(No Model.) 3 Sheets—Sheet 1.

J. BROOKS.

CUTTING AND FEEDING MECHANISM FOR PRINTING PRESSES.

No. 456,191. Patented July 21, 1891.

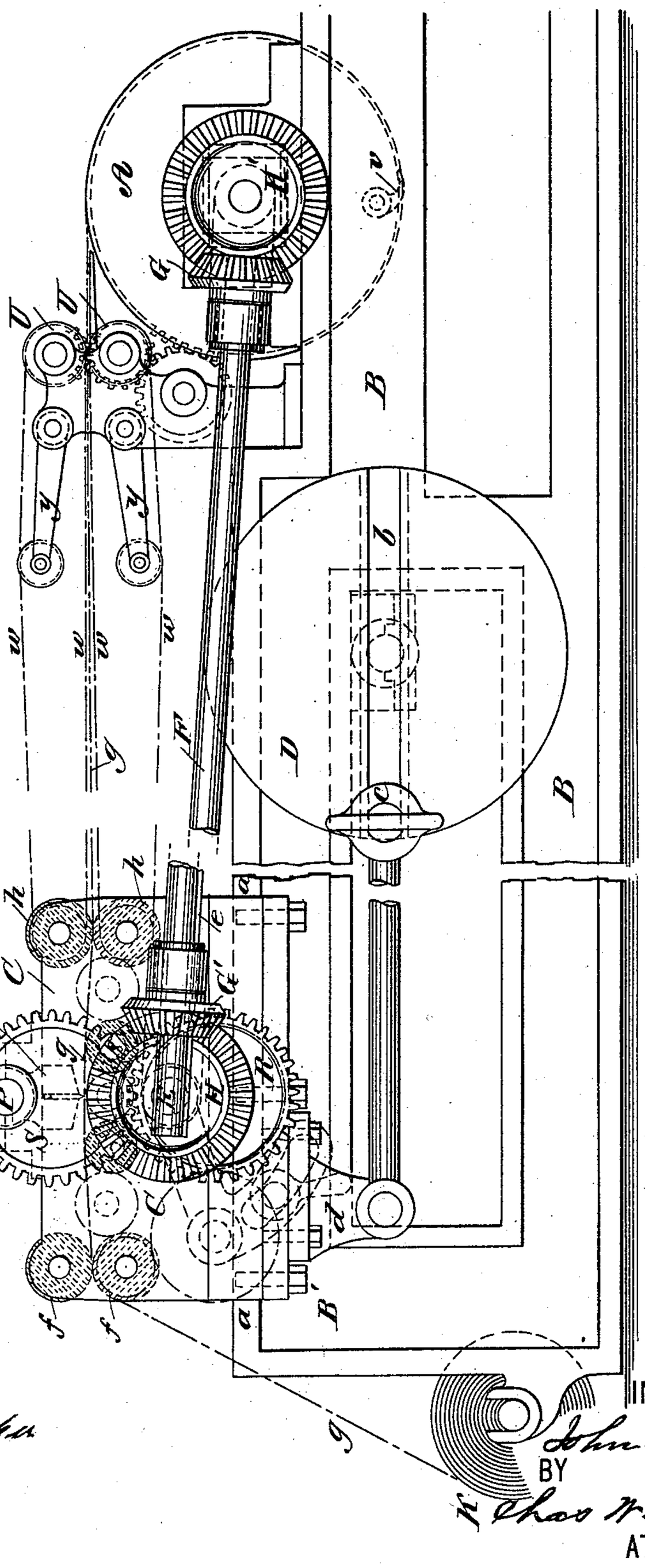

Fig. 1.

WITNESSES:
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(No Model.) 3 Sheets—Sheet 2.

J. BROOKS.

CUTTING AND FEEDING MECHANISM FOR PRINTING PRESSES.

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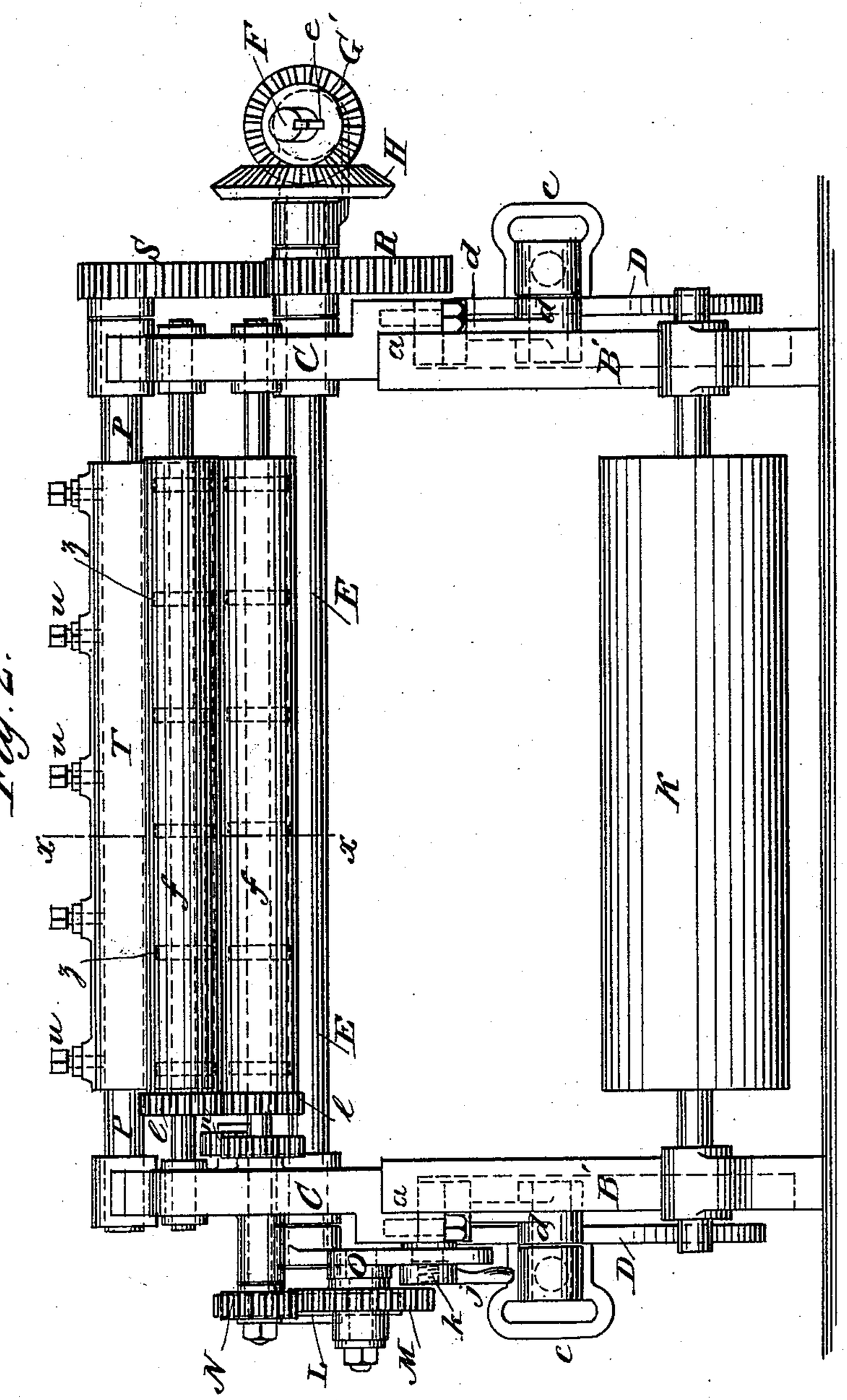

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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CUTTING AND FEEDING MECHANISM FOR PRINTING PRESSES.

No. 456,191. Patented July 21, 1891.

Fig. 3

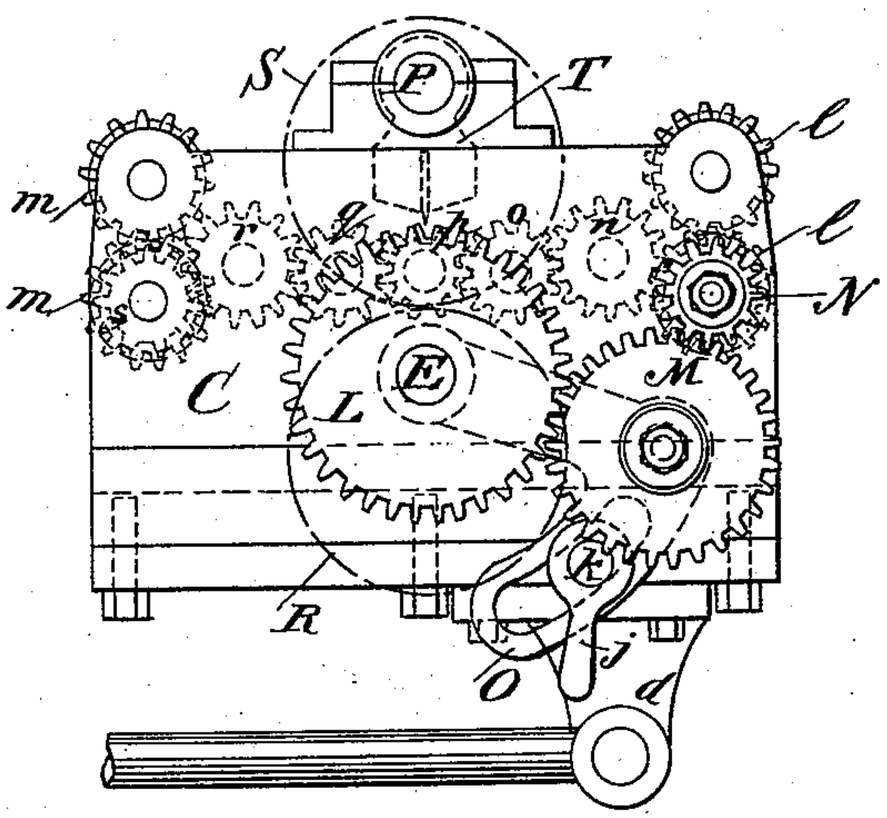
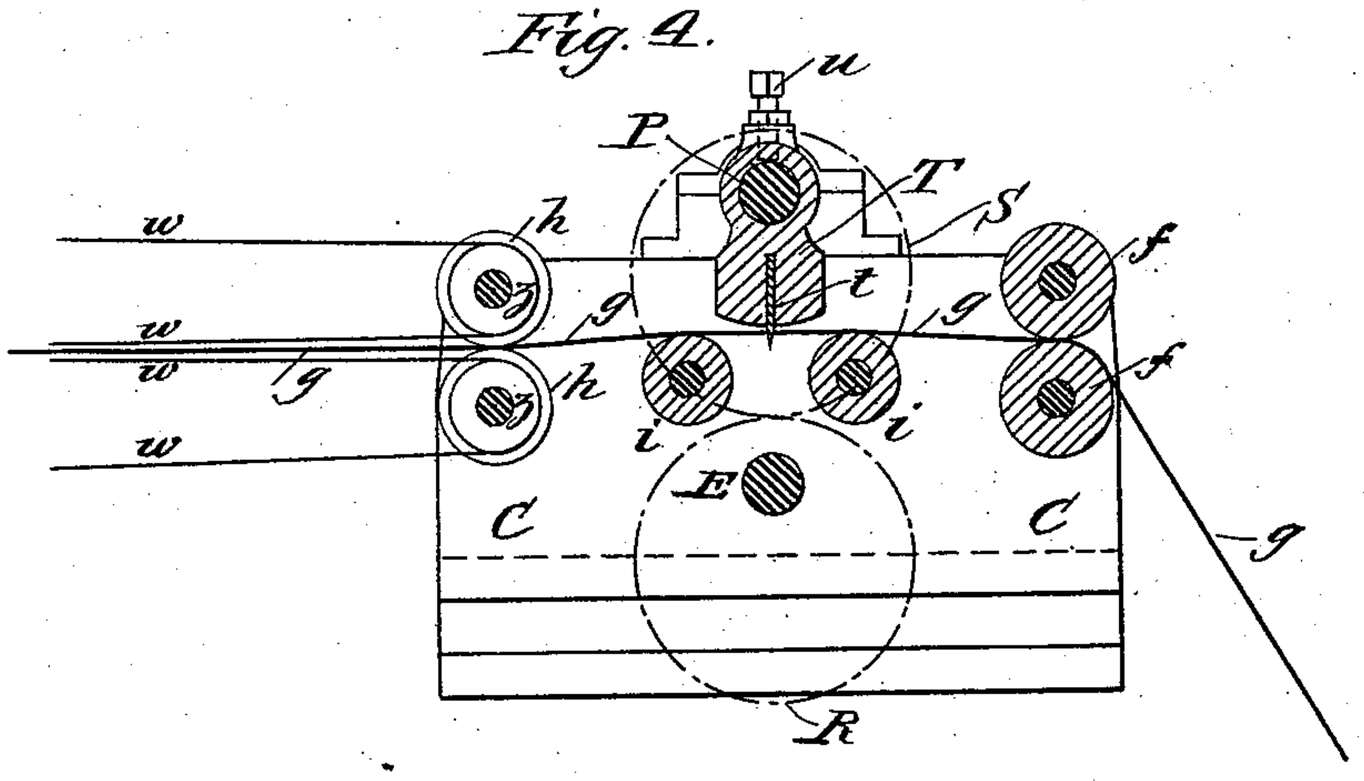


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN BROOKS, OF PLAINFIELD, NEW JERSEY.

CUTTING AND FEEDING MECHANISM FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 456,191, dated July 21, 1891.

Application filed October 13, 1888. Serial No. 287,985. (No model.)

To all whom it may concern:

Be it known that I, JOHN BROOKS, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Cutting and Feeding Mechanisms for Printing-Presses, of which the following is a specification.

My invention relates to printing-presses in which the paper is supplied from a roll or web and cut off in sheets of the desired length as the paper is fed into the machine and in which the paper is fed in by independent rollers driven by changeable gears, so that the speed of the same in proportion to the speed of the other parts of the press can be varied, and whereby a rotary cutting-knife that acts once for each revolution of the press is caused to cut the web into the required lengths of sheets according to the amount of paper fed through the knife at the intervals of cutting.

The object of my invention is to provide for varying the speed of the feed-rolls and correspondingly varying the speed of the cutter when acting upon the paper, in order that the cutter may be moving at the same speed as the paper at that part of its revolution that performs the act of cutting and avoid tearing or injury to the paper that would arise should the relative speeds of the feed-rolls and cutter be at variance.

The object of my invention is also to provide for the correct tallying of the leading ends of the sheets with the grippers of the first impression-cylinder according to the lengths of sheets that are derived from the variable speeds at which the web is fed.

In order to enable others skilled in the art to which my invention appertains to understand and use the same, I will proceed to describe its construction in detail, explain its operation, and point out in the appended claims its novel characteristics, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation; Fig. 2, an end elevation; Fig. 3, a side elevation of a portion of the machine, taken at that side opposite to Fig. 1; and Fig. 4 a section of Fig. 3 on the line *x x*, Fig. 2.

A is the first impression-cylinder of the printing-press.

Upon the extension B′ of the bed-frame B, I place a movable carriage C, that travels upon suitable guideways *a* in a direction which adjusts the cutting mechanism supported in said movable carriage at different distances from the impression-cylinder A. The carriage C may be moved by any suitable appliances. I have illustrated for the purpose the rotative disks D at each side of the machine, connected by a shaft and traversed by a dovetailed diametric slot *b*, in which a crank-pin *c*, having a T-shaped head to fit the slot, is adjustable by means of a clamping-handle. A connecting-rod extends from a bracket *d* on the carriage to the said crank-pin, and by rotating the disks D by the hand or otherwise the carriage can be slid on the guideways *a* in the desired scope of adjustment, according to the position of the crank-pin *c* in the slot *b*.

E is the main driving-shaft of the cutting and feeding mechanism, and it receives its motion from any suitable part of the press, so as to rotate once for each rotation of the printing-cylinders. As a convenient means of imparting rotation to the shaft E, irrespective of the distance of the carriage C from the printing mechanism, I have illustrated a counter-shaft F, that has beveled gears G G′, in engagement with the beveled gears H H′, respectively, on a shaft, as J, of the printing-machine and on the shaft E of the cutting mechanism, respectively. The shaft F is supported in bearings I in brackets on the shafts E and J, and the beveled gear G′ is movable lengthwise of the shaft F, but rotative therewith, by means of a feather *e*, a construction corresponding to that fully described by me in my application for Letters Patent, Serial No. 242,219, filed June 23, 1887. In said application I have also described a different means than that herein shown for moving and adjusting a carriage similar to the carriage F, and such means are equally applicable herein in lieu of the means at present illustrated.

f f are the first feed-rolls, which are in close contact and draw the web of paper *g* from the roll K. *h h* are the second feed-rolls, which are also in contact with the web and conduct it forward. The rolls *i i* move at the same surface speed as the rolls *f f*, and serve to support the paper under the cutting-knife ap-

proximate to its point of contact with the paper. The rolls *h h* move at a surface speed slightly in excess of the surface-speed of the rolls *f f* and the rolls *i i*, whereby the paper is always drawn taut beneath the cutting-knife. In order to impart these relative movements, I employ the system of gearing more clearly shown in Fig. 3, in which L is the driving-gear on the main shaft E. It is to be observed here that the periphery of the gear-wheel L moves at a speed lower than the surface speed of the impression-cylinder A, proportionately as its diameter is less than that of said cylinder. M is an intermediate gear imparting motion from the driving-gear L to the changeable gear N on the shaft of the feed-roll *f*. The gear N may be removed and substituted for by other gears having various numbers of teeth, whereby the surface speed of said feed-roll *f* is rendered variable, but is always lower than that of the printing mechanism.

In order to accommodate the different sizes of changeable gears N, the intermediate gear M has its bearing upon a gudgeon that projects from the sector D, fulcrumed on the shaft E and clamped in its various positions by a suitable hand-nut *j* on the stud *k*, projecting through the slot of the sector from the frame of the carriage. The rolls *f f* are geared to one another by the gears *l*, and the rolls *h* likewise geared together by the gears *m*. Rotation is imparted from the rolls *f* to the rolls *h* and to the rolls *i* by means of the train of gears *n o p q r*, gears *o* and *q* of which are on the shafts of the rolls *i i*, and gear *r* of which meshes with a gear *s*, of less size than the gear *m*, on the same shaft as the gear *m*, whereby the slight excess of speed of the feed-rolls *h* aforesaid is acquired.

P is the cutting-knife shaft that is driven at the rate of one rotation for each rotation of the press by means of the equal eccentric gears R S on said shaft and on the driving-shaft E, respectively. The driving-shaft E runs at a uniform rate of speed while the knife-shaft P receives an accelerated and retarded movement by reason of the eccentric gears, so that when the long radii of the gear R are in engagement with the short radii of the gear S the shaft P receives an accelerated movement, and when the short radii of the gear R are in engagement with the long radii of the gear S the rotary movement of the shaft P is retarded, the latter position appearing in the drawings. The rotary cutter-head T, bearing the cutting-knife *f*, is adjustable upon its shaft P by means of set-screws *u* or any other suitable or well-known clamping devices, so that the cutter may be set at any point in its orbit relative to the position of the eccentric gear S, and the cutter be adjusted to act upon the paper at a period when it moves at a surface speed corresponding to that of the paper, or nearly so, and hence make a separation or partial separation, as may be required, of the sheet from the web without tearing or injuring the paper. The eccentric gears may be either circular or elliptical.

I prefer in the practice of my invention to partially separate the sheets instead of wholly separating them in the cutting mechanism, and to this purpose the cutting-knife *t* is provided with a toothed edge that perforates the web with a line of perforations across it, and the separation is completed subsequently by the feed-rolls U, that seize and part the sheets from the perforated webs and deliver them to the grippers *v* of the cylinder A.

To carry the paper from the rolls *h* of the carriage to the rolls U, I employ the conveying-belts *w*, and the latter are given the proper tension at the different distances of the carriage C by means of tightening-pulleys on the adjustable arms *y*. The conveying-belts *w* and their propelling-rolls U move at the surface speed of the press, and there are loose pulleys *z* intercepting portions of the rolls *h* at suitable distances apart transversely and that carry the ends of the belts opposite the rolls U. The pulleys *z* of the conveying-belts are sufficiently separated for the advancing end of each sheet to pass in freely between the tapes, and the latter come together at the opposite sides of the sheet, so as to move the sheet along between the tapes as rapidly as the paper is supplied, and the sheet is carried at the speed of the tapes as soon as it reaches the rolls U, and is separated from the web at the succeeding point of perforation thereon.

In operation the lineal adjustment of the rolls *h*, that deliver from the cutting mechanism apart from the rolls U, that seize and part the sheets to tally their advancing ends with the grippers of the impression-cylinder, is made by the shifting of the carriage C in the manner described, so as to correspond with the length of sheet to be cut. To cut the longest sheet, the cutting mechanism is adjusted at its maximum distance from the printing mechanism, leaving the space between the rolls *h* and the rolls U sufficient to exceed the length of the sheet to be cut and to permit the perforated portion to pass out of the rolls *h* before being separated. To cut the shorter lengths, the carriage C is correspondingly moved toward the press, whereby the shorter sheets delivered at a lower surface speed from the cutting mechanism shall have a reduced distance to travel, such as will bring them to the grippers at the proper time.

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

1. In a cutting and feeding mechanism for printing-presses, the combination of a main shaft to which is imparted one rotation for each revolution of the printing-press, feed-rolls driven from said main shaft through the medium of changeable gearing to vary the surface speed of the paper, a rotary cutter that acts to cut or perforate the paper, eccentric gears located, respectively, upon said main shaft and upon the cutter-shaft, adapted

to impart to the latter periods of rotation equal to those of the main shaft, but of differential speed, and an adjustable connection of the cutter relative to the eccentric gear on its shaft for varying the speed at which the said cutter acts upon the paper.

2. The combination, with the rotary cutter, the eccentric gears, the main shaft, and the feed-rolls of the cutting and feeding mechanism, of the movable carriage bearing the same adjustable at different distances from the printing mechanism in order that the advancing end of the sheet may reach the impression-cylinder at the proper time, and mechanism, substantially as described, for imparting motion from the printing to the cutting and feeding mechanism irrespective of the different adjustments of said carriage.

3. The combination, with the cutting and feeding mechanism adjustable toward or from the printing mechanism, of feed-rolls, as U, that seize and part the sheets from the web and are located at a fixed point relative to the printing mechanism, conveying-belts extending from said feed-rolls to pulleys on the frame of the cutting and feeding mechanism, and tightening-pulleys for said belts adapted for the purposes set forth.

4. The combination, with a printing-machine, of a carriage the position of which is adjustable relative to the printing-machine, carrying feed-rolls and cutting devices for the paper, conveying-belts connected with the carriage and extending toward the printing-machine, and means, substantially as described, for varying the length of the path formed by the conveying-belts to coincide with the position of the carriage, substantially as described.

5. The combination, with two pairs of feed-rolls for a web, one pair having a speed in excess of the other pair, of a severing mechanism interposed between the two pairs of feed-rolls, and change-gearing for changing the speed of the severing mechanism and feed-rolls, substantially as described.

6. The combination, with two pairs of feed-rolls, two separated supporting-surfaces for one side of the web, and a single coacting cutter mounted upon the opposite side and adapted to act upon the unsupported portion of the web in the space between said supporting-surfaces, substantially as described.

7. The combination, in a severing mechanism for a paper web, of a driving-shaft, a rotary cutter driven from said shaft having means for varying the surface speed of the cutter, feed-rolls for the webs with means for varying their speed, and a second pair of feed-rolls having a speed in excess of the other pair, substantially as described.

8. The combination, with a printing-machine, of a paper-seizing mechanism, such as the rolls *h*, a paper-feeding mechanism, such as the rolls *f*, and a severing mechanism adapted to sever the paper between the paper-seizing mechanism and the paper-feeding mechanism, the whole being mounted so as to be bodily adjusted with respect to the printing-machine, substantially as described.

9. The combination of parting-tapes, positive feed-rolls, as *h*, and a severing mechanism for partially severing the web and through which the web passes loosely, said feed-rolls located beyond the severing mechanism and adapted to seize the paper before it is severed, the parting-tapes completing the severing of the paper at or after the severed end passes the feed-rolls, substantially as described.

10. The combination of two pairs of positive feed-rolls, one having a surface speed in excess of the other, a severing mechanism between said two pairs of feed-rolls for partially severing the web, and parting-tapes adapted to complete the severing of the paper at or after the severed end passes the bite of the accelerated feed-rolls, substantially as described.

11. In a web-severing mechanism, a support for the web, consisting of separated bearing-surfaces arranged upon one of its sides, means, as the accelerated rolls *h*, for keeping the web taut, a single coacting cutter upon the opposite side of the web and adapted to act upon the unsupported portion of the paper in the space between the separated bearing-surfaces, substantially as described.

12. In a severing mechanism, a support for the web, provided with two separated bearing-surfaces, and a single coacting cutter mounted upon the opposite side of the web, adapted to act upon the unsupported portion of the paper between said bearing-surfaces, substantially as described.

13. The combination of two pairs of web seizing or feeding rolls separated a distance apart, and a single coacting severing device located between the pairs of rolls and adapted to act upon the unsupported portion of the paper upon one side, said rolls holding the paper taut and in position to be acted upon by the severing device, substantially as described.

JOHN BROOKS.

Witnesses:
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HENRY F. PARKER.