No. 771,504. PATENTED OCT. 4, 1904.

J. H. SPOERL.

APPARATUS FOR FOLDING, PILING, AND CUTTING PAPER, &c.

APPLICATION FILED NOV. 30, 1903.

NO MODEL.

Fig. 1.

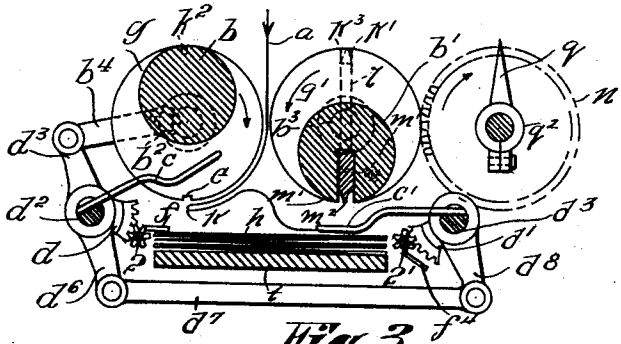


Fig. 3.

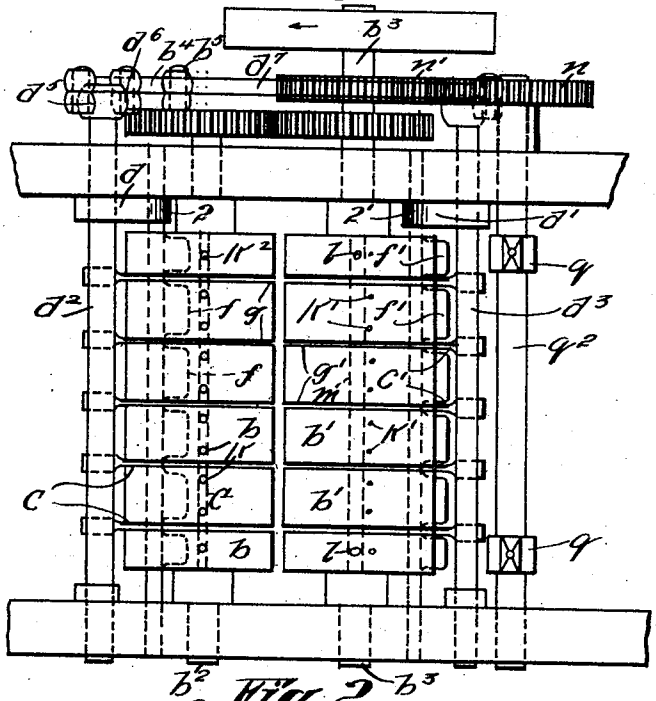
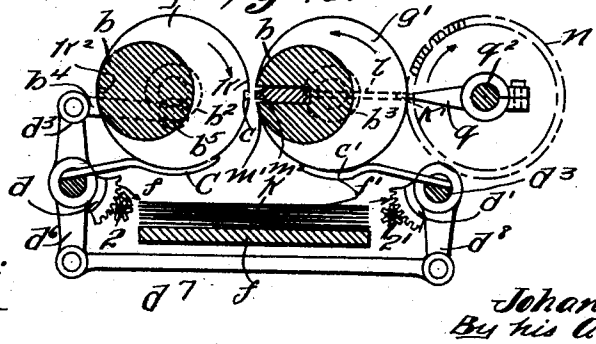


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FOLDING, PILING, AND CUTTING PAPER, &c.

SPECIFICATION forming part of Letters Patent No. 771,504, dated October 4, 1904.

Application filed November 30, 1903. Serial No. 183,127. (No model.)

To all whom it may concern:

Be it known that I, JOHANN HEINRICH SPOERL, a subject of the Emperor of Germany, residing in Düsseldorf, Empire of Germany, have invented certain new and useful Improvements in Apparatus for Folding, Piling, and Cutting Paper and the Like, of which the following is a specification.

This invention relates to and has for an object to provide improved apparatus for alternately folding in opposite directions on perforated lines at uniform distances apart a web delivered from rotary printing-presses, the said web being, if desired, separated into piles containing a certain number of sheets, so that removal thereof can be effected without stopping the machine.

One form of the apparatus is illustrated in the drawings accompanying and forming a part of this specification, wherein—

Figure 1 shows a cross-section of the mechanism and shows the position of the right gripper c' on the upper sheet, which has been stripped from the right cylinder and is folded in zigzag form on the line of transverse perforations. Fig. 2 is a similar view to Fig. 1, with the difference that the movable parts are in a different position; otherwise this figure shows the moment of the cutting off after piling a predetermined number of sheets; and Fig. 3 shows the cylinders $b\ b'$ looking from the top.

The web a, transversely perforated at uniform intervals, is conducted to the cylinders b and b' in the present instance from the top, half the circumference of each of which is equal to the distance between two lines of perforations in the web. Each of these cylinders $b\ b'$ is provided with a row of thin and pointed pins $k\ k'$, which respectively enter the guideway m^2 and the recess k^2 and penetrate the web close to the perforated lines, so that the sheet is alternately moved to the right and left by the cylinders and folded at the perforated lines. The cylinders are mounted on shafts $b^2\ b^3$, and adjacent to the cylinders are arranged grippers $c\ c'$, which are fast upon rock-shafts $d^2\ d^3$. In the present instance there are shown several grippers for each cylinder. Upon the rock-shafts are also fast segments $d\ d'$.

As seen in Fig. 1, the shaft d^2 has fast upon it an arm d^5, which is pivoted to pitman b^4, having an eye connected to a crank b^5, whereby the gripper c and the segment d are oscillated. The shaft d^2 also has an arm d^6, which is connected, by means of a link d^7, with an arm d^8 upon the rock-shaft d^3, whereby the motion transmitted from the cam b^5 will actuate the grippers in unison, which in their uppermost positions extend into recesses $g\ g'$ in the cylinders in order to remove the paper from the pins $k\ k'$ at the right moment and to press it down upon the table i. Below these grippers are plate-shaped counter-grippers $f\ f'$, which latter grippers are fast upon the shafts of pinions $e\ e'$, meshing with the segments $d\ d'$, and upon the upward movement of the gripper c the gripper f will descend, and upon the downward movement of the gripper c the gripper f will be thrown completely out of the path of movement of the gripper c, as will be clearly seen in Fig. 2. By this means when the gripper f' comes down upon the paper to force it in place and pile it the gripper f at the other side will engage the paper and prevent the pile from being disturbed by the action of the former gripper. This action of the grippers continuously justifies the pile by forcing each fold to its proper place. The grippers $f\ f'$ also serve to press the pile of paper at the fold and press it entirely flat.

The machine may also be provided with a device for cutting the web when a certain number of sheets have been folded without stopping the machine. In a guideway m^2 in one of the cylinders—for instance, b'—is arranged a movable knife m, guided by pins or rods l and adapted to enter a groove o in the other of said cylinders to cut the web. The guide pins or rods l carry abutments k^3, which may be engaged by strikers q, carried by a shaft q^2. Such shaft q^2 will be driven by a gear-wheel n, fast upon it and in mesh with a gear-wheel n', fast with the shaft b^3. The gear-wheel n will be provided with as many teeth as it is desired to lay double sheets

upon the table i, and the gear-wheel n' will be provided with one less than such number of teeth, whereby after the cylinder b' has revolved the predetermined number of times the strikers q will register with the abutments k^3 and advance the knife against the pressure of the spring m', which after the further rotation of the gear-wheels forces the knife back into its idle position and there holds it until the knife is again pressed forward.

Having thus described my invention, I claim—

1. The combination with a pair of rotatable rolls adapted to seize a web of paper and draw the same between them, a row of pins upon each cylinder the row of one being dodged relatively to the row of the other whereby a portion of the paper may be carried partially around the periphery of one and then another portion partially around the periphery of the other roll, means for stripping the paper from the rolls and laying the same in a pile, and means for pressing the pile of paper at the folds after it has been so laid.

2. The combination of a pair of rolls adapted to draw a web of paper between them, means to rotate the rolls, pins upon the peripheries of the rolls adapted to engage paper passing between the same, means to strip the paper from the rolls and pile the same, means to press the folds, and means to cut the web after a predetermined number of folds.

3. The combination with a pair of cylinders each having upon one side a row of pins to engage a web of paper passing between the rolls and upon its other side a row of recesses to accommodate the pins of the other roll, means to remove the paper from the rolls, and means to justify the pile and press the folds.

4. In a machine of the character described the combination with means to feed paper toward a table, means to alternately fold the same in opposite directions, means to lay at each side of the pile the last-formed fold upon the pile, and means at each side of the pile to act in conjunction therewith to press the paper and hold the same from movement during the action of the laying-on device.

5. The combination with a pair of cylinders adapted to seize and draw between them a web of paper, means to fold the paper alternately in opposite directions, a knife carried by one roll and mounted therein for radial reciprocation, a striker mounted upon the shaft and adapted to force the knife forward, and a train of gear-wheels carried by the said shaft and the roll carrying the knife, the gear-wheel upon the roll having a number of teeth equal to the number of sheets it is desired to pile, and the wheel upon said shaft having one less number of teeth.

6. The combination with a pair of rotatable cylinders adapted to seize a web of paper and draw the same between them and provided with recesses to receive pins carried by the other cylinder, a row of pins upon each cylinder to enter said recesses, the pins adapted upon the rotation of the cylinders to engage the paper and carry the same in folds alternately toward the respective slides of a table, a table whereon such paper may be piled, a number of recesses in each cylinder, arms adapted to enter such recesses and upon movement of the same toward the table to strip the paper from the pins, means controlled by the rotation of the cylinders to alternately actuate said strippers, means controlled by said respective strippers to engage the opposite side of the pile during the action thereof, and an automatic cutting-off device.

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