

(No Model.)

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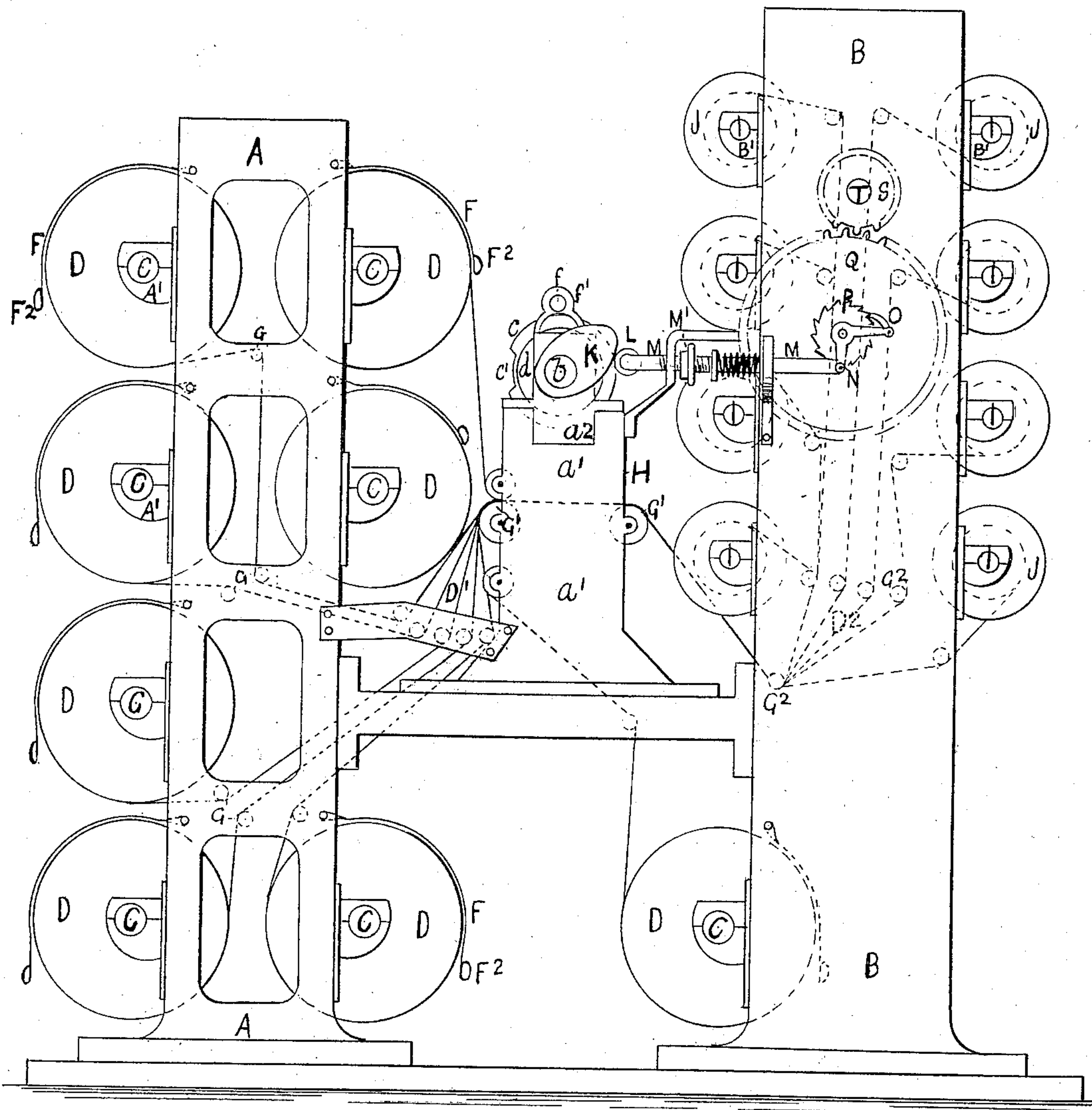
W. W. COLLEY.

MACHINERY FOR UNREELING, PERFORATING, AND REREELING PAPER
INTO ROLLS, &c.

No. 368,705.

Patented Aug. 23, 1887.

FIG. 1.



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(No Model.)

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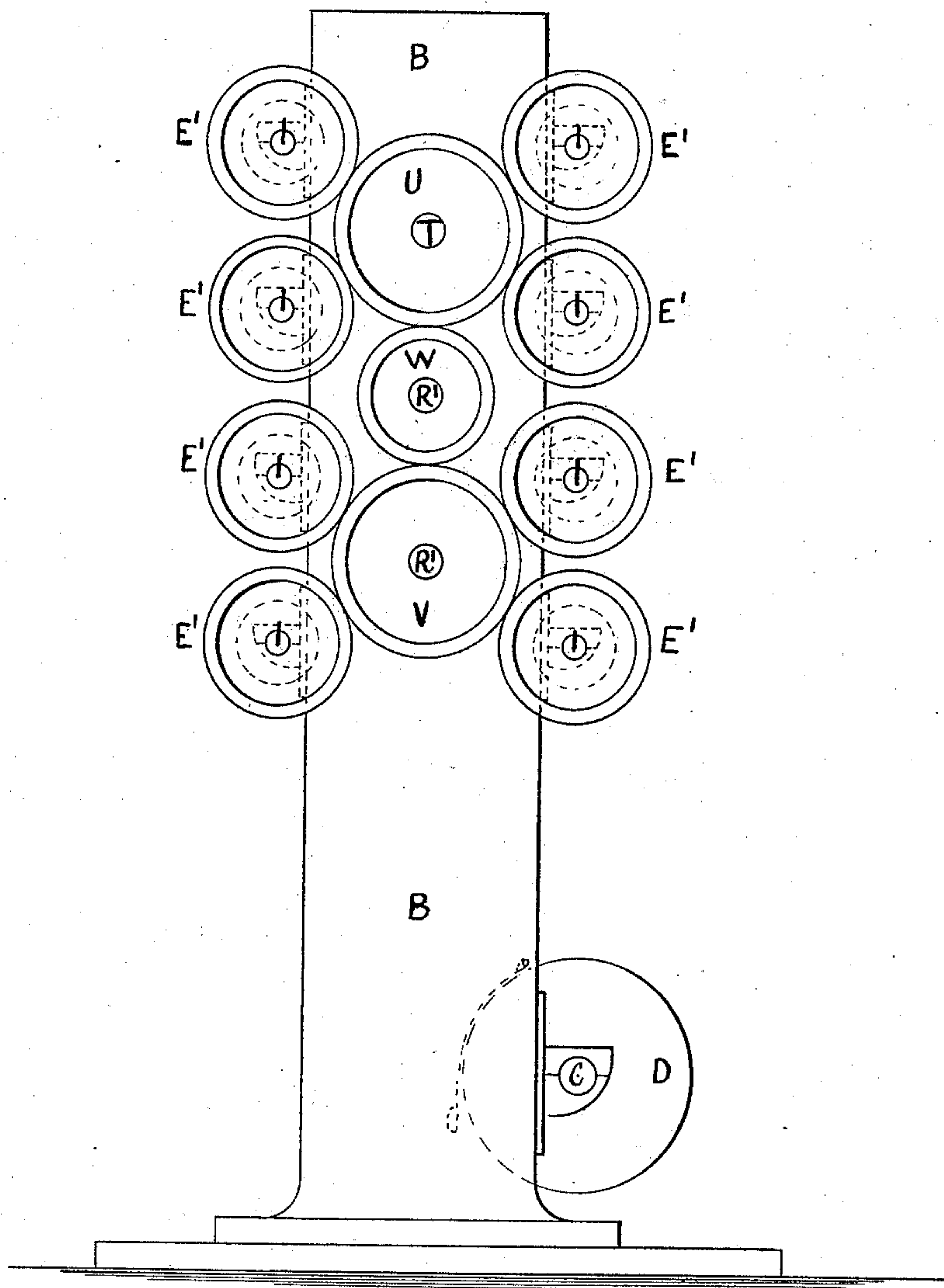
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FIG. 2.



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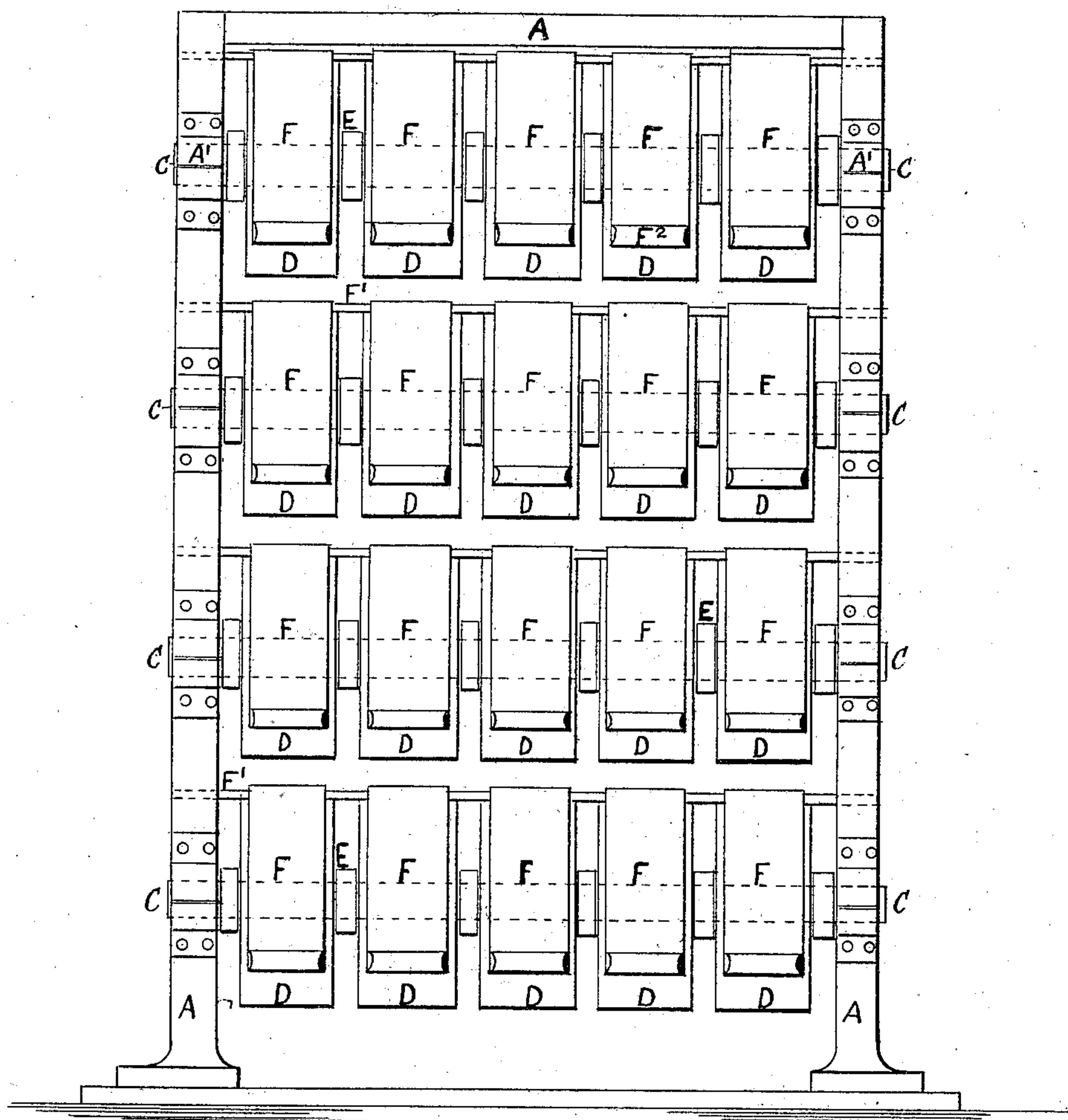
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FIG. 3.



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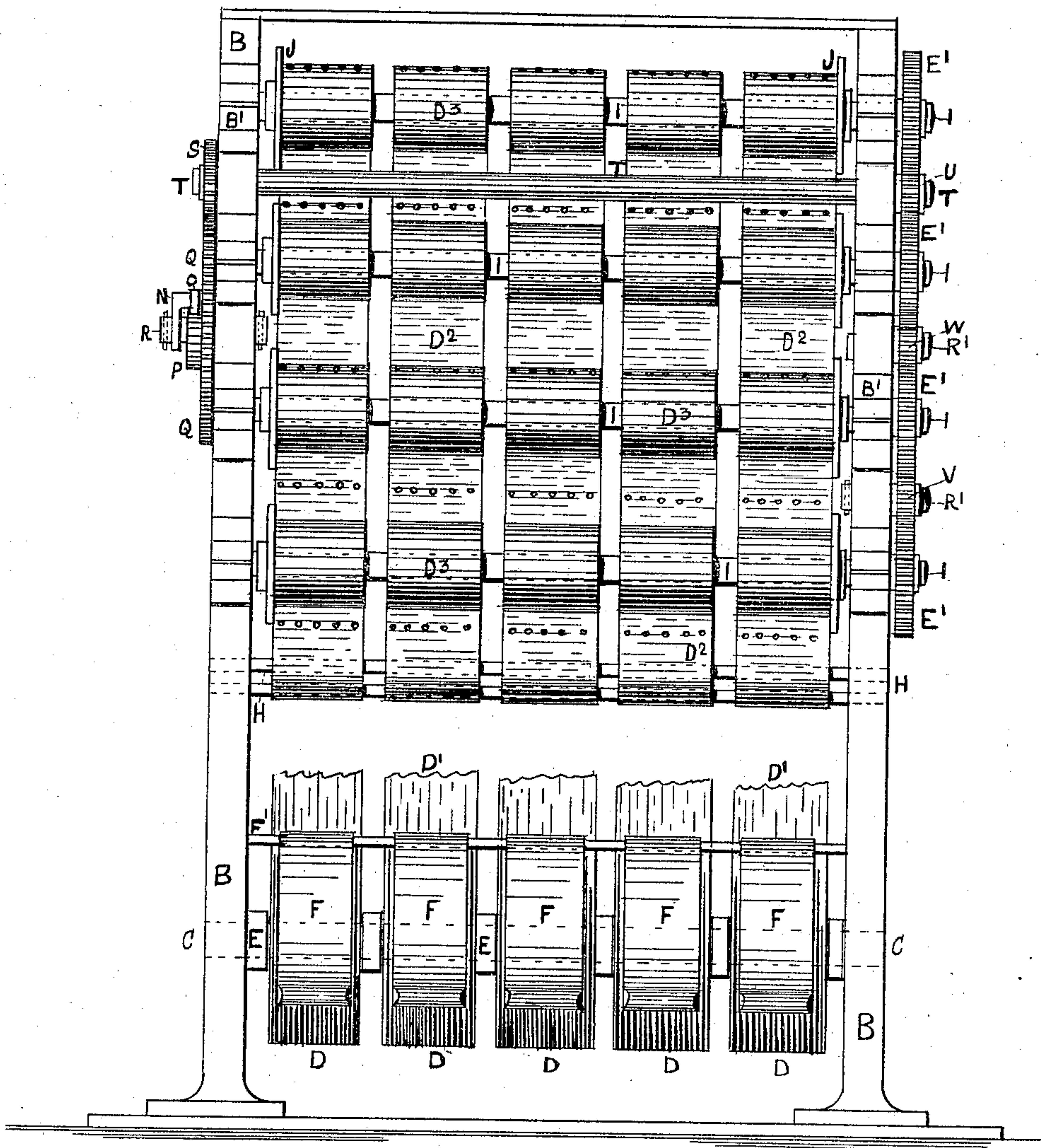
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FIG. 4.



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FIG. 6.

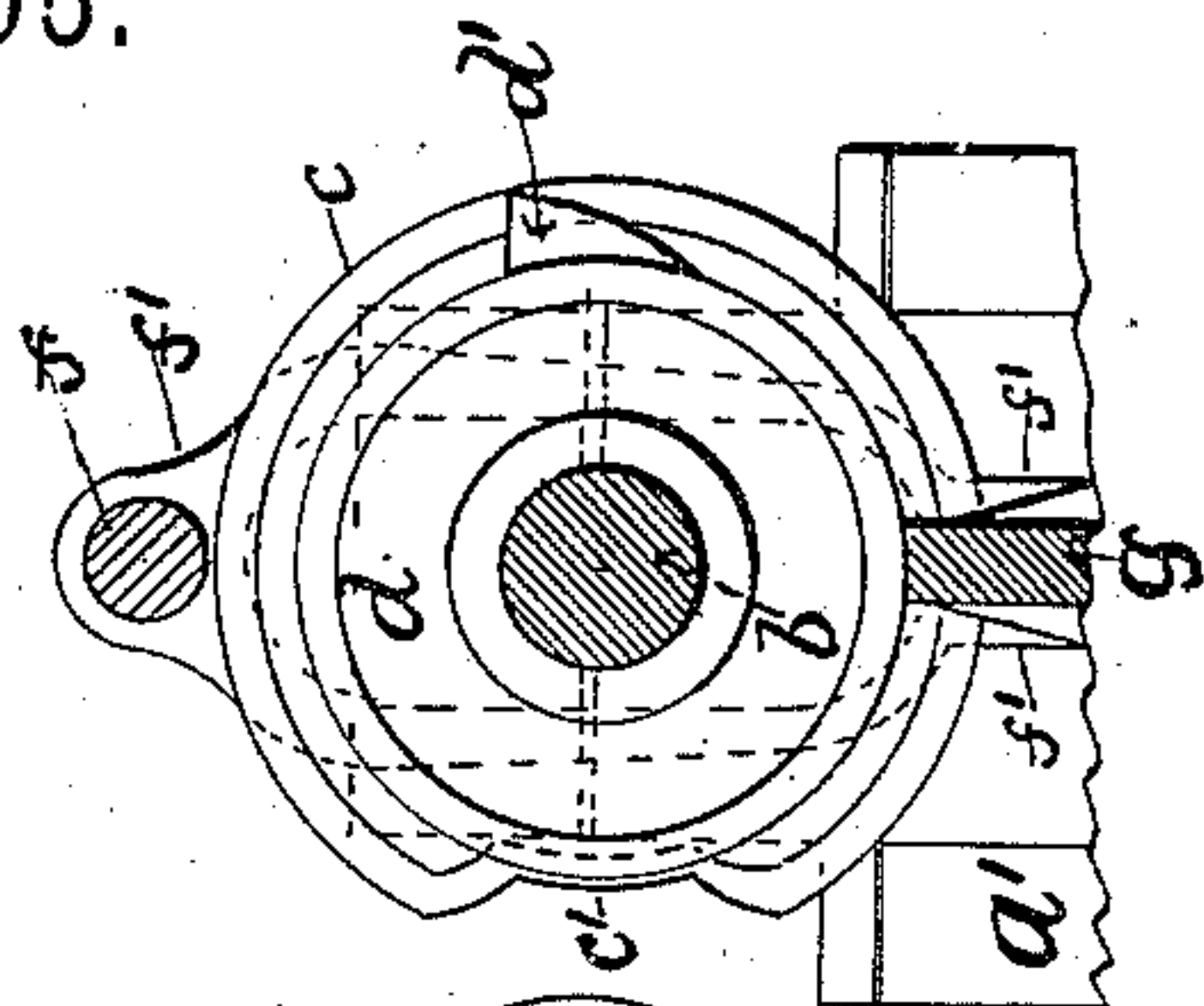
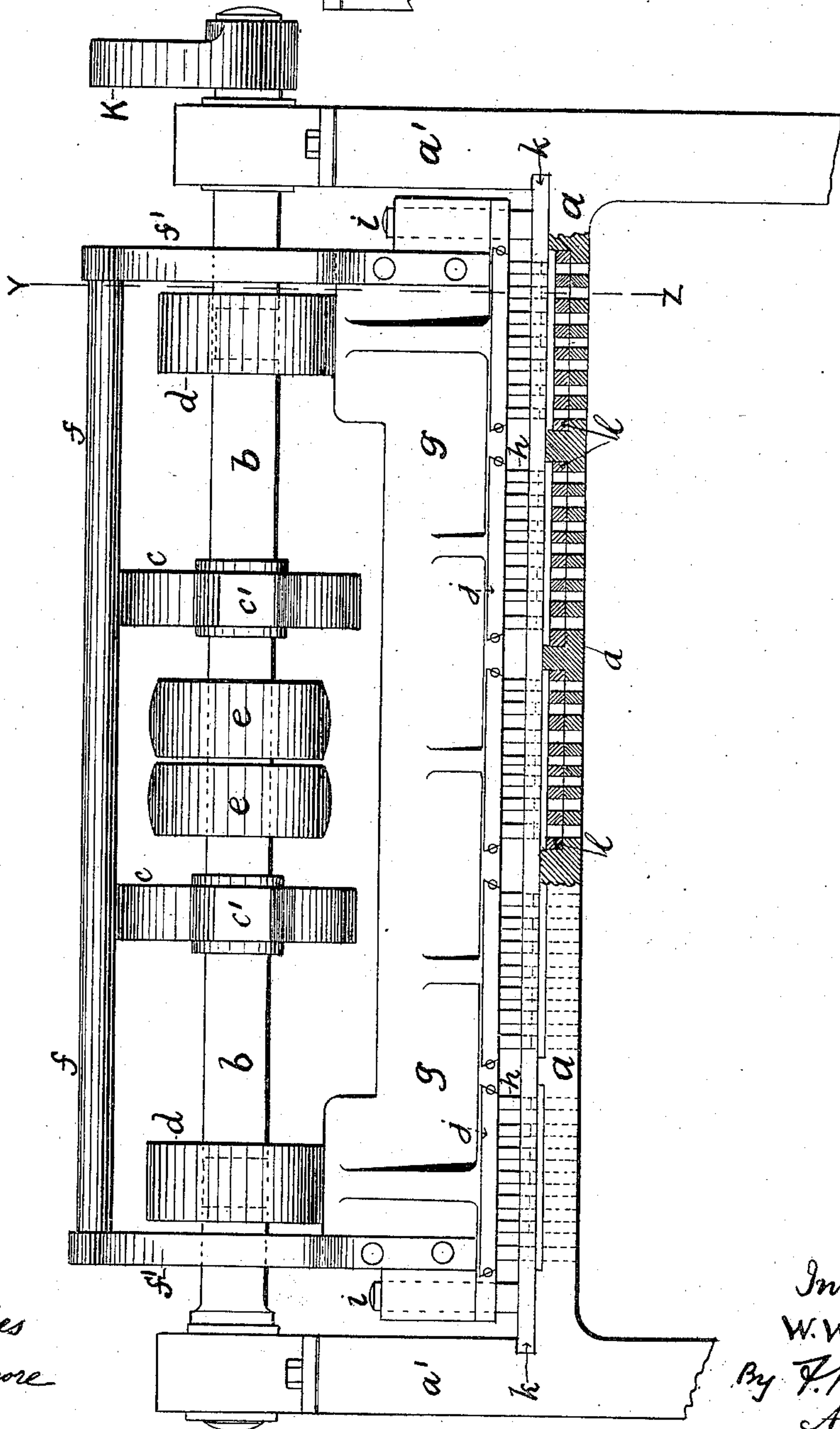


FIG. 5.



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UNITED STATES PATENT OFFICE.

WALTER WILLIAM COLLEY, OF CAMBERWELL, LONDON, ENGLAND.

MACHINERY FOR UNREELING, PERFORATING, AND REREELING PAPER INTO ROLLS, &c.

SPECIFICATION forming part of Letters Patent No. 368,705, dated August 23, 1887.

Application filed April 24, 1886. Serial No. 200,110. (No model.) Patented in England July 29, 1885, No. 9,106; in Germany April 18, 1886, No. 37,741; in France June 25, 1886, No. 177,005, and in Belgium June 25, 1886, No. 73,622.

To all whom it may concern:

Be it known that I, WALTER WILLIAM COLLEY, a subject of the Queen of Great Britain, residing at Camberwell, London, England, have invented new and useful Improvements in Machinery for Unreeling, Perforating, and Rereeling Paper into Rolls for Toilet and other Purposes, (for which, jointly with Morris Hart, I have obtained a patent in Great Britain, No. 9,106, bearing date July 29, 1885; Germany, No. 37,741, bearing date April 18, 1886; and in my own name alone in France, No. 177,005, bearing date June 25, 1886, and in Belgium, No. 73,622, bearing date June 25, 1886,) of which the following is a specification.

By this invention several rolls of paper turning independent of each other can be simultaneously unwound and the different lengths perforated across their width at desired distances for separating purposes at one operation, and after perforation be simultaneously rewound into separate rolls for toilet and other use. The salient feature of the invention consists in the arrangement of machinery whereby several bands of paper are brought together one over the other, drawn from several rolls turning independent of each other, and guiding such layer or series of layers of bands of paper through a suitable perforating apparatus, whereby the whole of the bands can be perforated together at one stroke of the perforating-pins, and after perforation distributing such bands to different winding spindles to wind each of such bands into a separate roll. I attain these objects by the mechanism illustrated in the accompanying drawings.

Figure 1 represents a side elevation of the entire machinery as worked for unwinding, perforating, and rewinding forty separate rolls of paper; Fig. 2, a side elevation of part of off side of Fig. 1; Fig. 3, an end view of one part of machine, showing rolls of paper during unwinding before perforation, with automatic tension-brake applied; Fig. 4, an end view of other end of machine and of rolls of wound paper after perforation; Fig. 5, a front view of perforating apparatus embodied in Fig. 1, drawn to a larger scale and partly in section. Fig. 6 is a partial sectional view on line Y Z, Fig. 5.

The perforating apparatus consists of suitable table or bed, *a*, formed with or bolted to standards *a'*, with upper cap-bearings, *a''*, to carry a cross-shaft, *b*, having keyed on two wheels, *c c*, with notch *c'*, and two wheels, *d d*, with eccentric cam *d'*, also a fast and loose pulley, *e*, for driving shaft *b*, by which the machine is set in action.

Above shaft *b*, and parallel with same, is a rod, *f*, connected by pendent arms *f'* to a cross-head, *g*, to which the perforating-pins *h* are attached, as hereinafter explained. This cross-head *g* works upon two upright guides, *i*, attached to bed *a*. Each set of perforating-pins (the number being regulated according to the width of the paper to be perforated) is carried in a separate pin-plate, *j*, formed with dovetail ends, a corresponding dovetail slide being made in lower part of cross-head *g*, the pin-plates being retained in slide by small screw. The pins are guided by a usual guide-plate, *k*, through which they pass and from which they are never wholly withdrawn during working. This guide-plate is attached to table *a*. Under the guide-plate is a die-plate, *l*, with holes corresponding to those in guide-plate. This die-plate is let into table flush with top, and is made in sections, as also guide-plate *k*, to admit of a part or parts being taken out for renewal or otherwise. A space of a quarter of an inch is provided between the guide and die plates for the layers of bands or webs of paper to pass between for perforating. The latter is effected by the pins being pressed through the paper and into the die-plate.

The cross-head *g* may be held up by strong spiral spring; but I prefer the arrangement represented in the drawings at Figs. 5 and 6. According to this plan the cross-head *g* is held up by rod *f* coming upon the periphery of wheels *c*. The notch *c'* in these wheels is set directly over the cam *d'* on wheels *d*. When the notch comes round to the rod *f*, the cams begin to act upon their bearing on top of cross-head *g* and press the pins through the paper and into the die-plate, the notch *c'* allowing the rod *f* to drop sufficient for this purpose; and to prevent the wheels *c* from acting on rod *f* before the cams are free from their bearing, the notch *c'* is sufficiently elongated, as shown at

Fig. 6. This perforating apparatus is bolted to suitable cross-girders fastened between the frames or standards A B.

The frame for holding the paper to be unwound consists of a pair of standards, A, bolted to a suitable bed and fitted with bracket or cap bearings A', to carry cross-spindles C, upon which the rolls of paper, D, to be unwound are carried. These spindles are made fixtures by pinching-screw or other means. Each spindle C shows five rolls of paper, D, (but the number may be increased or decreased,) carried on them, and having a suitable spacing ring or washer, E, between each roll. (See Fig. 3.) This washer is screwed and fixed on spindle. The whole of the rolls D turn loosely upon these fixed spindles entirely independent of each other.

To regulate the tension of the unwinding of each roll, an automatically-acting brake, F, is used to each roll. This consists of a piece of textile material attached at one end to a cross-rod, F', hung in frame A, the other end having a weight, F², connected to it. The material of F hangs over and upon roll D, and the weight F² pulls it down upon them sufficient to control the unwinding of the rolls.

It will be observed by reference to the drawings that one of the spindles C for rolls D is carried in different part of machine, there being no room for it between standards A.

D', Fig. 1, are bands of paper before perforation, being drawn from rolls D, coming together to form a layer to pass through perforating apparatus H; D², the rising webs of paper after perforation passing to the different winding-spindles; D³, rolls of wound perforated paper on winding-spindles I, Fig. 4.

B represents a second set of side frames or standards bolted to a suitable bed and carrying the rewinding parts. These standards are fitted with ordinary cap-bearings, B', to carry reeling-spindles I. Before starting, each of these spindles is threaded with tube-cases corresponding in number to the rolls to be wound on spindle. These tube-cases are secured to the spindles I to prevent their turning, as upon them the perforated paper is wound. These spindles have fitted near each end a guide-disk, J, to keep the end rolls from wandering.

Preparatory to starting the machinery the ends of the bands of paper from the rolls D on each of the eight spindles C are passed over and under rollers G and collected together one over the other, making five series of bands or webs of paper eight thick, and brought between rollers G' and passed through the series of spaces in perforating apparatus to the winding part, and over and under guide-rollers G², to distribute each band or web to the different winding-spindles, and the end secured to the tube on spindle by glue or otherwise.

The whole of the eight winding-spindles I must be driven at the same surface speed, and for this purpose I prefer to gear them to-

gether, as shown in Fig. 2. In this view on one end of the eight spindles I is keyed a gear-wheel, E', four of these gear-wheels gearing with a large wheel, U, and four with a lower gear-wheel, V, receiving motion from U by the intermediate gear-wheel, W. The wheels V and W revolve upon a short arm-pivot, R', secured in one of the standards B. (See Fig. 4.)

The machine is set in motion from the main driving-shaft *b* by means of a cam, ratchet, and pawl arrangement, as follows: On the outside of driving-shaft *b* an arm-cam, K, is keyed, which at every revolution comes against a roller, L, carried in a fork at one end of a depressible guided connecting-rod, M, the other end of such rod being jointed to one end of a pivoted bell-crank lever, N. The other end of latter carries a pawl, O, engaging with a ratchet-wheel, P, keyed to a large gear-wheel, Q, turning on a short arm-pivot, R, attached to one of the standards B. The gear-wheel Q gears with a smaller gear-wheel, S, keyed to a spindle, T, passing through both standards B, and having keyed onto other outside end the large gear-wheel U. (See Fig. 2.) After the rod M has been pressed in and released by the cam K and wheels P Q moved the required distance, it returns to its original position by the action of a spiral spring, so as to be acted on by cam K at every revolution of shaft *b*. The rod M is fitted with a feed-regulator, M', consisting of a screw-threaded lock-wheel screwing on rod M. This lock-wheel bears against one of the guide-bearings of rod M, and is turned as required by the attendant in charge to make pawl-lever N take a shorter stroke as the diameter of the winding-rolls increases, to insure that the lines of perforations across the paper shall be the same distance apart at the completion of a roll as they were at the commencement.

The machine may be constructed to be worked either by hand or power. In place of the cam K, connecting-rod M, lever N, pawl O, and ratchet-wheel P, I may employ a handle fitted to wheel Q, to enable the latter to be turned by hand, and the shaft *b* of the perforating apparatus may also be turned in the same way.

I am aware that it is not new to simply gear winding-spindles together and to distribute webs of cut paper to such winding-spindles, as such has been proposed in paper-cutting machinery; nor is it new to draw layers of paper drawn from several rolls turning independent of each other through a perforating apparatus, to perforate designs through several bands of paper at the same time, such designs being afterward cut off from the paper immediately after passing through perforating apparatus; nor is it new to employ a regular intermittent feed for drawing a layer of bands of paper through a perforating apparatus by means of feed-rolls geared together and intermittently turned; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In machinery for the purposes described, the combination of parts consisting of the standards A B, fixed spindles C, spacing-rings E, brake F, guide-rollers G G' G², perforating apparatus H, cam K, rod M, feed-regulator M', lever N, pawl O, ratchet-wheel P, gear-wheels Q and S, pivot R, spindle T, gear-wheels U and E', and winding-spindles I, as and for the purposes hereinbefore described, and represented in the accompanying drawings.

2. In machinery for the purposes described, the combination of the standards B, driving-shaft *b*, cam K, rod M, provided with roller or bearing L, held in a working position by spring, feed-regulator M', lever N, pawl O, ratchet P, gear-wheels Q and S, pivot R, shaft T, gear-wheels U, W, V, and E', pivots R', and winding-spindles I, the whole operating as hereinbefore described, and represented in the accompanying drawings, for giving an intermittent winding action to winding spindles and to enable such winding action to be regulated as the wound rolls increase in diameter.

3. In machinery for the purposes described, the combination, with winding-spindles geared to turn exactly together, intermittently revolved, of means, substantially as described, for regulating the intermittent action to pro-

vide for the increase of the wound rolls, a perforating apparatus, and guide and distributing rollers G G' G².

4. In machinery for the purposes described, the combination of fixed spindles C, to carry rolls of paper for unwinding, spacing-rings E, a brake to control the unwinding of the paper on spindles C, and a series of guide-rollers, G G', to collect and guide the bands of unreeling paper together through a perforating apparatus.

5. In machinery for the purposes described, the combination of the cam K, rod M, provided with spring and roller or bearing L, and the feed-regulator M', for the purposes described.

6. In machinery for the purposes described, the combination of the shaft *b*, wheels *d*, having cams *d'*, wheels *c*, having notch *c'*, rod *f*, arms *f'*, cross-head *g*, and pins *h*, for the purposes hereinbefore described, and represented in the accompanying drawings.

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