

J. KLEIN.
PAPER CUTTING AND FOLDING DEVICE.
APPLICATION FILED OCT. 28, 1908.

1,010,437.

Patented Dec. 5, 1911.

3 SHEETS—SHEET 1.

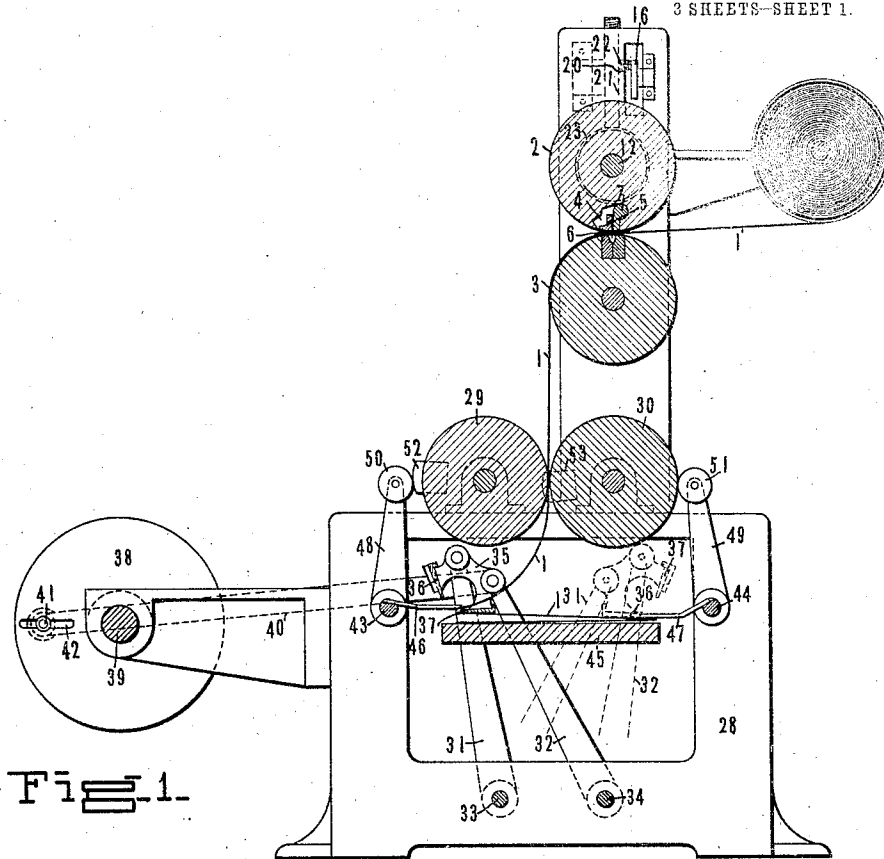


Fig. 1.

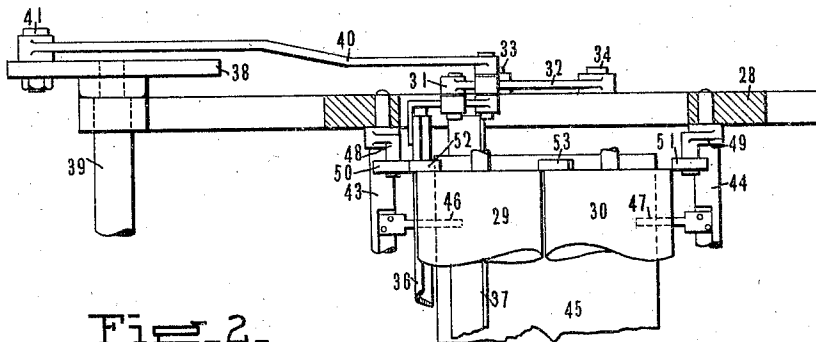


Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 3.

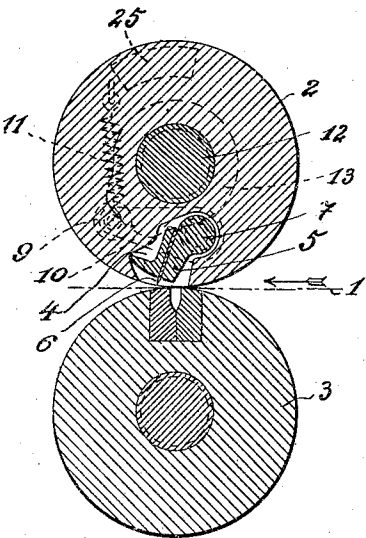


Fig. 4.

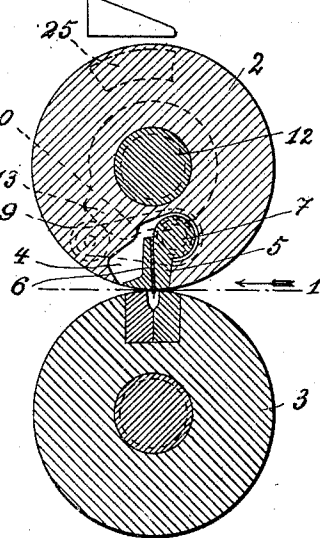


Fig. 5.

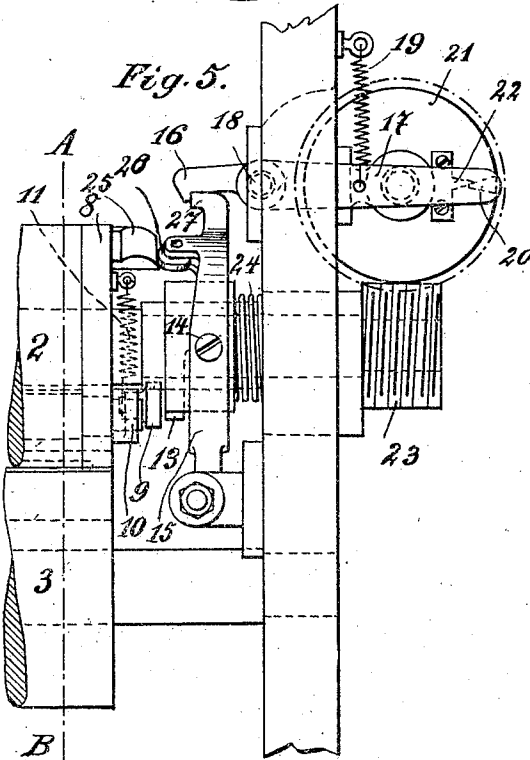
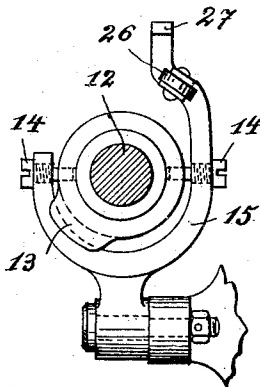


Fig. 6.



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3 SHEETS—SHEET 3.

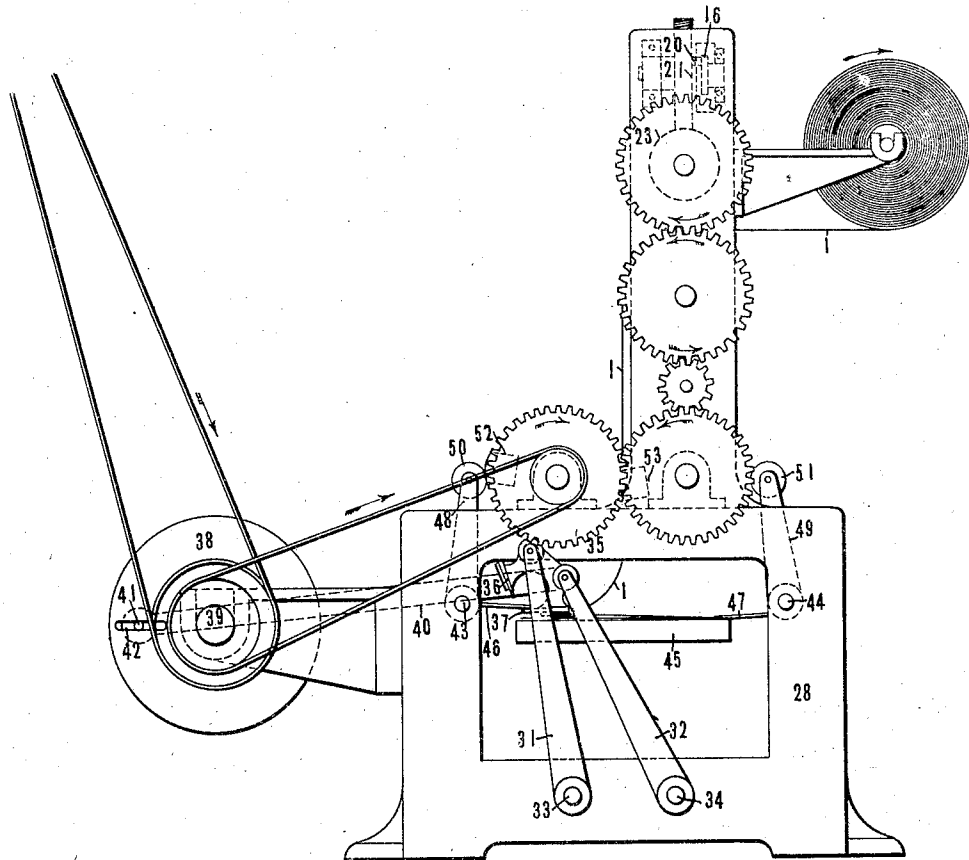


Fig. 7.

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UNITED STATES PATENT OFFICE.

JOSEF KLEIN, OF BERLIN, GERMANY, ASSIGNOR TO THE CARTER-CRUME COMPANY, LIMITED, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF CANADA.

PAPER CUTTING AND FOLDING DEVICE.

1,010,437.

Specification of Letters Patent.

Patented Dec. 5, 1911.

Application filed October 28, 1908. Serial No. 459,942.

To all whom it may concern:

Be it known that I, JOSEF KLEIN, a subject of the German Emperor, residing at 44 Waldemarstrasse, Berlin, Germany, have invented certain new and useful Improvements in Paper Cutting and Folding Devices, of which the following is a specification.

The present invention relates to contrivances for folding and separating paper. The general object thereof is to provide a simple and practical device of this character adapted to cut a paper web into predetermined lengths and fold the lengths to form a block or pad.

Another object is to provide simple and practical means for folding a continuous web into sheets connected in a zig-zag manner.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

Referring now to the accompanying drawings, wherein is shown one of various possible embodiments of this invention, Figure 1 shows the folding contrivance in vertical section; Fig. 2 is a plan view of a portion of Fig. 1 partially in section; Figs. 3 and 4 show the cutting or separating device in section taken on the line A—B of Fig. 5. In these illustrations the device for engaging and disengaging the cam has been omitted with a view to showing more distinctly this special device. Fig. 5 shows the separating device in partial elevation; Fig. 6 shows the cam effecting the operation of the blade with its disconnecting device seen from the left of Fig. 5; Fig. 7 is an elevation showing the various parts in operative relation to one another.

Referring to the drawings there is shown a suitable frame 28 within which the guiding and cutting cylinders 2 and 3 are rotatably mounted. The latter is provided in the usual manner with a narrow longitudinal groove or slot adapted to receive the edge of cutting blade 6. Cylinder 2 is provided with a longitudinally extending groove 4 and positioned therein is the blade holder

or nipper 5 which securely grips the cutting blade 6. The shaft 7 of the blade holder is journaled in disks 8 disposed at either end of the cylinder 2 and is eccentrically mounted with respect to the shaft thereof, as is clearly shown in Fig. 3. A roller 9 carried by a crank arm 10 secured upon the shaft 7 is disposed in operative relation to a spring 11 so as to normally hold the edge of the cutting blade within the circumference of the cylinder 2, which position, shown in Fig. 3, it occupies between succeeding cutting operations. Loosely mounted upon shaft 12 of cylinder 2, in a manner adapting it to be shifted longitudinally thereon, is a cam 13 connected as by means of the screws 14 with a fork-lever 15 which prevents rotation thereof. Pivoted by means of the pin 18 to the machine frame, as shown in Fig. 5, is a locking lever 16 having an elongated arm 17 extending outwardly beyond the said frame, the inner end of which is formed and adapted to engage a projection 27 of the fork-lever 15 and is normally held in such engagement by means of an extensile spring 19. The end of the arm 17 is provided with an abutment 20 which is positioned with respect to a similar abutment 22 carried by a rotatable disk 21 so as to be engaged thereby once during each complete revolution of said disk, the latter rotating with a worm wheel which is itself driven by a worm 23 secured to the shaft 12 of cylinder 2. The ratio of gearing is selected to produce one revolution of the worm wheel and disk while the cylinder 2 performs a number of revolutions corresponding to the number of sheets folded into a block or pad by means hereinafter described. The worm and worm wheel are adapted to be changed so as to produce pads having a greater or smaller number of sheets folded therein. At each revolution of the disk 21 the tappet or abutment 22 attains the position shown in Fig. 5 and further movement thereof carries downwardly the abutment 20 and lever arm 17, thus releasing the fork-lever 15 and enabling the spiral spring 24 positioned between the frame and the cam 13 to shift the latter into the path of travel of the roller 9. It should be understood that as the radius of rotation of the tappet 22 is shorter than that of the abutment 20 the former member will soon release the abutment 20 permitting the spring 19 to return

the lever 16 to its former position. When the roller 9 travels up the projection of the cam 13 the arm 10 is pressed outwardly and the blade assumes the cutting position shown in Fig. 4. After the paper web 1 which is being drawn between the cylinders 2 and 3 has been cut by the blade 6 the roller 10 passes the cam projection and is returned to its inactive position by the spring 11.

10 An inclined cam member 25 carried by the terminal disk 8 now engages a roller 26 pivotally mounted upon the fork-lever 15 and presses the said lever into its normal position, where it is held by means of the locking lever 16. It will be seen that the cutting blade remains in inoperative position until the desired number of sheets have been fed to the folding mechanism.

Referring to Figs. 1, 2 and 7 the folding mechanism will now be described. Mounted upon the frame 28 preferably in a position beneath the cutting cylinders 2 and 3 are a pair of coacting drawing and guide rollers 29 and 30 between which the paper web 1 passes after leaving the cutting cylinders. At either side of the two side pieces of the machine frame 28, two cranks 31 and 32 are mounted to swing about the pivots 33 and 34. Connecting members 35 are pivoted to each pair of cranks 31 and 32 and upon these members the folding rails 36 and 37 are fastened. Crank disks 38 secured to a drive shaft 39 are united with the members 35 by means of connecting rods 40, the crank pins 41 being adjustably mounted in slots 42 provided in the crank disks for that purpose, thus making it a simple matter to change, at will, the length of swing of the members 31 and 32. Two rock shafts 43 and 44 are journaled in the frame 28 upon opposite sides of the table 45 and are provided with spring members 46 and 47 which extend out over the edges of the table from opposite sides and are adapted to rest upon said table with a suitable degree of pressure. The shafts are rocked by means of rocker arms 48 and 49 provided with rollers 50 and 51 adapted to coact with cams 52 and 53 carried respectively by the drawing rolls 29 and 30.

The operation of the folding mechanism is as follows: As the drive shaft 39 rotates, double cranks 31 and 32 and the rail bearing connecting members 35 oscillate back and forth and cause first one and then the other of the folding rails to pass with their inner edges close to the table, during which operation they sweep by turns over the web 1 guided, as shown in Fig. 1, between the said inner edges of the two rails, each rail as it passes over the table forcing the web down in single sheets thereon, which sheets are connected to one another at their edges in a zig-zag fashion. In Fig. 1 of the drawing the opposite terminal position of the

folding rails, with their rod connections, is shown in dotted lines. As the member 35 moves inwardly from one extreme position the folding rail which has lately been in contact with the paper is swung into an elevated position while the other rail moves toward the table and at the same time passes over the corresponding springs 46 or 47 which press down on the sheet just folded and hold same in position. Before the advancing folding rails reach the limit of their travel the springs 46 or 47 resting upon the paper must be raised in order that the folding rail together with the paper carried thereby may pass beneath the said springs. This is accomplished at the proper time by the cam 52 or 53 engaging the roller 50 or 51 and causing a rocking of the shaft 43 or 44. The folding rails 36 and 37 are preferably given a wedge shaped section but may, however, consist of wires.

The drive shaft 39 receives its rotation from any suitable source of power and transmits same to the drawing rolls 29—30 and the cutting cylinders 2—3 in any suitable manner, one arrangement being shown in Fig. 7. It is to be further noted that while I have not shown such a construction, if it is desired to perforate the web along the lines of the folds, suitable perforating devices may be comprised in the construction of either the drawing rolls or the cutting cylinders. The paper roll may be mounted in any convenient position upon or near the machine, one way of mounting being illustrated in Fig. 7.

From the foregoing it will be seen that the present invention is one well adapted to attain, among others, all of the ends and objects hereinbefore set forth in an exceedingly simple and thoroughly practical manner, that the paper web will be fed to the folding mechanism at the proper rate of speed and that the same will be cut into lengths which, when folded, will give the required number of sheets to the pad.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device for folding a continuous web, in combination, means for feeding the web, a table, oscillating arms mounted in pairs adjacent opposite sides of said table, a member pivotally connected to said pairs of arms adapted to be rocked by the swinging thereof, and a pair of folding rails secured to said member and adapted alternately to fold the web and press the same down upon said table. 20

Signed at Berlin, Germany, this fourteenth day of October 1908.

JOSEF KLEIN.

Witnesses:

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