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Patented Mar. 26, 1901.

W. N. CORNELL.

MACHINE FOR IMITATING PECULIARITIES OF NATURAL WOODS.

(Application filed Feb. 3, 1900. Renewed Sept. 22, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

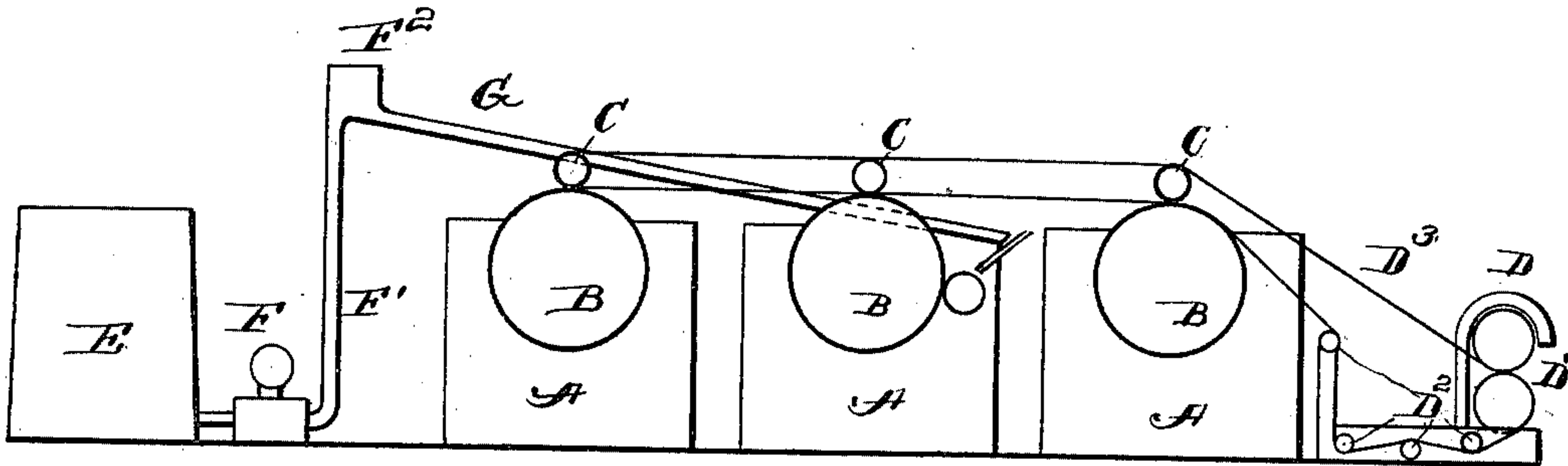


Fig. 2

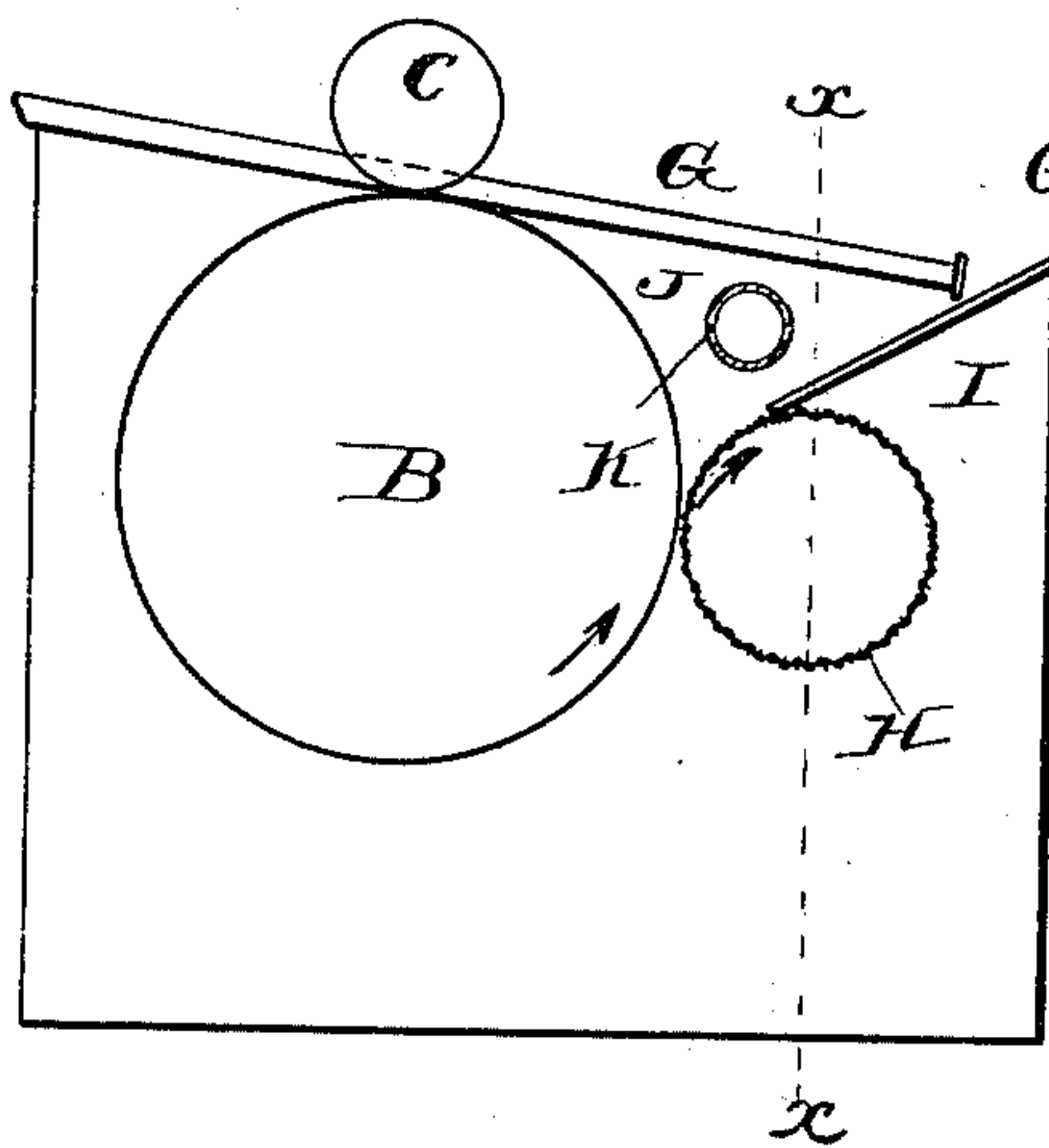
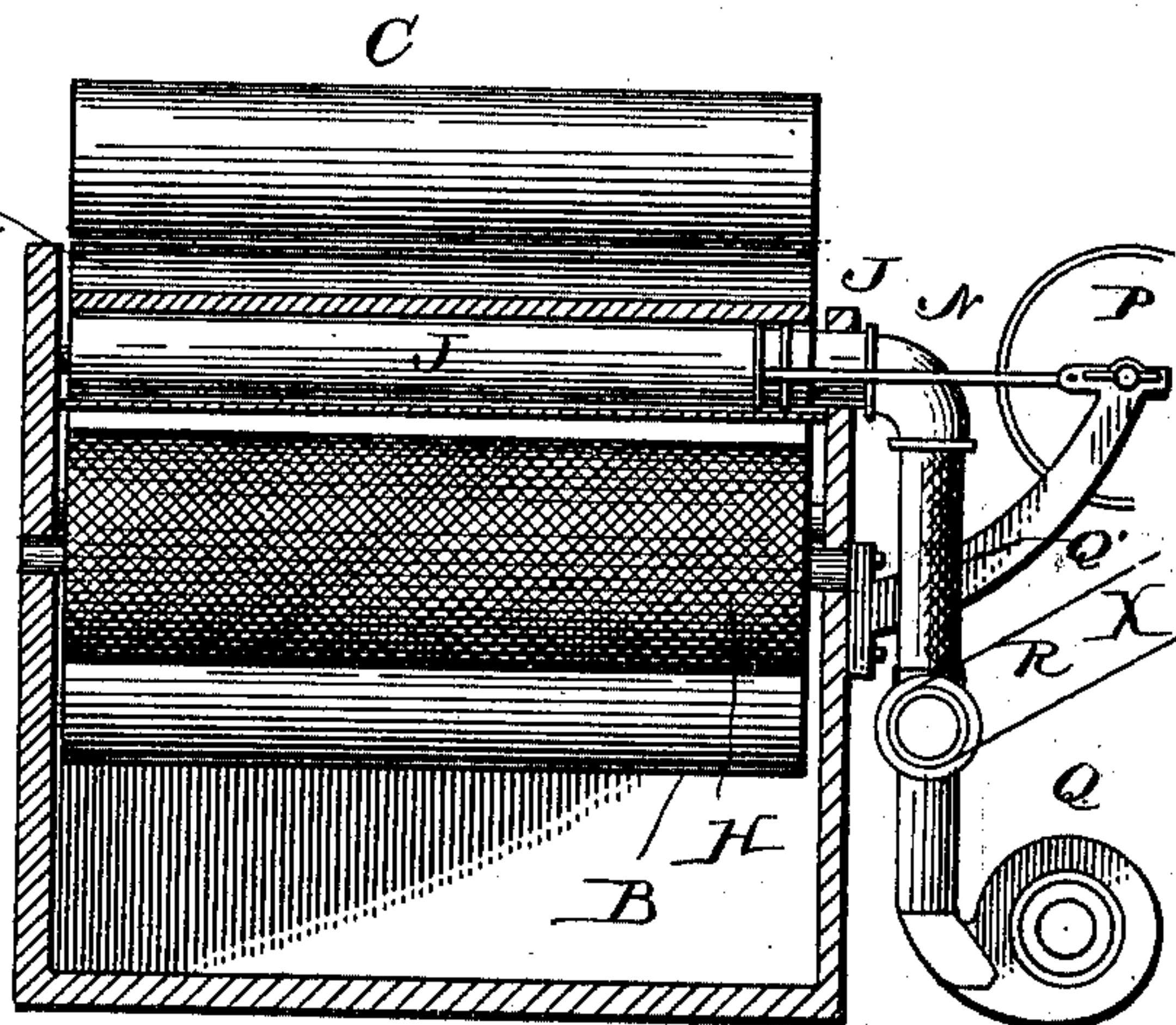


Fig. 3



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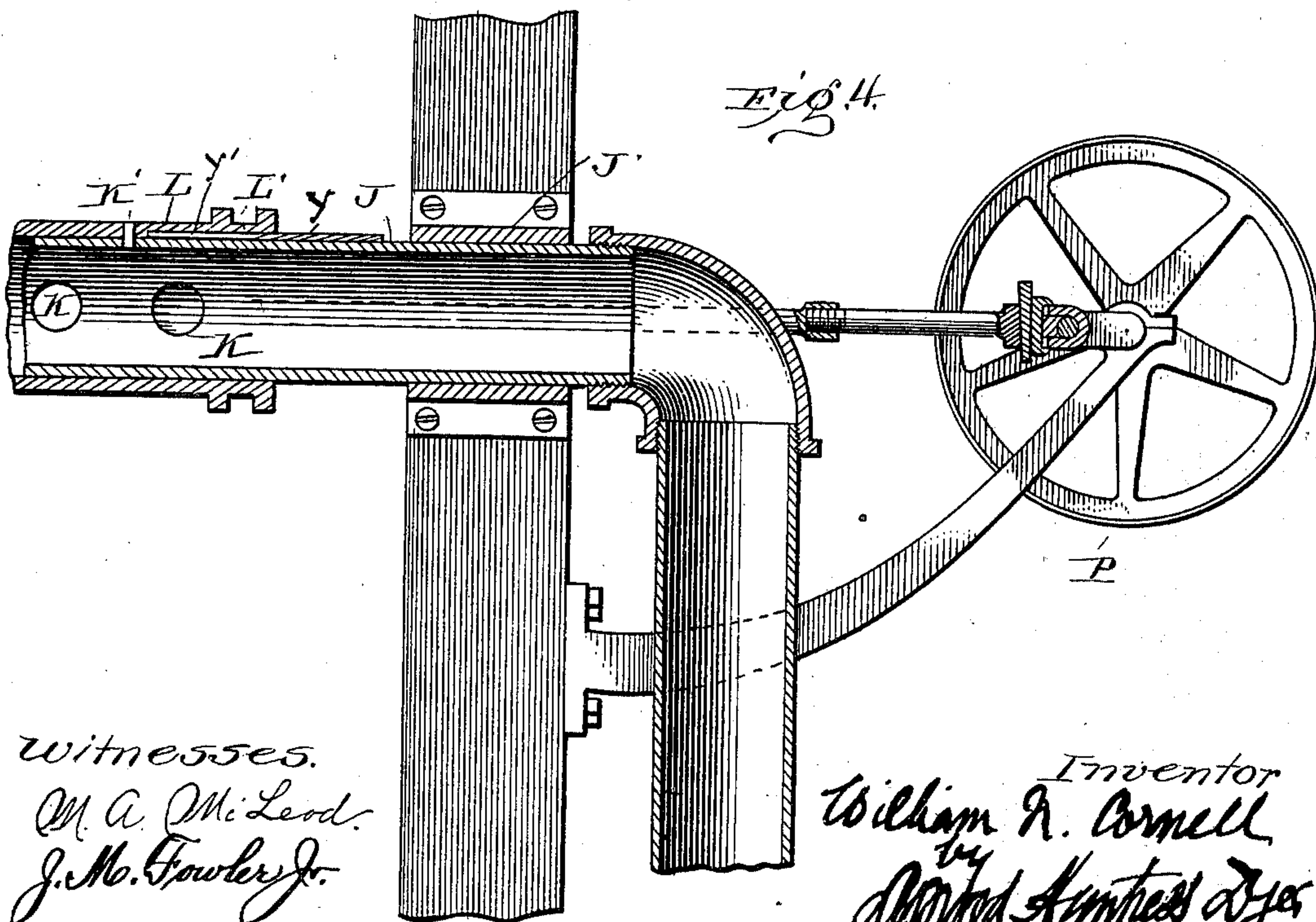
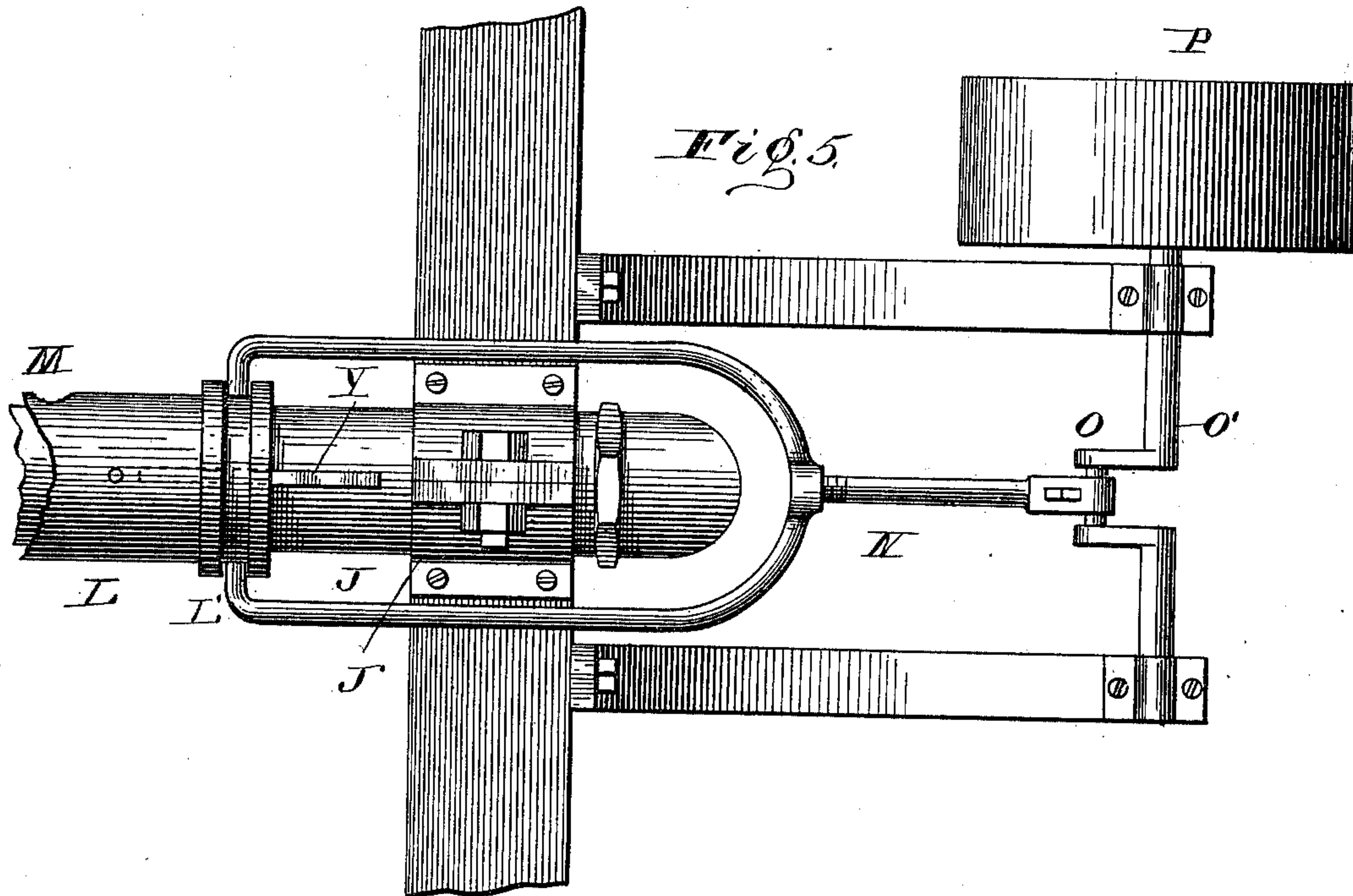
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3 Sheets—Sheet 2.



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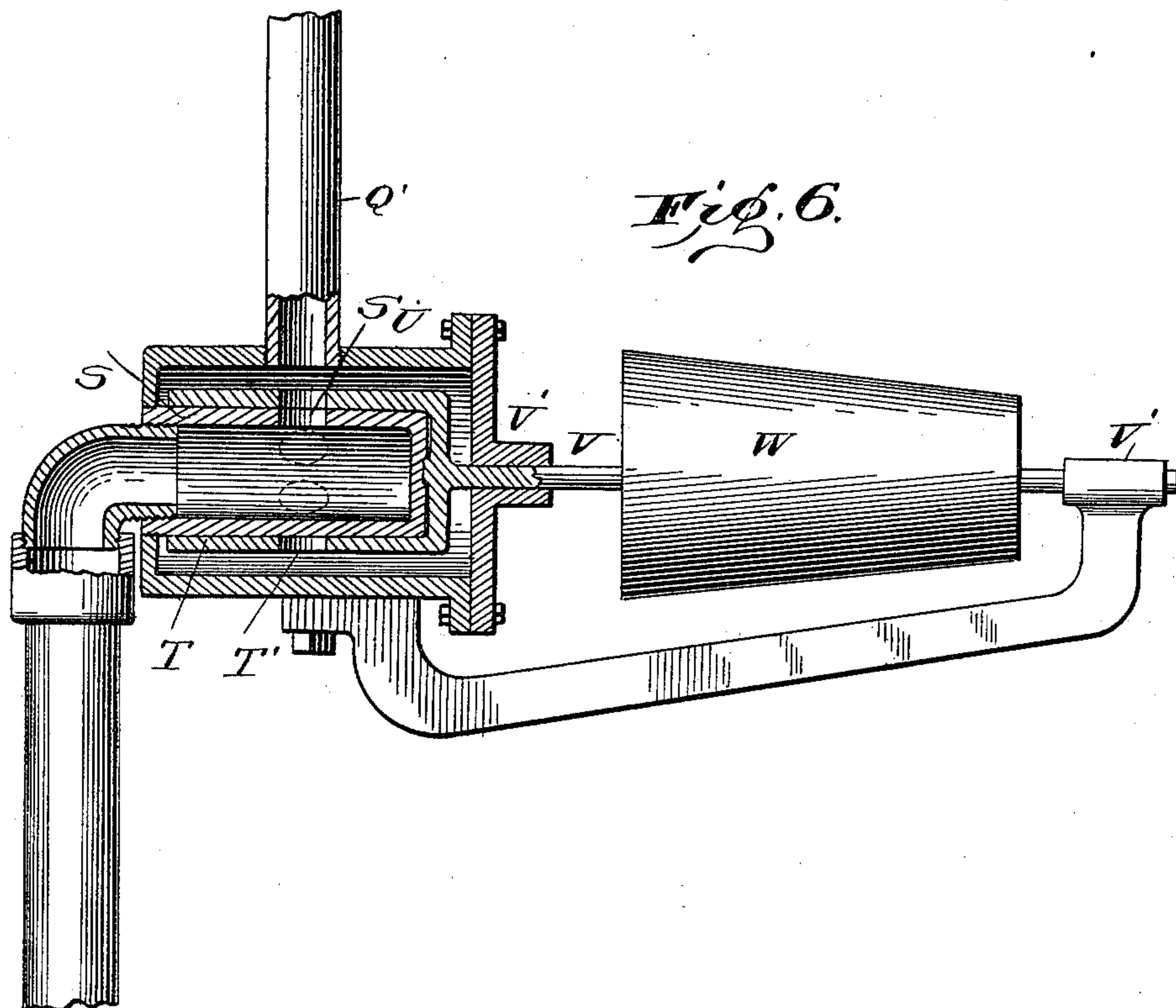
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR IMITATING PECULIARITIES OF NATURAL WOODS.

SPECIFICATION forming part of Letters Patent No. 670,846, dated March 26, 1901.

Application filed February 3, 1900. Renewed September 22, 1900. Serial No. 30,853. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. CORNELL, a citizen of the United States, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Machines for Imitating the Peculiarities of Natural Woods; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for making imitations of various varieties and kinds of woods.

The object of my invention is to produce means whereby a distribution of irregular particles or portions of pulp may be made on the face of the making-cylinder of the ordinary type of paper-making machines, so as to produce a perfect imitation of the knots and burls of natural woods. I have heretofore experienced great difficulty in distributing these particles of pulp across the face of the making-cylinder and at the same time to have the particles of pulp of uniform thickness and yet distributed irregularly, so as to give the paper the appearance of natural wood. I have also had great difficulty in having the pulp thick enough in contact with the working face of the cylinder to accomplish this end. By my invention I place the pulp (which for the purposes of this invention is presumed to be preliminarily formed in a rather thick state) in independent particles on the surface of the cylinder, thereby separating them sufficiently to form the irregular appearance of natural wood. This irregular application of the particles of pulp is made through the agency of a blast of air which may be varied in intensity, duration, and location to differentiate the distribution and imitate woods of different physical characteristics.

Generally the idea of the invention may be accomplished by the following means: In a vat of a cylinder-machine, on the operative side thereof adjacent to the cylinder, is placed a roll covered with fine wire-cloth. A suitable apron or board for the pulp in a thin liquid

state to flow between it and the cylinder is then arranged to allow the water to drain away through the interstices of the wire-cloth. Above this roll and parallel thereto and adjacent to the point of contact between it and the cylinder is placed a normally stationary pipe with suitable openings in the periphery thereof. The openings in the pipe are directed either in a downward direction or upward, as may be desired, owing to the location of the pipe and the variety of wood imitated. To accomplish this end, the pipe may be arranged to twist slightly in its bearings. Connected to this pipe by a flexible tube is a source of air-supply—as, for instance, a fan or blower.

To vary the location of the blasts of air, the following device is employed: Fitted closely to the stationary pipe is an outer pipe with registering openings. This outer pipe, by means of a cam or worm-gear, is caused to vibrate or slide back and forth over the inner pipe any required distance and at any rate of speed, thereby changing the size of the openings of the inner pipe. If the two pipes be clamped together, they will simultaneously vibrate, distributing the pulp in wavy lines on the cylinder.

A suitable cut-off valve may be arranged to vary the blasts of air passing through the inner pipe. If desired, the valve may be arranged to be automatically opened and closed at short intervals, the periods of which may be varied. Suitable provision is made to keep the openings of the inner and outer pipes in alinement. Suitable provision is also made to lock the two pipes together in making paper imitating wood with continuous streaks.

In order to better understand the nature of the invention, attention is called to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side view of an ordinary style of wood-pulp machine with my improvement attached thereto. Fig. 2 is an enlarged view of one of the vats. Fig. 3 is an end view of the vat, cylinder, and distributing-tube and a sectional view of the auxiliary cylinder. Fig. 4 is an enlarged sectional side view of the distributing-tube and agitating device.

Fig. 5 is a top view of the same, and Fig. 6 is an enlarged sectional view of the air-reducing valve.

In all the several views like parts are designated by the same letters of reference.

As shown in Fig. 1, the plant may consist of a series of vats A A A, each containing a making-cylinder B, with a couch-roll C mounted in swinging bearings and engaging with the upper faces thereof. The upper and lower press-rolls D D' and the felt rolls D² and felt D³ are arranged, as heretofore, upon almost every variety of pulp-machines known to the trade.

The stuff-vat E, which contains the pulp in a very thin paste, is arranged as shown. A pump F forces the pulp from the stuff-vat through a pipe F' into an elevated reservoir F², from which it passes through an inclined pipe G to a point adjacent to the centermost of the making-vats. As shown in the illustrations, the center vat is the only one having my improvement thereon; but this is not essential, as the attachment to be described may be applied to any or all of the vats.

Mounted within bearings within the sides of the central vat A and so arranged as to be parallel to the shaft of the making-cylinder is the feed-roll H. This roll is covered with fine wire-cloth or its equivalent. A suitable apron or board I is arranged above the roll and adjacent to the outlet of the pipe G for the pulp in a thin liquid state to flow between it and the cylinder. The water will pass away through the interstices of the wire-cloth and transform the pulp into a thick mass at the point of contact of the rolls B and H.

Above the roll and cylinder and parallel thereto, but separated a short distance from the cylinder, is arranged a normally stationary pipe J, having openings K K pointing toward the working face of the cylinder. The pipe is mounted in clamp-bearings J' on the edge of the vat, so that it may be twisted to vary the angle of the openings. Surrounding this pipe J is a second pipe L, having registering openings M therein. In order to give the tube L an oscillatory, undulatory, and vibratory motion, a pitman N is provided, which connects with a groove L' in the pipe L to a crank O, mounted upon a shaft O'. The latter is rotated by means of a pulley P, driven by a belt from any suitable source of power—as, for instance, the making-cylinder shaft.

Two holes or openings may be made in the pipes J and L, which will register when the holes K and M are registered. These holes are lettered K'. When registered, a suitable pin may be inserted, which will lock the two pipes together. The clamp-bearings J J' being loosened, the two pipes will vibrate simultaneously.

Q is a fan or blower connected to the inner stationary pipe J by means of the flexible tube Q', the latter being used to allow the inner pipe, when desired, to be vibrated.

R is a cut-off valve to vary the blasts of air passing through the inner pipe. The valve consists of the fixed inner member S, having an opening S' therein, and an outer concentric movable member T, having a series of registering openings T' therein. By rotating the movable member T the opening S' will be successively opened and closed, as will be evident. A casing U surrounds the movable member and connects with the flexible pipe Q'. To rotate the movable member, a shaft V, mounted in suitable bearings V', is provided and carries a cone-pulley W, which is rotated at any desired rate of speed by means of a belt X, which connects with a constantly-moving source of power.

Suitable provision is made to keep the openings of the inner and outer pipes J and L in alinement. Such provision may consist of a feather Y, secured to the inner pipe, working within a keyway Y', connected with the outer pipe.

The operation of the entire device is as follows: The pulp passes through the pipe G and flows down the apron over the top of the wire-gauze roll H into the "nip" or space between the top of the wire-roll and a corresponding height on the face of the cylinder B. From the nip particles of pulp are blown by the air escaping under pressure through the perforations K in the pipe J. As shown in Fig. 2, the blast of air may be directed downward upon the surface of the pulp and portions removed therefrom and splashed or spattered upon the web of paper being carried up by the making-cylinder B.

The opening of the perforated pipes may turn downward below the surface of the pulp or above, according to the amount of pulp desired to be thrown upon the cylinder-face or the size of the particles to be blown against the cylinder-face.

By making the feed-roll of wire-cloth it allows the water to pass away, thus leaving the pulp thicker than it could flow into this nip and in proper condition to be blown against the cylinder. The pulp has to be very thick at this point to accomplish this object.

The construction of the air-valve as described is a simple appliance to break the current of air and can be made in any desirable way to make short quick puffs of air. The duration of the blasts of air regulate the size of the particles of pulp lifted onto the cylinder-face in combination with the size of the opening of the vibrating pipe. If this valve is set with a continuous blast or current of air through the pipe, it would blow or lift a streak or strip of pulp on the cylinder-face. When this is desirable, the valve is locked open by removing the belt X, so as to give one opening and a continuous blast, the two pipes J and L being locked together and therefore vibrating simultaneously. The effect of crotched mahogany is produced. By making the blast of air of the desirable duration quartered oak is produced. Any other

variety of wood may be imitated by varying the position and operation of the pipes J and L and the valve R.

Having now particularly described and as-
5 certain the nature of my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. Means for imitating the peculiarities of natural woods comprising in combination, the
10 cylinder, means for generating a blast of air, a perforated air-pipe placed upon the working side of the cylinder so arranged as to place particles of pulp on the said cylinder irregularly, substantially as described.

15 2. Means for imitating the peculiarities of natural woods, comprising in combination, a making-cylinder, a feed-roll placed on the making side of the cylinder and in engagement therewith, means for feeding the pulp
20 to the point of engagement of the cylinder and feed-roll, means for generating a blast of air, a perforated air-pipe above the feed-roll so arranged as to place separate particles of pulp on the said cylinder irregularly, substan-
25 tially as described.

3. Means for imitating the peculiarities of natural woods comprising in combination, a cylinder, means for generating a blast of air, means for varying the blast of air, a perfo-
30 rated air-pipe placed on the making side of the cylinder so arranged as to place separate particles of pulp on the said cylinder irregularly, substantially as described.

4. Means for imitating the peculiarities of
35 natural woods, comprising in combination, a cylinder, means for generating a blast of air, a perforated air-pipe placed on the making side of the cylinder, means for varying the location of the blast of air on the cylinder so
40 as to place particles of pulp on the said cylinder irregularly, substantially as described.

5. Means for imitating the peculiarities of natural woods comprising in combination, a
45 cylinder, means for generating a blast of air, means for varying the duration of the blast of air, a perforated air-pipe placed on the mak-

ing side of the cylinder, means for varying the location of the blast of air upon the cylinder so as to place particles of pulp on the said cylinder irregularly, substantially as de- 50 scribed.

6. Means for imitating the peculiarities of natural woods, comprising in combination, a making-cylinder, a feed-roll placed on the making side of the cylinder and in engage- 55 ment therewith, means for feeding the pulp to the point of engagement of the cylinder and feed-roll, means for generating a blast of air, a perforated vibratory air-pipe above the feed-roll so arranged as to place separate par- 60 ticles of pulp on the said cylinder irregularly, substantially as described.

7. Means for imitating the peculiarities of natural woods, comprising in combination, a making-cylinder, a feed-roll placed on the making side of the cylinder and in engage- 65 ment therewith, means for feeding the pulp to the point of engagement of the cylinder and feed-roll, means for generating a blast of air, a perforated vibratory air-pipe above the feed-roll, the said pipe having a concentric internal pipe with registering perforations, so arranged as to place separate particles of pulp on the said cylinder irregularly, sub- 70 stantially as described.

8. Means for imitating the peculiarities of natural woods, comprising in combination, the fan or blower Q, a perforated air-pipe J placed on the making side of the cylinder, a concentric sleeve or pipe L, the pitman N and 80 crank O, and means for turning the latter and means for operating the fan or blower to generate a blast of air in the pipes so as to place separate particles of pulp on the said cylinder irregularly, substantially as described. 85

This specification signed and witnessed this 21st day of December, 1899.

WILLIAM N. CORNELL.

Witnesses:

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