lower shaft 31 carries and rotates the lower bed roll 20 in operative engagement with the lower felt covered

feed roll 21 thereby advancing and unwinding the material from the lower paper roll 19 in the same manner as described for the upper roll. The lower shaft 31 carries a gear 88 which meshes with a similar gear 70 fixedly mounted upon and rotatable with a lower shaft 33. The lower shaft 33 carries the lower perforating or cutting roll 22 in cooperative engagement with the lower bed roll 20. It is to be noted that both the upper 75 and lower sets of rolls 20 and 22 are thereby rotated at the same rate and serve to partially sever the upper and lower advancing sheets of material in exactly the same way, the only difference being that the knife 17 80 and recess 18 of the upper set of rollers are so positioned that they partially sever the upper sheet of paper at points exactly midway between the corresponding partially severed portions of the lower web of material. 85

The felt covered feed rolls 23 and 24, between which the two partially severed portions of material are fed are actuated by the lower shaft 31 through a gear 90 which 90 meshes with a gear 98 mounted for that purpose on the lower shaft 31. The gear 90 is mounted on a stud shaft 91 and meshes with a gear 93 fixedly mounted upon the shaft 35 which carries the lower feed roller 24. 95 The upper feed roller 23 is caused to operate at the same rate and in the opposite direction to that of the feed roller 24 by means of a gear 92, suitably mounted on the upper shaft 34 in mesh with the gear 93. 100

The gear 90 also meshes with a gear 96 suitably mounted on a stud shaft 94 in order that the upper guide rollers 25 and 27 and the corresponding lower guide rollers 26 and 28 may be rotated in the same general direction as the corresponding upper feed roll 23 105 and lower feed roll 24. The gear 96 meshes with a relatively wide gear 97 suitably mounted on a stud shaft 95 in a position to mesh with gears 99 and 101 mounted on shafts 37 and 39, respectively. The gear 99 is positioned at a sufficiently greater distance from the frame 10 to clear the gear 101 so that there is no operating engagement of the gears 99 and 101. The resulting 115 rotation of the gears 99 and 101 in counterclockwise direction, as observed in Fig. 4, similarly rotates the shafts 37 and 39, thereby causing the guide rolls 26 and 28, mounted thereon, to be rotated in the desired direction. A gear 100 mounted on a shaft 120 38, meshes with the gear 101 and causes the shaft 38 to rotate the upper guide roll 27. Similarly, a gear 98 mounted upon a shaft 36 meshes with the gear 99 and causes the 125 desired rotation of the upper guide roll 25.

The breaker rolls 29 and 30, journaled upon shafts 40 and 41, respectively, are subjected to oscillatory motion by reason of the shafts being journaled in the rocking 130

arms 42 and are rotated by an operative connection with the gear 97. For this purpose an idler gear 102 is mounted on a lower shaft 55 in mesh with the gear 97 and meshes in turn with an idler gear 104 mounted on the shaft 46. The gear 104 meshes with a gear 100 which is fixedly mounted upon the shaft 41 and thereby causes the shaft and the lower breaker roll 30 to rotate in clockwise direction, as observed in Fig. 6. The gear 100 meshes with a gear 105, similarly mounted on the shaft 40 to cause the breaker roll 29 to rotate in counterclockwise direction, as observed in Fig. 6. Since the rocking arms 42 are pivoted about the shaft 46 their oscillation carries with them the rollers 29 and 30 and their corresponding gears 105 and 100, maintaining the gears in mesh with each other and the gear 100 in meshing relation with the gear 104, thereby permitting simultaneous rotation and oscillation of the rollers 29 and 30. The trains of gears are all so arranged and constructed that each of the rollers operated thereby perform their part in advancing the superimposed sheets of material at the same rate except for the oscillating rollers 29 and 39 which, by reason of their oscillation completely sever the sheets of material in turn, as herebefore described.

Taking up the folding mechanism of the machine, a pair of vertically aligned short pressure flaps 50, extending transversely through the machine, are mounted upon corresponding rocker shafts 52. As observed in Fig. 6, the upper of the flaps 50 is pressing against the upper portion of the folded work material while the lower is out of engagement with the work during the folding of the material adjacent the lower flap. The edge of the inwardly projecting legs of the angle irons 49 are cut back to permit the flaps 50 to be rotated into their vertical position.

A pair of vertically aligned transversely extending rocker shafts 53, journaled in the side frames 10 and 11, each carry an arm 51. The arm 51 on the upper of the shafts 53 is positioned adjacent to and outside of the frame 10. The arm 51, mounted on the lower of the shafts 53, is positioned outside of and adjacent to the side frame 11. Each of the arms 51 carries a transversely extending pressure flap 51a. The flaps 51a in turn engage the severed sections of the material in the mid portion thereof and folds the same, as best observed in Fig. 6, wherein the flap 51a, connected with the lower one of the arms 51 is shown in contact with the work and the upper flap 51a is shown in the position it takes following movement of the arm 50 into vertical position. The pressure flaps 51a are operable in turn to successively hold the books

of relatively thin material such as tissue and other light weight paper in their folded position.

In Fig. 6, a completely severed portion of the lower sheet is shown as being folded at its mid portion by contact therewith of a tucker blade 58 which extends transversely through the machine and through an opening 79 in the side frame 11 of the machine. The projecting end of the tucker blade 58 is mounted on a bar 57 carried by an arm 56. The arm 56 is mounted on the lower of the shafts 55 and is operatively connected with a cam disk 78 in a manner hereinafter more particularly described. A similar tucker arm 56 is mounted on the upper shaft 55, as best shown in Fig. 4, and has suitably fastened in its lower end a bar 57 carrying a tucker blade 58 which projects through an aperture 79 in the side frame 10 of the machine. The upper arm 56 is of sufficient length to extend across and contact with the under side of the work material so as to fold the severed portion of the upper sheet of material at its mid point in the same way as is shown in Fig. 6 for the lower sheet of material. The two blades 58 are alternately operable to fold the material by traveling back and forth in intersecting circular paths.

The rocker arms 52 and 53, carrying the pressure flaps 50 and 51a and the tucker arms 56 carrying the upper and lower tucker blades 58 are operatively connected with the constantly rotating gear mechanism hereinbefore described so as to alternately fold and press the folded work into position by means of mechanism properly timed for that purpose. For this purpose each of the shafts 31 has a cam disk 69 mounted thereon and each of the disks is rotated by its shaft 31 to actuate a system of arms and links in proper sequence to produce the desired movement of the folding and pressing mechanism. The lower shaft 31 has its cam disk 69 mounted on the outside of the side frame 11 and operatively connected with the adjacent arm 56. The rocking of the arm 56 moves the blade 58 downwardly to fold the material and also moves the corresponding lower pressure flap 50 and blade 51a. The upper of the shafts 31 has its cam disk 69 mounted on the outside of and adjacent to the side frame 10 so as to actuate the set of arms and links which correspondingly move the tucker blade 58 and pressure flaps 50 and 51 operating on the upper folded portions of the material.

As observed in Fig. 2 the cam disk 69 has a substantial portion cut away and is so positioned that its periphery contacts with a roller 68 suitably mounted on a rocker arm 67. The rocker arm 67 is rotatable about a pivot 70 and is constantly urged in counter clockwise direction by a com-

pression spring 74. A plunger rod 71 is connected with the rocker arm 67 by means of a pivoted yoke connection 72, the arm 71 extending through the spring 74 and projecting through an aperture provided for that purpose in an outstanding leg of an angle iron 75. The angle iron 75 provides an abutment for the compression spring 74 so that the roller 68 is constantly held by the pressure of the spring 74 in contact with the outer periphery of the cam disk 69. The rocker arm 67 is connected with the adjacent tucker arm 56 by means of a link 66. In the position shown wherein the roller 68 is in contact with the circular portion of the periphery of the cam disk 69, the tucker blade 58 is in its lowermost position, as shown in Fig. 2 and Fig. 6. It is obvious that this tucker blade 58 remains in its lowermost position during that portion of the rotation of the disk 69 wherein the roller 68 is in contact with the curved portion of the periphery of the disk. As the disk 69 is rotated by the shaft 31 in clockwise direction the roller 68 will be brought into contact with the cut away cam face 78. The spring 74 will cause the arms 67 and 56 to rotate in counterclockwise direction as a result and thereby move the tucker blade 58 out of contact with the work and into a position corresponding to and immediately above the other of the tucker blades 58, as shown in Fig. 6.

The tucker arm 56 is fixedly mounted on the rocker shaft 55, and in rotating, as above described, carries with it arms 62 and 63 each having upwardly projecting end portions providing cam surfaces 64 and 65, respectively. The lower rocker shaft 52 has a rocker arm 60 fixedly mounted thereon with a roller 110 positioned to engage the cam surface 64 of the arm 62. Similarly, the rocker shaft 53 is provided with a rocker arm 61 having a roller 111 positioned to operatively engage the cam surface 65 of the arm 63. Compression springs 77 are provided to hold the arms 60 and 61 with their rollers 110 and 111 in contact with the cam surfaces 64 and 65, respectively. Each of the rocker arms 60 and 61 are provided with a plunger rod 76 operatively connected therewith by means of a yoke, (not shown), similar to the yoke connection 72 with the arm 67. Angle irons 73 provide abutments for the springs 77 and have their outstanding legs apertured to slidably receive the free ends of the arms 76. As the arm 56 is rotated in counterclockwise direction, as observed in Fig. 2, following the engagement of the roller 68 with the cam surface 78 of the disk 69, the arms 62 and 63 will be similarly rotated, bringing the rollers 110 and 111 into contact with the lower cut away portion of the cam surfaces 64 and 65, respectively, thereby causing the corresponding

pressure flaps 50 and 51a to be rotated into contact with the work and maintaining the adjacent folded portions of the sheets of flimsy material in their vertical position. Conversely, when the tucker arm 56 is rotated back to the position corresponding to the lowest position of the tucker blade 58, the flaps 50 and 51 will be rotated in counterclockwise direction to the position shown in full lines in Fig. 2, wherein they are out of contact with the work.

Identical mechanism for actuating the other set of pressure flaps 50 and 51a and tucker blades 58 is mounted on the outside of the side frame 10. The mechanism mounted on frame 10 is so positioned relative to that shown on frame 11 that the two sets of operating mechanism are symmetrical about a horizontal plane between the two sheets of juxtaposed material. The operation of the two sets of mechanism is identical and differs only in the time of operation. This difference in timing is accomplished by so mounting the cam disk 69 on the upper shaft 31 as to position the cam face 78 in contact with its roller 68 when the cam face 78 of the disk 69 mounted on the lower shaft 31 is diametrically opposite to its roller 68. By mounting the actuating arms 56, 62 and 63 on the outside of the frames 10 and 11 with one set above and the other below the work and having the pressure flaps 51a and tucker blades 58 suitably mounted on arms on the exterior of the frames, the desired oscillatory movement of the oppositely operating plates and flaps is accomplished without any interference and constitutes an important feature of the invention.

Thus it will be seen that I have provided an improved interfolding machine operable for interfolding two juxtaposed sheets of paper having novel means for alternately severing such sheets of paper and novel folding mechanism wherein the two sheets of paper are alternately folded upwardly and downwardly and held in position alternately by pressure flaps having their paths intersecting, the mechanism being so constructed that each member moves to perform its function without interfering with the movement of corresponding mechanism which crosses its path.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts herein described and shown, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In an interfolding machine, the combination of means for advancing and partially cutting the work material, and a pair of

oscillating rollers between which the partially cut work material is fed for completely severing same.

2. In an interfolding machine, the combination of means for advancing and partially severing the work material at regular intervals and a pair of oscillating rollers between which said partially severed material is fed for completely severing the same.

3. In an interfolding machine, the combination of means for advancing and partially severing two sheets of the work material, means for advancing said sheets in juxtaposition and a pair of oscillating rollers between which said juxtaposed sheets are fed for completely severing same.

4. In an interfolding machine, the combination of means for advancing and partially severing two sheets of the work material at regular intervals, means for bringing said partially cut sheets in juxtaposition and a pair of oscillating rollers between which said juxtaposed sheets are fed, for completely severing same.

5. In an interfolding machine, the combination of means for simultaneously advancing and partially severing two sheets of the work material, means for advancing said partially severed sheets in juxtaposition, said juxtaposed sheets each having their partially severed portions positioned midway between the corresponding partially severed portions of the adjacent sheet, and mechanism alternately completely severing said advancing sheets at their extreme forward partially severed portions and continuing the advance of the completely severed portions in overlapping juxtaposed relation for the purpose described.

6. In an interfolding machine, the combination of means for advancing and partially severing the work material, two pairs of rollers between which the partially severed material is fed in turn, and means operable to oscillate one of said pairs of rollers to completely sever the material.

7. In an interfolding machine, the combination of means for advancing and partially severing the work material, two pairs of rollers between which the partially severed material is fed in turn, and means operable to oscillate one of said pairs of rollers in the path of the material to completely sever the material.

8. In an interfolding machine, means for advancing and partially severing two sheets of work material, two pairs of rollers between which said partially severed sheets are fed in juxtaposed relation with the partially severed portions of one sheet positioned midway between the partially severed portions of the other sheet, both of said pairs of rollers rotatable to advance the material at the same rate, and means operable to oscillate one pair of the rollers in the

path of said material to alternately completely sever partially severed portions.

9. In a machine of the kind described, means for uniformly advancing and partially severing two separate sheets of work material, means advancing said partially severed sheets in juxtaposed relation with the partially severed sections of one sheet midway between the partially severed sections of the other sheet and a pair of rollers between which said partially severed juxtaposed sheets are fed, said rollers oscillating together in the path of said sheets for alternately completely severing each of said sheets at a partially severed section between said advancing means and rollers.

10. In a machine of the kind described, means for uniformly advancing and partially severing two separate sheets of work material, means advancing said partially severed sheets in juxtaposed relation with the partially severed sections of one sheet midway between the partially severed sections of the other sheet and a pair of rollers between which said partially severed juxtaposed sheets are fed, said rollers oscillating together in the path of said sheets for alternately completely severing each of said sheets at a partially severed section between said advancing means and rollers said rollers alternately discharging the most advanced completely severed portion of each sheet into a mechanism folding said sheets along a transverse median line to form a book of two leaves.

11. In a machine of the kind described, means for uniformly advancing and partially severing two separate sheets of work material, means advancing said partially severed sheets in juxtaposed relation with the partially severed sections of one sheet midway between the partially severed sections of the other sheet and a pair of rollers between which said partially severed juxtaposed sheets are fed, said rollers oscillating together in the path of said sheets for alternately completely severing each of said sheets at a partially severed section between said advancing means and rollers, said rollers alternately discharging the most advanced completely severed portion of each sheet into operative engagement with folding mechanism, said mechanism in turn folding the most advanced of each completely severed portion along a transverse median line to form a book of two leaves.

12. In a machine of the kind described, means for uniformly advancing and partially severing two separate sheets of work material, means advancing said partially severed sheets in juxtaposed relation with the partially severed sections of one sheet midway between the partially severed sections of the other sheet and a pair of rollers between which said partially severed juxtaposed

5 sheets are fed, said rollers oscillating together in the path of said sheets for alternately completely severing each of said sheets at a partially severed section between
10 said advancing means and rollers, said rollers alternately discharging the most advanced completely severed portion of each sheet into operative engagement with a folding mechanism, said mechanism in turn
15 folding the most advanced of each completely severed portion along a transverse median line to form a book of two leaves, the severed portions of one sheet being folded oppositely to the severed portions of the other sheet whereby the leaves of each book are positioned between the leaves of adjacent books.

13. In a machine of the kind described, means for uniformly advancing and partially reversing two separate sheets of work material, a pair of feed rollers positioned in advance of said means between which said sheets are fed in juxtaposed relation with the partially severed sections of one sheet
25 midway between the partially severed sections of the other sheet, a second pair of feed rollers between which said partially fed sheets are fed, said second pair of rollers being spaced in advance of the first
30 mentioned pair of rollers a distance greater than the distance between the partially severed sections of one strip, said second pair of rollers oscillating in the path of said sheets to alternately sever the same between
35 said pairs of rollers.

In witness whereof, I hereunto subscribe my name this 14th day of Jan. A. D., 1930.

LOUIS A. STRAUBEL.