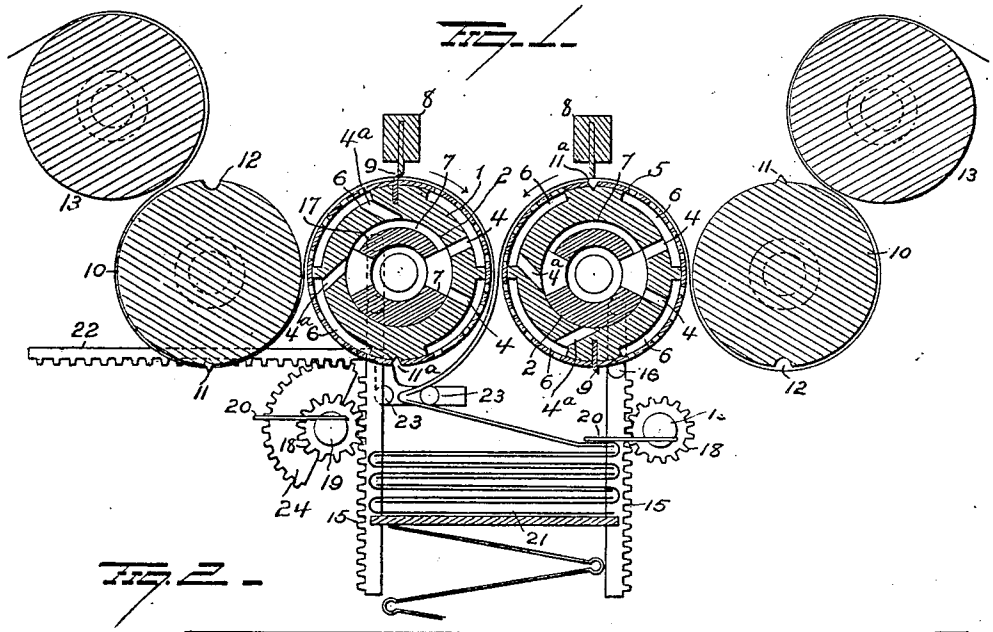
No. 843,781. PATENTED FEB. 12, 1907.

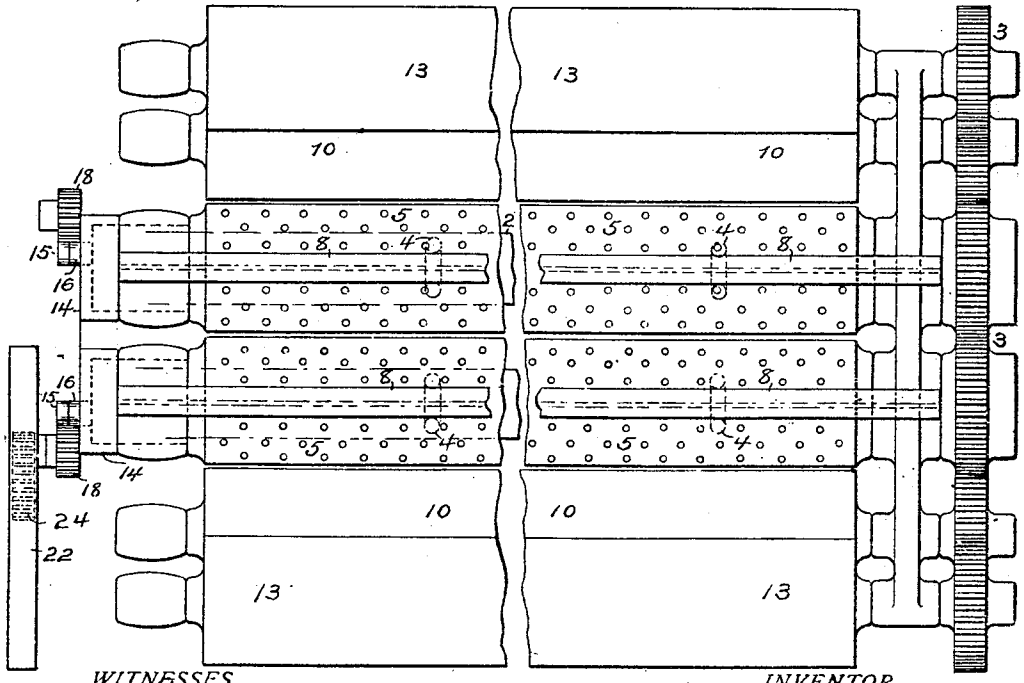
S. WHEELER.

APPARATUS FOR CUTTING, FOLDING, AND INTERFOLDING SHEETS OR UNITS.

APPLICATION FILED DEC. 31, 1904.

3 SHEETS—SHEET 1.





WITNESSES

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FIG. 3.

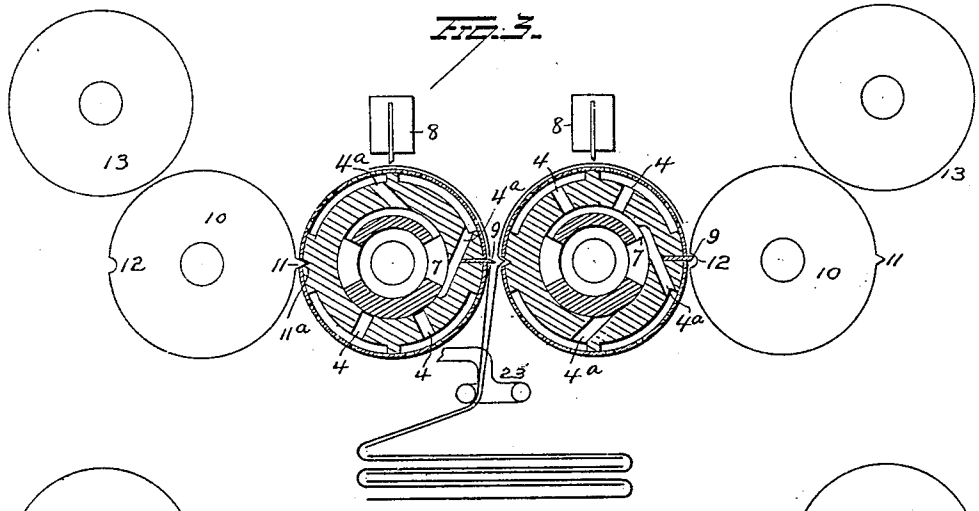


FIG. 4.

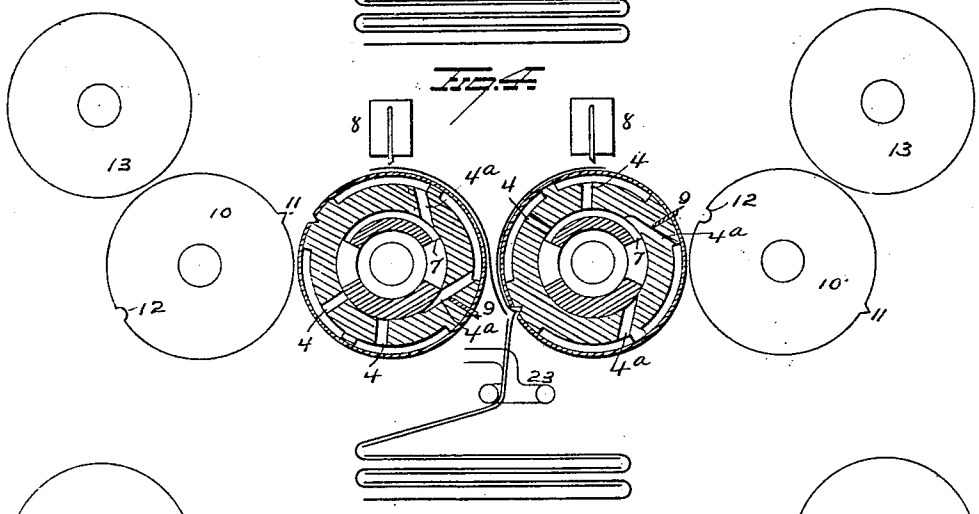
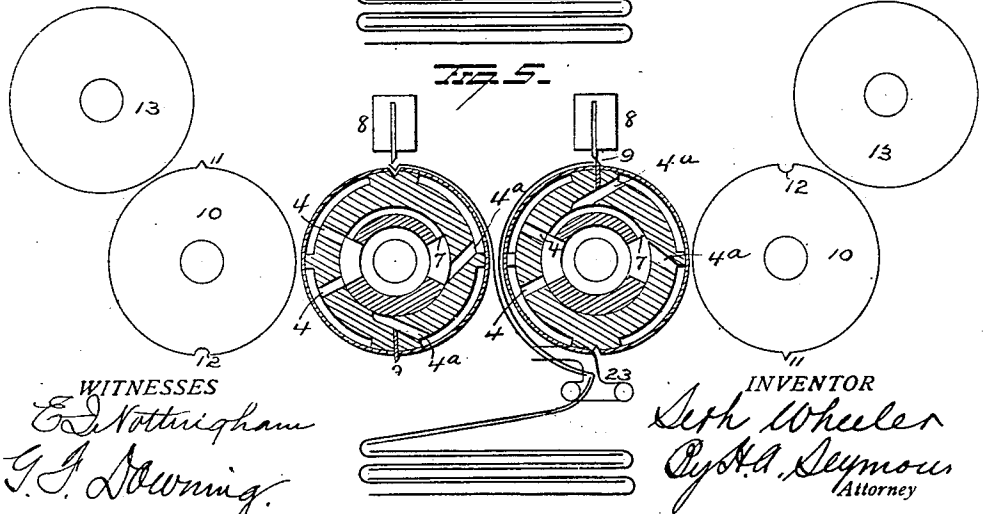


FIG. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

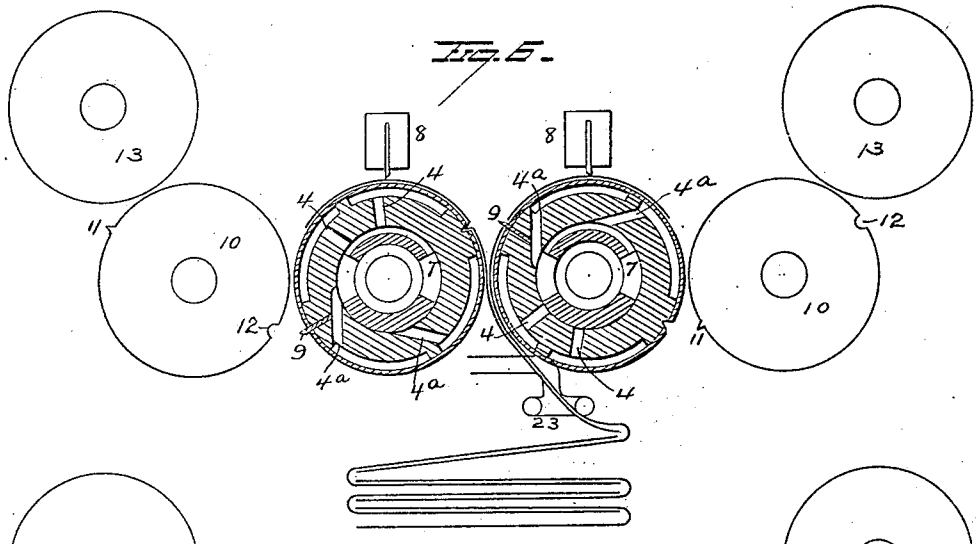


Fig. 7.

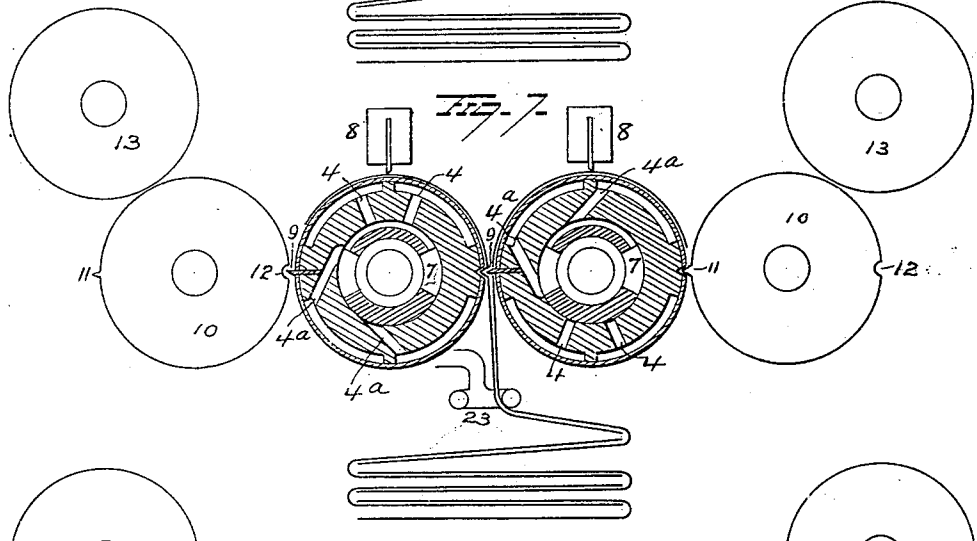
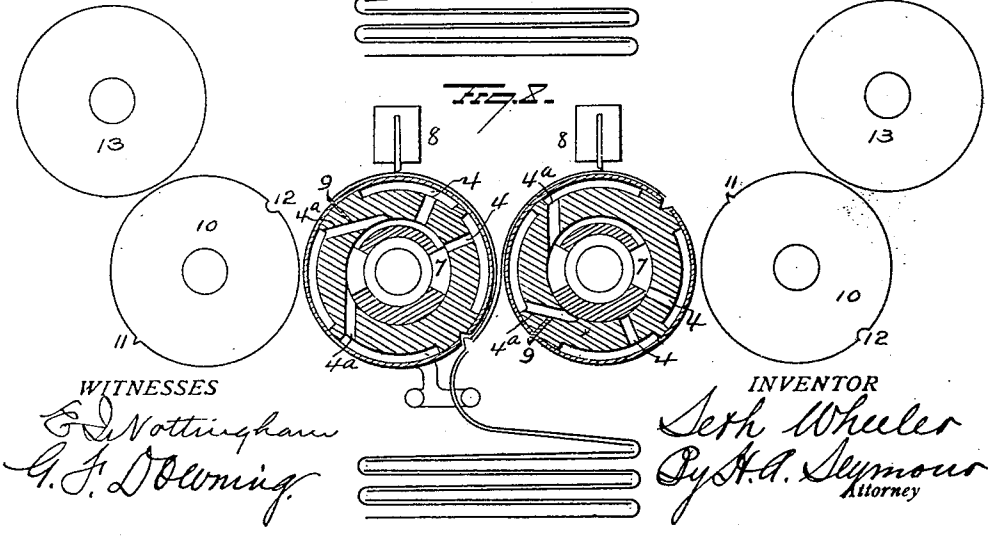


Fig. 8.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CUTTING, FOLDING, AND INTERFOLDING SHEETS OR UNITS.

No. 843,781. Specification of Letters Patent. Patented Feb. 12, 1907.

Application filed December 31, 1904. Serial No. 239,275.

To all whom it may concern:

Be it known that I, SETH WHEELER, a resident of Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Apparatus for Cutting, Folding, and Interfolding Sheets or Units; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved apparatus for cutting, folding, and interfolding sheets, and more particularly an apparatus constructed to sever a strip or strips into sheets or units of several sheets, uniformly fold the several sheets or units and interfold the end flaps of adjacent sheets; and the particular object is to provide an apparatus wherein the sheets or units are held to the rolls while being impressed for folding by suction and further provide improved means for cutting the strip or strips, improved folding mechanism, and other improvements in the details of construction hereinafter pointed out.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in longitudinal section illustrating my improvements, and Fig. 2 is a plan view. Figs. 3, 4, 5, 6, 7, and 8 are views showing the various positions of the parts during the operation of the apparatus.

1 1 represent two hollow rolls, supported to turn on hollow shafts 2 and driven by a chain of gearing 3, which also drive all the other rolls of the apparatus hereinafter described. These hollow shafts 2 are connected with any suitable form of suction chamber or pump whereby air is continuously sucked through the hollow journals and through openings 4 4^a in rolls 1, according to the position of said openings, and perforated cylindrical casing or shells 5 are located around the rolls, and elongated chambers 6 are provided in the surface of the rolls beneath the perforated casing or shells and communicate with the openings 4 4^a, and the surface of the hollow shafts 2 is provided with a duct or passage 7 around one-half of the shafts.

Above the rolls 1 1 fixed cutter-blades 8 are located and coöperate with blades 9, carried by the rolls to sever the sheets when the blades pass each other, and it will be seen that the blades 9 are so positioned as to operate alternately and compel the sheet or sheets coming from one side to overlap and extend to the fold of the sheet coming from the opposite side, and thus compel the sheets or units to interfold.

Beside the rolls 1 1 are impressing-rolls 10, which are provided at one side with a V-shaped rib 11 to force the sheet or unit into a similarly-shaped groove 11^a in roll 1 and force a folding impression in the sheet or unit, and at the opposite side of the rolls 10 recesses 12 are provided to permit the cutters 9 to pass without injury.

13 represents feeding-rolls for feeding the strip or strips of paper to rolls 10, and, as before stated, all of these rolls are driven by the chain of gearing 3.

On the ends of rolls 1 1 wheels 14 are secured and vertical racks 15 are connected at their upper ends by links 16, with rolls or pins 17 mounted on wheels 14, so that as the latter turn the racks 15 will be reciprocated vertically. These racks mesh with gears 18 on shafts 19, carrying folder-blades 20 to press the folds of the interfolded sheets upon a movable platform or table 21, and a pinion or segment 24 on one of the shafts 19 transmits reciprocating motion to a horizontal rack 22. This rack 22 is provided at its forward end with parallel rods 23, spaced apart and between which the overlapped and impressed sheets or units pass, and the movement of the rack 22 serves to properly lay the sheets or units in their folded position onto the table 21 to be pressed down by the folder-blades 20.

The operation of the machine is as follows: The webs of paper taken from rolls upon both sides of the machine by the feed-rolls 13 pass around the impression-rolls 10, carrying the V-ribs 11, which in entering the grooves 11^a mark the line of fold on the separated sheets. The rolls 1 are carried on fixed hollow shafts provided with openings which communicate with the interior of the rolls. The hollow shafts are in communication with a vacuum-chamber or exhaust-pump, by means of which the air being partially exhausted within the perforated shells or casings of rolls 1 1 the webs as they pass from contact with the impression-rolls are caused to adhere to rolls 1 1 and pass under the fixed cutter-blades 8 8, at which point

they are divided into sheets by the action of the moving cutter-blades 9 9 against fixed blades 8 8. It will be observed that the relative position of blades 9 9 is such that the ends of the sheet from the right-hand web are in line with the fold-mark of the left-hand web, and vice versa, so that when the webs meet between the rolls 1 1 one sheet will be one-half its length in advance of the opposite sheet, as shown in Fig. 3. At this point both webs adhere to their respective rolls; but as they leave it the openings 4^a of that part of roll 1 carrying the last incoming sheet is closed, (see Fig. 4,) allowing the end of the sheet to leave its roll and to be carried into position by guide-rods 23 and interfolded with the terminal of the advance sheet, which still adheres to its carrying-roll. When the fold-mark reaches the lowest point reached by its carrying-roll, the opening or duct 4 will be closed, (see Fig. 5,) thus permitting the sheet to fall upon the pile of assembled sheets, to which position it will be assisted by a rod 23 on bar 22. When the interfolded sheets reach the pile, they will be acted upon by a folder-blade 20, which retains them interfolded. As the bar 22, with its rods 23, starts to travel from right to left the operation of the carrying-rolls will be repeated. Figs. 6, 7, and 8 show the relative positions of the ducts or openings 4 4^a at the various stages during the travel of the parts 22 23 until the position shown in Fig. 2 is again reached. Thus the ducts or openings will assume the positions shown in Figs. 2, 3, 4, and 5 when the parts 22 23 travel from left to right and the positions shown in Figs. 6, 7, 8, and 2 when the parts 22 23 travel from right to left.

The important features of this machine are pneumatic method of holding and releasing the webs and sheets of paper and the fixed cutter-blades. While I have not shown it, it is obvious that the incoming webs may be divided longitudinally, as desired, by means of rotary cutters on the feed-rolls or elsewhere.

A great many slight changes might be made in the general form and arrangement of the parts described without departing from my invention, and hence I would have it understood that I do not restrict myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In an apparatus of the character described, the combination of two rolls, pneumatic means temporarily holding cut sheets or units on said rolls, fixed cutter-blades, and blades on the rolls coöperating therewith to sever strips or webs into sheets or units of several sheets.

2. In an apparatus of the character described, the combination of two rolls, hollow shafts on which said rolls turn and which form pneumatic suction-tubes, perforated shells or casing on said rolls and openings or ports connecting said hollow shells with the suction-chamber during a part of the revolution of the rolls to temporarily hold sheets or units thereon.

3. In an apparatus of the character described, the combination with two rolls, of means for feeding paper thereto, fixed cutters, cutters on the rolls coöperating with the fixed cutters to sever the paper into proper length of sheets or units, means for impressing the sheets or units and the cutters on the rolls being so positioned as to compel the ends of the sheets or units to be overlapped and the rolls being so constructed as to hold the severed sheets or units on the rolls temporarily.

4. In an apparatus of the character described, the combination with means for severing strips into sheets or units of several sheets, overlapping the sheets or units and impressing said sheets or units or their lines of fold, a platform, a reciprocating frame, and rods or pins on said frame between which the sheets pass, said reciprocating frame adapted to properly lay the interfolded sheets.

5. In an apparatus of the character described, the combination with rolls between which impressed and overlapped sheets or units are passed, of a table or platform, a horizontally-reciprocating rack, rods or pins on said rack between which the sheets or units are passed and laid thereby in proper folds upon the table, folder-blades pressing down the folds of the pile on the table, and vertically-reciprocating racks operating said folders and horizontal rack.

6. In an apparatus of the character described, the combination of hollow suction tubes or shafts, rolls mounted on said shafts and having suction openings or ports therein, perforated shells or casings on the rolls and said rolls constructed to open and close said ports to hold or release sheets or units against the perforated shells or casings.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SETH WHEELER.

Witnesses:
EDGAR WHEELER,
WM. A. WHEELER.