

(No Model.)

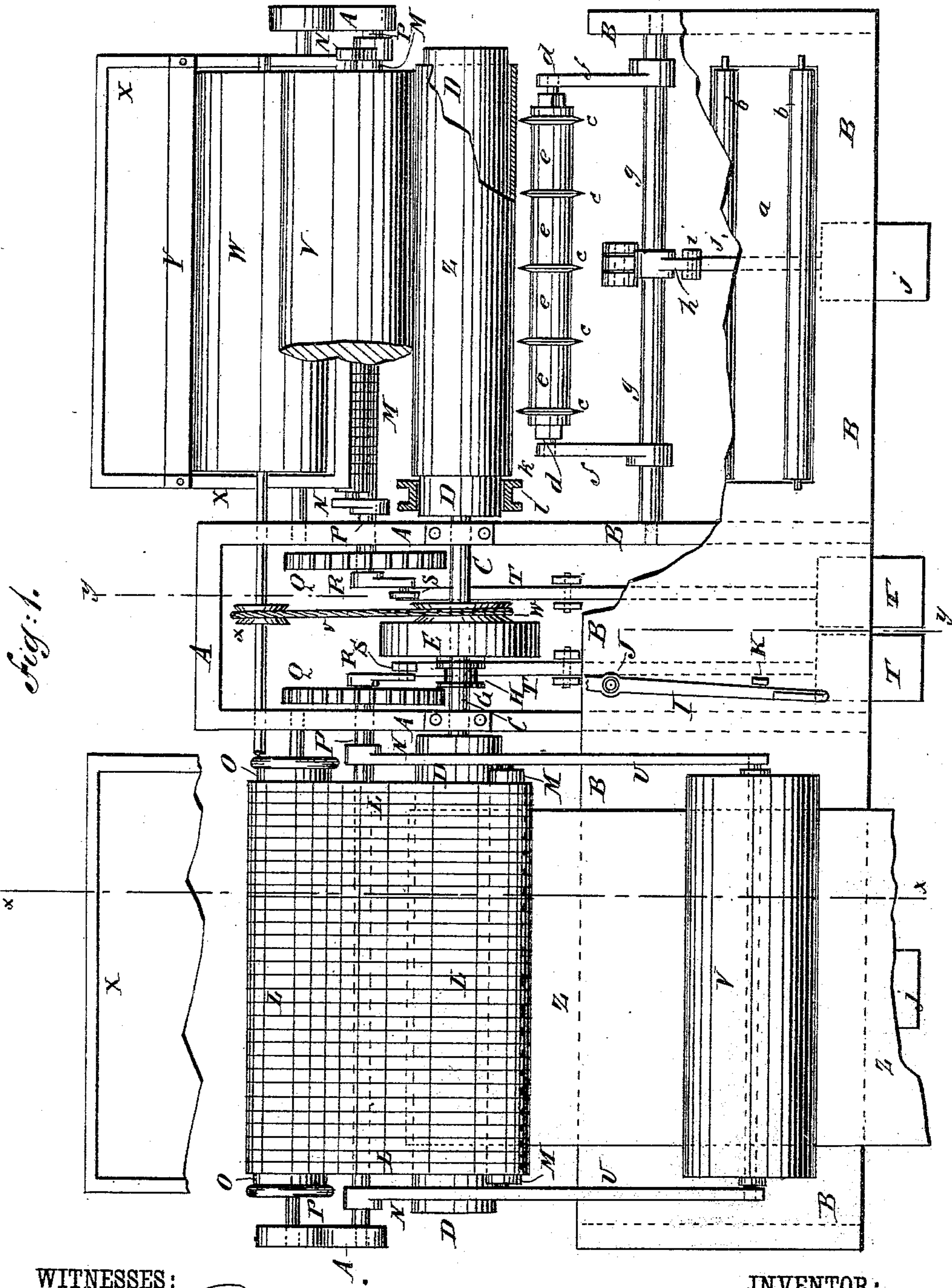
4 Sheets—Sheet 1.

T. GRANGER.

MACHINE FOR MAKING PAPER TUBES.

No. 373,655.

Patented Nov. 22, 1887.



WITNESSES:

Chas. Nida
C. Bedgwick

INVENTOR:

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BY

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ATTORNEYS.

(No Model.)

4 Sheets—Sheet 2.

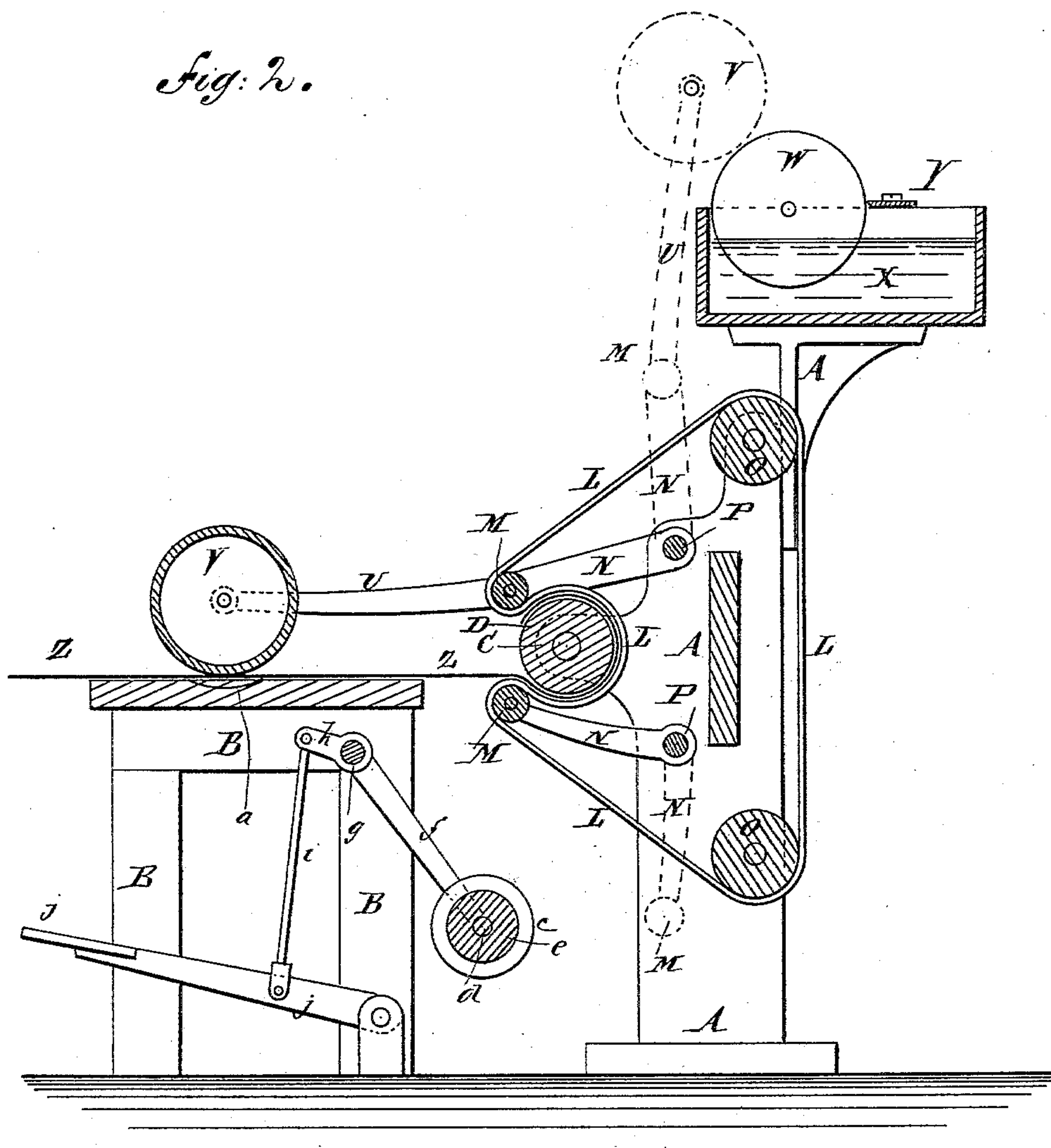
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Fig. 2.



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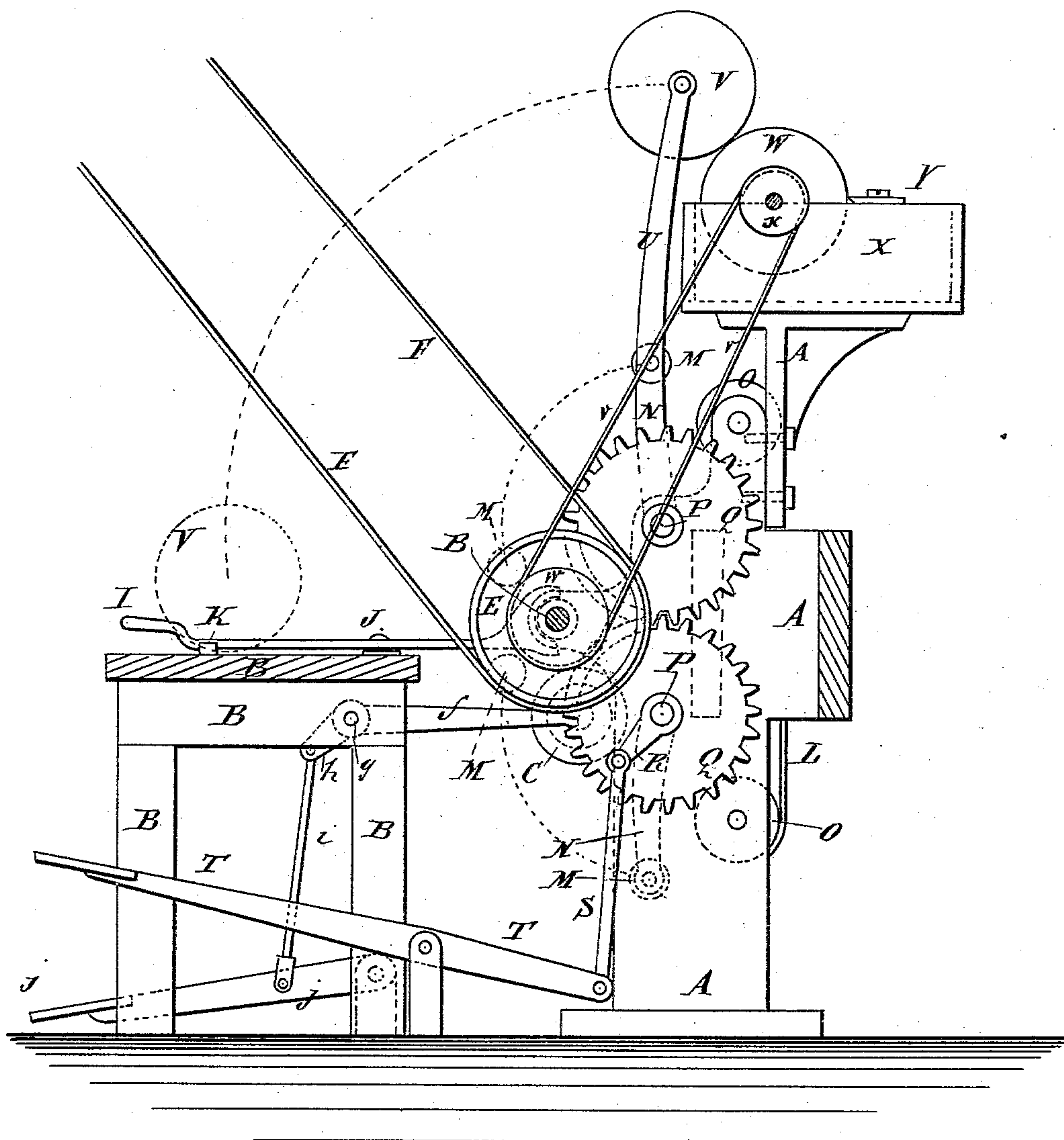
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Fig. 3.



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4 Sheets—Sheet 4.

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Fig: 4.

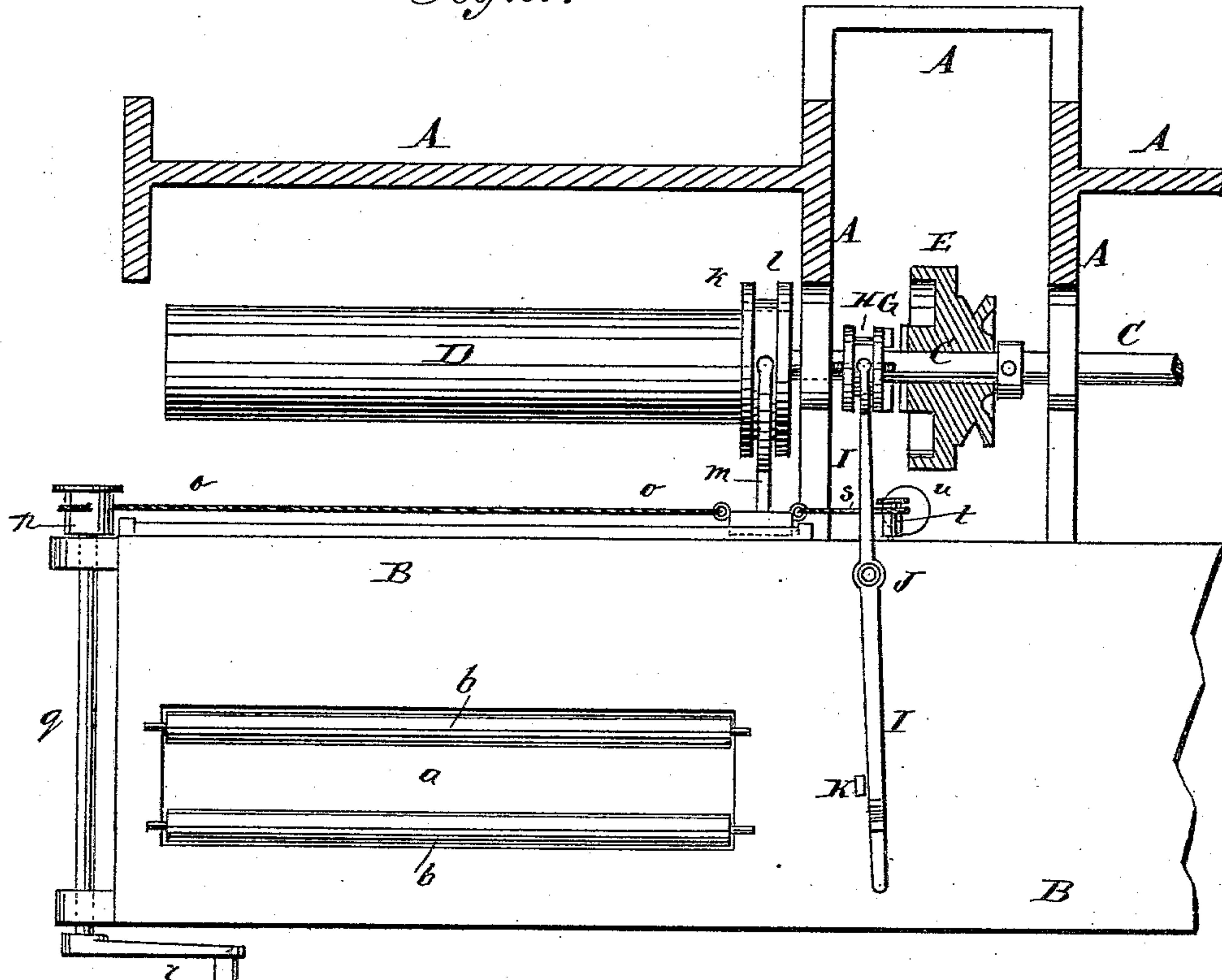
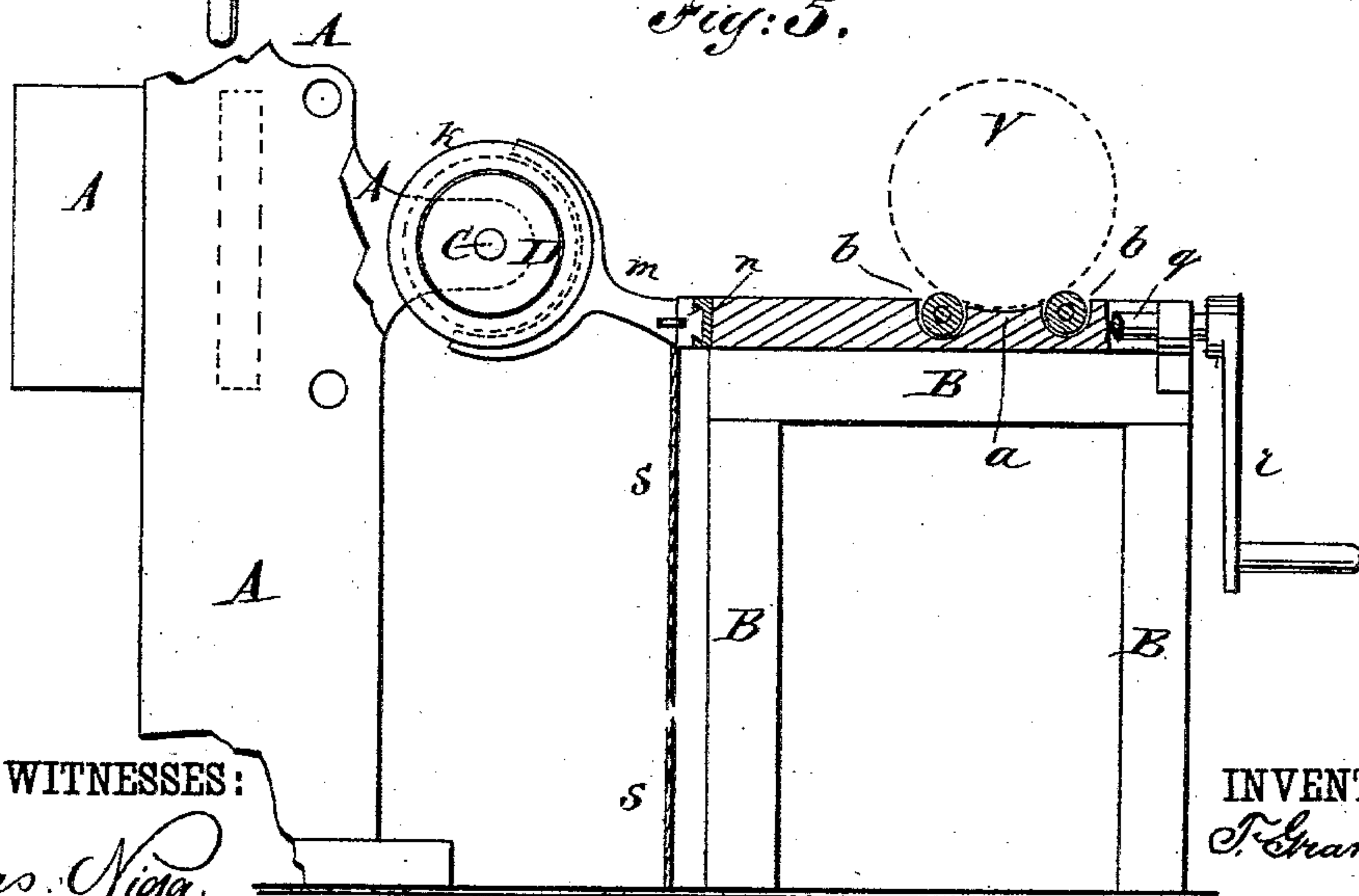


Fig: 5.



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UNITED STATES PATENT OFFICE.

THOMAS GRANGER, OF NEW YORK, N. Y.

MACHINE FOR MAKING PAPER TUBES.

SPECIFICATION forming part of Letters Patent No. 373,655, dated November 22, 1887.

Application filed June 2, 1886. Serial No. 203,904. (No model.)

To all whom it may concern:

Be it known that I, THOMAS GRANGER, of the city, county, and State of New York, have invented a new and useful Improvement in
5 Machines for Making Paper Tubes, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate
10 corresponding parts in all the figures.

Figure 1 is a plan view of my improved machine, parts being broken away. Fig. 2 is a sectional side elevation of the same, taken
15 through the line *x x*, Fig. 1. Fig. 3 is a sectional side elevation of the same, taken through the line *y y*, Fig. 1. Fig. 4 is a sectional plan view of a part of the same. Fig. 5 is a side elevation of a part of the same, partly in section, and parts being broken away.

The object of this invention is to provide machines for making paper tubes, constructed in such a manner that the paper tubes can be
25 made quickly, and which at the same time shall be simple in construction and convenient in use.

The invention consists in the construction and combination of various parts of the machine, as will be hereinafter fully described.
30 A is the frame of the machine, and B is the feed-table placed in front of the said frame.

In bearings in arms or brackets formed upon or attached to the front of the middle part of the frame A revolves a short shaft, C. To the
35 ends of the short shaft C are attached the inner ends of the mandrels D, upon which the paper tubes are formed, and the outer ends of which are free and unsupported, so that the paper tubes, when formed, can be readily removed.
40 moved.

Upon the middle part of the shaft C is placed a loose pulley, E, to which motion is given by an endless belt, F, from any convenient power. To the shaft C at one side of the pulley E is
45 secured a sliding clutch, G, the hub of which has an annular groove, H, formed in it to receive the forked end of the lever I. The lever I is pivoted to a support, J, attached to the feed-table B, and its free end projects into
50 such a position that it can be readily reached

and operated to move the clutch G and throw the pulley E into and out of gear with the shaft C. The lever I is secured in either position by placing it upon one or the other side of the stop K, attached to the feed-table B.

The paper is held in place while being formed
55 into rolls upon the mandrels D by endless belts L, passing around the lower, inner, and upper sides of the said mandrels, passing around the small guide and pressure rollers M, journaled
60 to the outer ends of the arms N, pivoted to the frame A below and above the level of the said mandrels and around the guide-rollers O, also journaled to the frame A above and below the level of the said mandrels. The inner ends of
65 the arms N are rigidly attached to shafts P, which rock in bearings in the frame A.

To the inner ends of the shafts P of each pair of arms, N, are attached two gear-wheels, Q, the teeth of which mesh into each other,
70 so that the said shafts will be rocked together, but in opposite directions.

To the inner end of each lower shaft, P, or to each lower gear-wheel, Q, is attached a short crank, R, to which is pivoted the upper
75 end of a connecting-rod, S. The lower ends of the connecting-rods S are pivoted to the inner ends of the foot levers or treadles T, the outer ends of which project at the front of the machine, so that they can be readily reached
80 and operated by the operator to swing the pressure-rollers M away from the mandrels D or to swing them against the said mandrels with any desired pressure.

Upon the upper arms, N, are formed extension-arms U, to the outer ends of which are
85 journaled the paste-applying rollers V, which, when the pressure-rollers M are swung away from the mandrels D, are swung into contact with the rollers W, journaled to the ends of
90 the paste-troughs X, so that the lower parts of the said rollers will be immersed in the paste in the said troughs. The troughs X are attached to the frame A and are provided with scrapers Y to remove the surplus paste from
95 the said rollers before the paste-applying rollers V come in contact with them. The rollers V are made of such a size that one revolution of the said rollers will apply paste to the paper Z from which the tubes are to be made
100

from a point at a distance from the inner end of the said paper equal to the circumference of the mandrels to the outer end of the said paper, so that the inner layer of the paper tubes will be free from paste and the succeeding layers will be securely cemented in place. The arms U are made of such a length that the rollers V when lowered will come in contact with the paper Z at the proper distance from its inner end. The top of the feed-table B, beneath the point where the roller V comes in contact with the paper Z, has a recess, *a*, or a slot formed in it into which the said paper is depressed by the said roller V, the lower part of the face of the said roller being a little below the surface of the said table when the said roller comes to the limit of its downward movement, so that the paste-applying roller will never come in contact with the said feed-table or smear it with paste.

To the table B at the edges of the recesses or slot *a* are pivoted small rollers *b* to lessen the strain upon the paper as it passes over the said edges.

The long paper tubes, when completed and while still upon the mandrels D, can be cut into short tubes by a series of circular cutters, *c*, placed upon shafts *d* and kept at the required distance apart by tubular washers *e*, placed between them upon the said shafts, or by other suitable means. The ends of the shafts *d* are journaled to the ends of arms *f*, attached to the shafts *g*, which are journaled to the table B, and to which are attached short crank-arms *h*. To the ends of the crank-arms *h* are pivoted the upper ends of connecting-rods *i*, the lower ends of which are pivoted to foot levers or treadles *j*, so that the cutters *c* can be swung up against the paper tubes upon the mandrels D by operating the said treadles, and can be allowed to swing away from the said tubes when not required for use.

The paper tubes, when completed, can be stripped from the mandrels with the hand or by means of rings *k*, sliding upon the said mandrels and placed at their inner ends. The rings *k* have annular grooves *l* formed in them to receive the forked ends of arms *m*, the bases of which are dovetailed and slide in dovetailed grooves *n*, formed in the inner edge of the top of the table B, or in bars attached to the said table-top. To the outer parts of the bases of the arms *m* are attached the inner ends of cords *o*, the outer ends of which are wound around and attached to drums or pulleys *p*, attached to or formed upon the inner ends of the shafts *q*, journaled to the end parts of the table B, and having cranks *r* attached to their outer ends. To the inner parts of the bases of the arms *m* are attached the upper ends of cords *s*, which pass over guide-pulleys *t*, pivoted to supports attached to the table B. To the lower ends of the cords *s* are attached weights *u* of sufficient gravity to draw back the arms *m* and rings *k* after being moved out-

ward by operating the cranks *r* to strip the paper tubes from the mandrels D.

The paste-rollers W are driven from the driving-pulley E by an endless belt, *v*, which passes around a pulley, *w*, attached to the said drive-pulley E, and around a pulley, *x*, attached to the journal connecting the inner ends of the said rollers W.

In using the machine a paper tube is formed upon one mandrel and allowed to remain under pressure while a second tube is being formed upon the other mandrel, which in turn is allowed to remain under pressure until the first tube has been removed from the first mandrel and a new tube formed upon it, so that the outer layers of the tubes will be pressed down smoothly and will be kept under pressure until securely cemented in place.

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

1. The combination, with a mandrel having one end unsupported, of an endless belt arranged in connection with said mandrel, fixed rollers, and rollers carried by swinging arms, one pair of said arms having extensions carrying a paste-applying roller, substantially as shown and described.

2. The combination, with a mandrel unsupported at one end, of a ring loosely encircling said mandrel at its supported end, an arm applied to said ring and sliding upon the feed-table, the handled or crank shaft connected to said arm to impart to it movement in one direction, said arm, with the ring, having an automatic return movement, substantially as shown and described.

3. In a machine for making paper tubes, the combination, with the frame A, the feed-table B, and the mandrel D and its driving mechanism, of the endless bands L, the guide-rollers O, journaled to the frame A, the guide and pressure rollers M, the arms N, carrying the said rollers M, the shafts P, journaled to the frame A, carrying the said arms N, and connected by gear-wheels Q, and the arm R, connecting-rod S, and treadle T, for operating the said guide and pressure rollers, substantially as herein shown and described, whereby the paper will be rolled firmly and smoothly upon the said mandrel, as set forth.

4. In a machine for making paper tubes, the combination, with the feed-table B, having recess *a*, the roller W, revolving in the paste-trough, and the arms N, carrying the guide and pressure rollers M, of the arms U, carried by the said arms N, and the roller V, carried by the said arms U, substantially as herein shown and described, whereby the withdrawal of the said pressure-rollers from the mandrel will raise the said paste-applying roller to receive paste, and applying the said pressure-rollers to the mandrel will lower the said roller to paste the paper, as set forth.

5. In a machine for making paper tubes,

the combination, with the feed-table B, having grooves *n*, and the mandrel D, of the grooved ring *k*, the sliding forked arm *m*, and the cord *o*, drum *p*, shaft *q*, and crank *r*, for drawing
5 the said ring and forked arm forward, and the cord *s*, pulley *t*, and weight *u*, for drawing the said ring and arm back, substantially as shown

and described, whereby the completed tube can be readily stripped from the said mandrel, as set forth.

THOMAS GRANGER.

Witnesses:

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