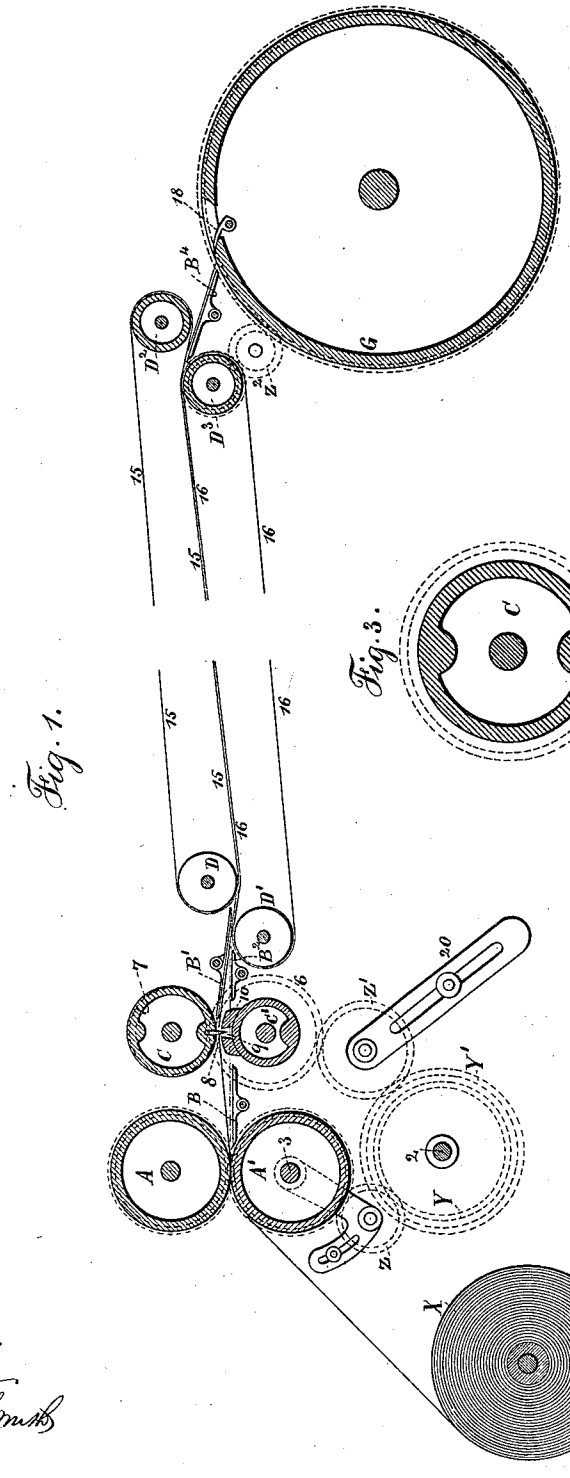
(No Model.) 2 Sheets—Sheet 1.

J. A. DEAR.

MACHINE FOR CUTTING SHEETS FROM WEBS OF PAPER.

No. 452,025. Patented May 12, 1891.



Witnesses:
J. Stair
Chas. A. Smith

Inventor:
Joseph A. Dear
per L. W. Serrell Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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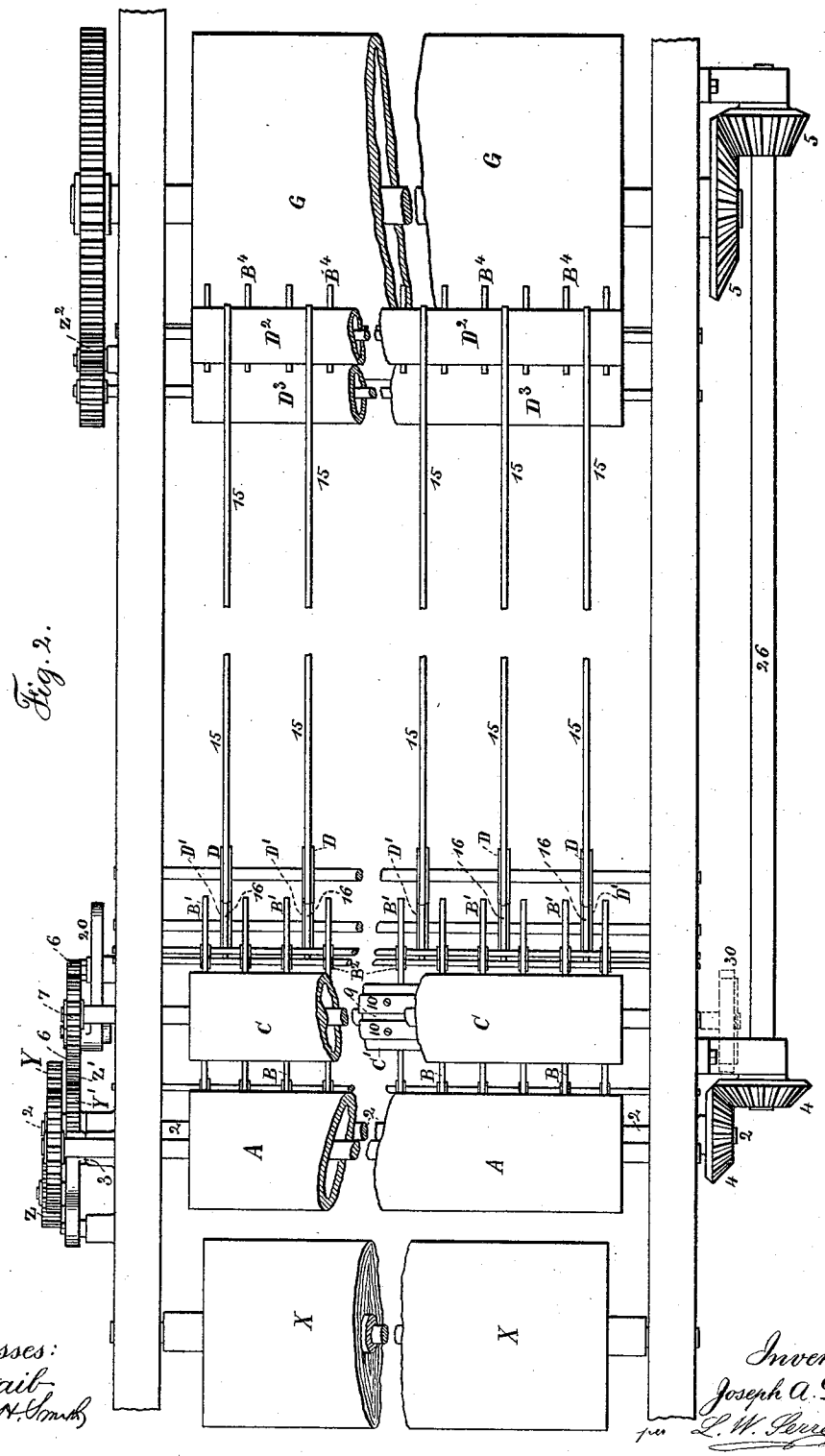


Fig. 2.

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UNITED STATES PATENT OFFICE.

JOSEPH A. DEAR, OF JERSEY CITY, NEW JERSEY.

MACHINE FOR CUTTING SHEETS FROM WEBS OF PAPER.

SPECIFICATION forming part of Letters Patent No. 452,025, dated May 12, 1891.

Application filed January 20, 1890. Serial No. 337,418. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. DEAR, of Jersey City, in the county of Hudson and State of New Jersey, have invented an Improvement in Machines for Cutting Sheets from a Web of Paper, of which the following is a specification.

This improvement is especially adapted to printing-presses in which the web of paper is fed into the press and which is cut off before being printed upon; but the cutting apparatus may be made use of for separating sheets of paper from a web independent of the printing-press, or such cutting apparatus may be used in connection with folding mechanism.

In mechanism for cutting a web of paper into sheets the cutting-cylinder has been made use of as a measure for the length of sheet, and in other instances the sheet has been fed independently of the cutters, and the cutter has been made to move at or about the same speed as the paper at the time that it acts upon the sheet, and in other instances the sheet has been perforated and pulled apart on the line of the perforations by rollers or belts having an accelerated movement.

In the drawings, Figure 1 is a vertical section representing my improvements. Fig. 2 is a diagrammatic plan view showing the gearing for connecting the press and the cutting mechanism, and Fig. 3 is a section in larger size of the cutting-cylinders.

The feed-rolls A and A′ are geared together with their surfaces in close proximity, so as to feed the paper along from the web X, and such paper passes over the bridge B, of any suitable construction, and between the cutting-rolls C and C′. The cutting-rolls C C′ are to be revolved any desired number of revolutions to each revolution of the press, and the length of the sheet fed in by the rollers A A′ can be varied by changing the speeds of such rolls A A′. To effect this object the gear Y upon the shaft 2 is changeable, and the gear Z is linked to the axis 3 of the feed-roll A′, so that the gear Z can be changed in its position according to the diameter of the gear Y, and the shaft 2 may be driven by any suitable gearing. I have shown in Fig. 2 the bevel-gears 4 and 5 and the longitudinal shaft 26, extending to the axis of the impression-cylinder G, so that the shaft 2 may be revolved at the same speed or at any desired speed in relation to the impression-cylinder G.

The cutting-cylinders C C′ are to be geared together and driven by suitable gearing. I have shown the gear-wheel Y′ upon the shaft 2 gearing into the intermediate gear Z′ and the wheels 6 and 7 as gearing the cylinders C C′ together. If the gears 6 and 7 are the same size, the cutter 8 will coincide with the slot 9 in C′ each revolution, and it is to be observed that while the cutter 8 may be of any desired character the slot 9 is between two projecting ribs 10 upon the surface of the cylinder C′ for a purpose hereinafter stated. If the sheets to be cut correspond in length to the circumference of the cylinder C or less than such circumference, then the cutting-cylinders C C′ will be geared to make one revolution for each sheet cut, and I prefer to drive these cutting-cylinders C C′ faster than the paper as it is fed along by the rolls A A′, in order that the cut made in the paper may be sharp and rapid and that the advancing sheet may be free to be drawn along by the belts leading to the impression-cylinder instead of such sheet requiring an accelerated movement to pull apart the connecting filament usually existing where the cutter perforates the paper transversely of the web without cutting the paper off sharp and clean. Under all circumstances it is to be observed that the surface of the cutting-cylinder C does not touch either the surface of the cylinder C′ or of the ribs 10. Hence the paper is not nipped by the cylinders themselves. If now the cutters are to be made use of in separating sheets that are longer than the circumference of the cylinder C, the cylinders C C′ are made to revolve more than once for each sheet separated. This is effected by changing the relative sizes of the gears 6 and 7, so that the slot 9 will coincide with the cutter 8 every second, third, or fourth revolution, and the cutter will not be operative in separating the sheet, except when the cutter 8 and slot 9 coincide, because the line of movement of the paper is adjacent to the surface of the cylinder C′ and the paper is lifted by the ribs 10 and the cutter touches but slightly, if at all, upon the web of paper in its normal position. For this reason the cutting operation will only be per-

formed when the ribs 10 raise the sheet of paper and support it while the cutter passes down into the slot 9, and it will now be evident that the gearing Y′ can be changed so as to adapt the cutting-cylinders to separate the paper one or more times each complete movement of the press, and that it is not necessary to change the cutting-cylinders C C′ themselves, and the gears can be constructed and marked so as to indicate the size of sheet with which they are to be employed, thus adapting the entire press to newspaper, book, or job work by a simple change of gearing, which is easily effected, upon the outer ends of the respective shafts.

When the cutting-cylinders are approximately the same size as the gears 6 and 7 that connect them together, as seen by dotted lines, Fig. 3, then the slotted cylinder and the cutter will be moving at the same surface speed when they come together; but if the gears and cylinders are not approximately the same size the slot must be wide enough to prevent the cutter coming into contact with the bars at the sides of the slot in consequence of the difference in the surface speed.

In consequence of the male and female cutter moving at a faster speed than the paper, there is no risk of the paper being simply embedded into the slot 9 and remaining wedged therein, and in addition to this the edge of the cutter is not liable to injure the paper by contact therewith when the paper is not raised by the ribs 10, because the paper rests upon the surface of the cylinder C′ and out of the way of the edge of the cutter. I prefer to pass the sheet over the bridges B and B^2 and beneath the bridges B′, in between the lines of tapes 15 and 16 upon the pairs of rolls D D′ D^2 D^3, and by the bridge B^4 to the grippers 18 upon the impression-cylinder G, and by placing the gear Z^3 between the gear upon the shaft of the impression-cylinder G and the gear upon the shaft of the roller D^3 the tapes 15 16 will move at the same surface speed as the impression-cylinder G, and the advancing end of the sheet will pass over the bridges B B^2 and in between the tapes 15 and 16 before the cutting operation takes place. Hence the sheet as separated will pass along to the impression-cylinder and be moved at the same speed as the grippers, in order that such grippers may properly grasp the sheet and carry it to the printing mechanism.

If desired, pulleys with pads thereon may be applied to either of the rolls D D′ D^2 D^3, as shown in my application, Serial No. 304,621, for patent, filed March 27, 1889. It will be understood that the gudgeon for the gear Z′ should be on an adjustable arm 20, so that it may be properly placed to gear with the gear Y′ upon the shaft 2 and the gear 6 upon the shaft of the roll C′ and to allow these gears to be changed.

In placing the gears in their proper positions for communicating motion from the shaft 2 to the shaft of the cutter-cylinder C reference is to be had to the position of the grippers 18 and the movements of the intervening parts so that the end of the sheet may reach the grippers properly.

This improvement may be made use of for cutting paper in a printing-press or in a folding-machine, but the mechanism by which the cutter is adapted to a folding-machine is reserved for a separate application.

It will be apparent that the cutter made use of may be of any desired character—such, for instance, as that shown in my patent No. 414,299—and in some instances it will be preferable to remove one or both of the cutting-cylinders and substitute others of different diameters in order that the diameters of the cutting-cylinders may correspond to or approximate the size of the gears 6 and 7, as such gears may be changed to cause the cutter and slot to coincide every second or more revolutions of one or both of the cutting-cylinders C C′.

It will be evident that one pair of cutting-cylinders and gears are adapted to cutting various lengths of sheets within a certain range or limit, and that by varying the gears or changing one or both cylinders the appatus will be adapted to cutting various lengths of sheets within another range or limit, and so on. Where the gears that unite the cylinders C C′ are at one end of their shafts, as seen by dotted lines at 30, Fig. 2, the gears Z′ and 6, that drive the lower cutting-cylinder C′, may be at the other end, as shown by full lines.

I claim as my invention—

1. The combination, with male and female revolving cutters, of gearing connecting the two revolving cutters and proportioned so that the cutters will not operate every revolution, substantially as specified.

2. The male revolving cutter having a fixed projecting knife, in combination with a cylinder with which the cutter does not come into contact, and raised bars upon such cylinder for forming the female cutter, and gearing that brings the cutter between the bars after more than one revolution, as specified.

Signed by me this 17th day of January, 1890.

JOSEPH A. DEAR.

Witnesses:

GEO. T. PINCKNEY,

WILLIAM G. MOTT.