

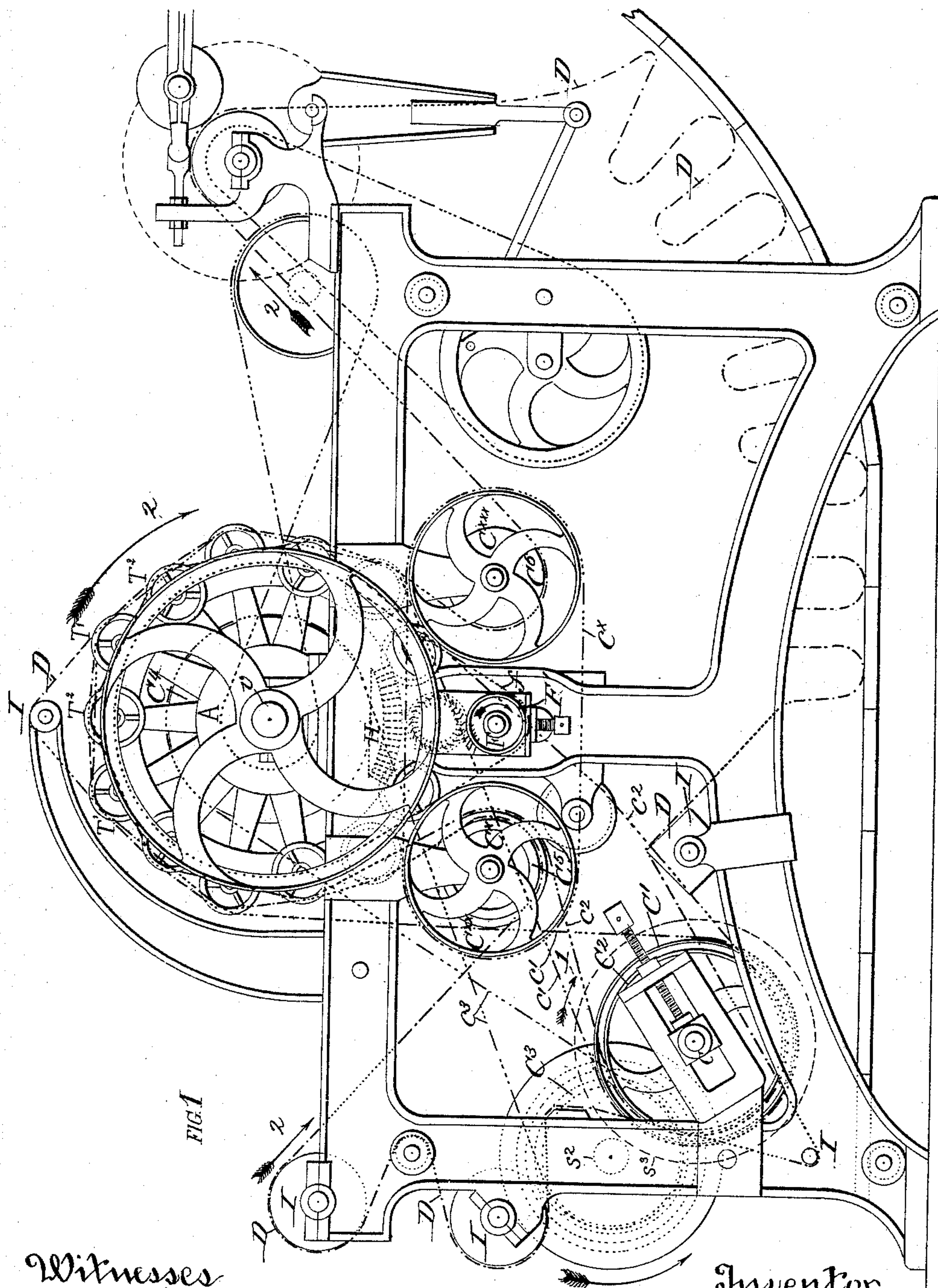
(No Model.)

4 Sheets—Sheet 1.

N. H. GROSSELIN, FILS.  
GIG MILL.

No. 485,929.

Patented Nov. 8, 1892.



Witnesses  
*Albert Spudew.*  
*Fannie Rose.*

Inventor  
*Nicolas Henry Groselin fils.*  
By his Attorney  
*Joseph Lyons.*

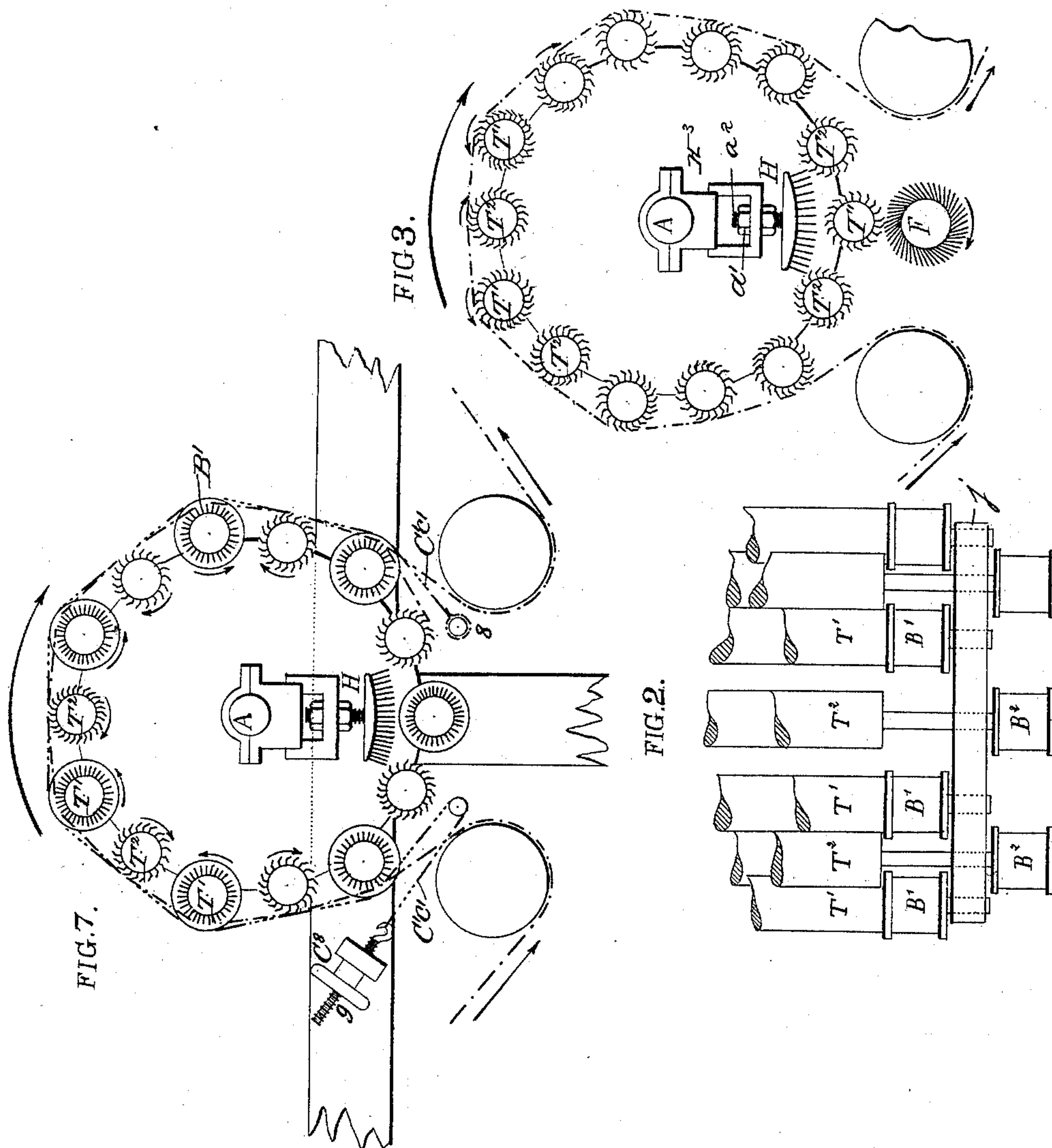
(No Model.)

4 Sheets—Sheet 2.

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*Albert Spiden.*  
*Fannie Wise*

Inventor  
*Nicolas Henry Groselin fils.*  
By his Attorney  
*Joseph Lyons.*



(No Model.)

4 Sheets—Sheet 3.

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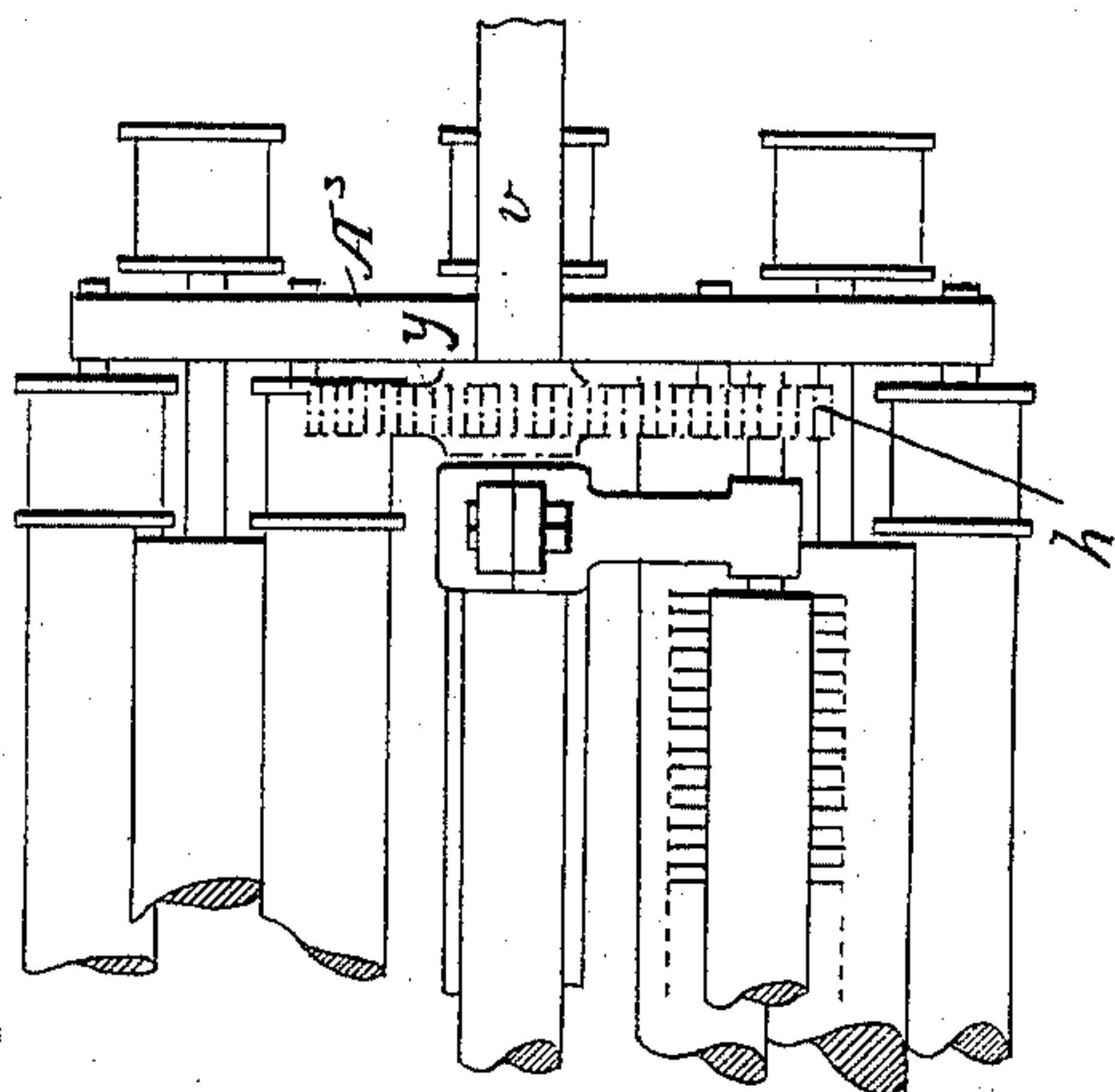


FIG. 4.

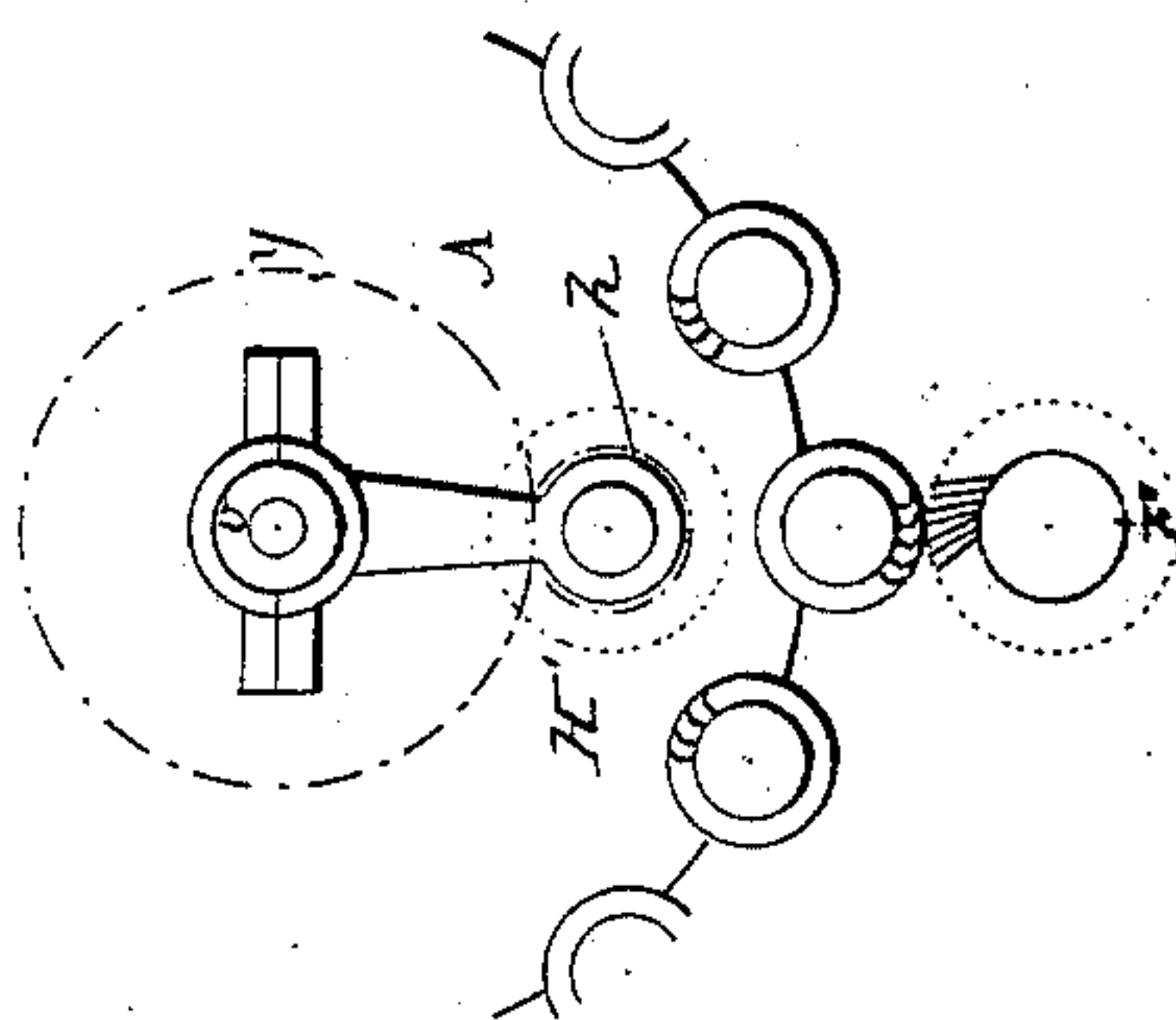


FIG. 5.

Witnesses  
*Albert Speiden,*  
*Fannie Wise.*

Inventor  
*Nicolas Henry Groselin fils.*  
By his Attorney  
*Joseph Long*

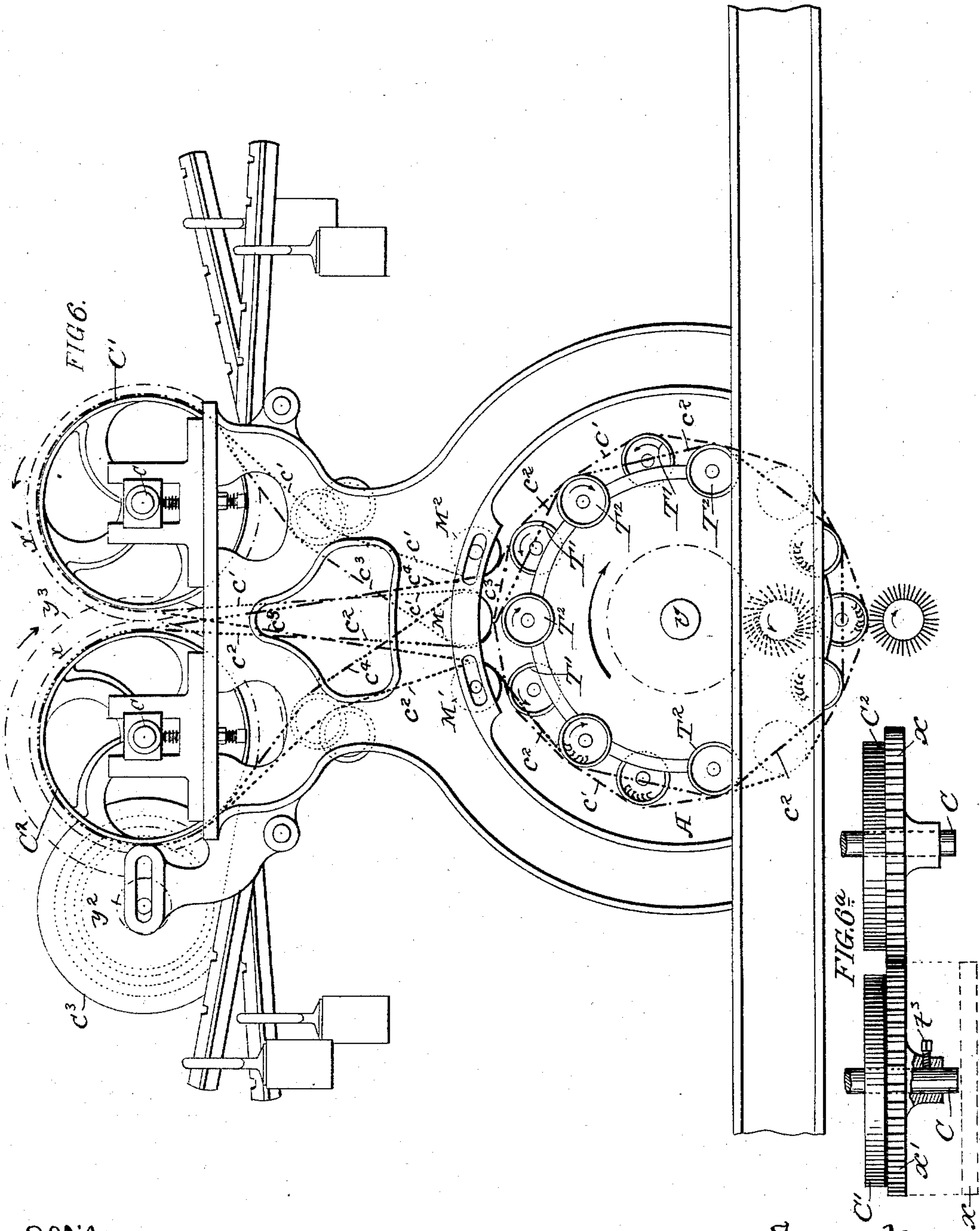
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4 Sheets—Sheet 4.

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By his Attorney  
*Joseph Lyons*



# UNITED STATES PATENT OFFICE.

NICOLAS HENRY GROSSELIN, FILS, OF SEDAN, FRANCE.

## GIG-MILL.

SPECIFICATION forming part of Letters Patent No. 485,929, dated November 8, 1892.

Application filed July 27, 1888. Serial No. 231,167. (No model.) Patented in France November 25, 1887, No. 187,203; in Belgium March 7, 1888, No. 80,913; in England April 11, 1888, No. 5,394; in Italy December 14, 1888, No. 24,592; in Spain January 24, 1889, No. 9,144; in Switzerland February 19, 1889, No. 501; in Russia February 20 and March 4, 1889, No. 11,867; in Austria-Hungary February 25, 1889, No. 9,132 and No. 23,070, and in Germany July 27, 1889, No. 55,784.

*To all whom it may concern:*

Be it known that I, NICOLAS HENRY GROSSELIN, Fils, a citizen of France, residing at Sedan, France, have invented certain new and useful Improvements in Gig-Mills, (which have been patented to me in France November 25, 1887, No. 187,203; in Belgium March 7, 1888, No. 80,913; in Germany July 27, 1889, No. 55,784; in Great Britain April 11, 1888, No. 5,394; in Switzerland February 19, 1889, No. 501; in Italy December 14, 1888, No. 24,592—408; in Spain January 24, 1889, No. 9,144; in Austria-Hungary February 25, 1889, No. 9,132 and No. 23,070, and in Russia February 20 and March 4, 1889, No. 11,867,) of which the following is a specification.

My invention relates to gig-mills of the character described in my Letters Patent, No. 377,151, dated January 31, 1888—that is to say, to gig-mills which comprise a drum around which are arranged teasing or card rollers having a variable rotary movement independent of the drum—and one characteristic feature of my invention is the arrangement of the working or card rollers, which preferably are all teasing-rollers, by which they are mounted on a drum in such a way that one series of said rollers turns in a reverse direction to the other series. By this arrangement when the rollers are all teasing-rollers the goods can be teased or dressed simultaneously both in the direction of and against the nap. This teasing operation in both directions is indispensable in the treatment of many characters of goods. Heretofore this result has been attained only by the use of several drums or by submitting the cloth more than once to the action of the same drum, which necessitated the turning of the cloth end to end for each action of the drum.

My arrangement not only avoids the use of two drums, but also obviates the loss of useful effect which arises therefrom in the case of felted fabrics and of cloth where only a short thick nap is desired, when as in existing methods teasing in two directions is not simultaneous.

My invention, moreover, consists in arranging the rollers in alternating series—that is

to say, so that the adjoining teasing-rollers turn in opposite directions. Another advantage arising from the arrangement of the reversely-turning rollers, and especially the arrangement in alternating series just referred to, is that they tend to neutralize each other's tendency to produce a drag on the fabric treated. The drum does not, therefore, drag said fabric in either direction, thus enabling me to dispense in a great measure with the usual dragging-rollers, which is an important advantage. Another advantage arising from this arrangement is that I am thereby enabled to utilize the entire working surface of the drum for card-rollers, inasmuch as the rollers which work against the nap may be utilized as guide-rollers for regulating the pressure of the fabric on the drum or they may act both as guide-rollers and teasing-rollers.

Inasmuch as the cards in the two series of teasing-rollers point in opposite directions, it becomes necessary to have separate strippers, which act each only on one series. My invention, therefore, also consists in arranging one series of teasing-rollers—for instance, those which act against the nap—at a greater distance from the center of the drum than the other series, in connection with two strippers for cleaning the cards of the teasing-rollers, one exteriorly located and the other arranged in the interior of the drum. By this arrangement both series of teasing-rollers are stripped of the flock adhering to them as they pass the strippers, and the strippers of the one series do not interfere with the rollers of the other series.

My invention also consists in other devices of construction to be set forth in the specification and claims; but to enable those skilled in the art to carry out my invention I will now particularly describe the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the gig-mill embodying my invention; Fig. 2, a plan of the working-rollers; Fig. 3, a vertical transverse section of the drum carrying the rollers; Figs. 4 and 5, a partial front elevation and a



partial vertical section, respectively, of a machine, showing a modification of certain features of my invention; Fig. 6, an elevation of a machine embodying still another modification; Fig. 6<sup>a</sup>, a detail thereof, and Fig. 7 a vertical transverse section of still another form of driving mechanism.

Referring now to Figs. 1, 2, and 3, it will be noted that I provide a drum A, consisting of a shaft *v* and two heads or disks *j*, and napping-rolls having journals turning in bearings of the heads. The drum may carry any desired number of working or teasing rollers—in the present instance, fourteen, of which seven, marked T', work against the nap and seven, marked T<sup>2</sup>, work with the nap. The drum A derives the requisite action to feed forward the cloth to be treated by any suitable means—in the present instance, as shown in Fig. 1, from pulley C<sup>3</sup>, which may be on the driving-shaft, by a crossed belt *c*<sup>3</sup>, passing around said pulley C<sup>3</sup> to the pulley C<sup>4</sup> on the shaft *a* of the drum A. On the shaft C, driven by gears *s*<sup>2</sup>-*s*<sup>3</sup> (shown by dotted lines in Fig. 1) from the shaft of the pulley C<sup>3</sup>, are mounted the two pulleys C' and C<sup>2</sup>, of different diameters, for a purpose presently to be described.

The pulley C' carries the crossed belt *c*', which runs thence over the pulleys B' of the rollers T', which work against the nap. The smaller pulley C<sup>2</sup> carries the uncrossed belt *c*<sup>2</sup>, which runs over the pulleys B<sup>2</sup> of the rollers T<sup>2</sup>, which work with the nap and over the pulley C<sup>x</sup>.

The arrangement of the pulleys B' and B<sup>2</sup> and the rollers T' and T<sup>2</sup> will best be understood from Fig. 2, where it will be seen that the said pulleys B' and B<sup>2</sup> are equal in diameter to the rollers T' and T<sup>2</sup>. It will also be noted that the pulleys B' are within the frame of the drum and the pulleys B<sup>2</sup> are in the usual manner arranged outside the frame.

It follows from the fact that the diameters of the pulleys B' and B<sup>2</sup> are equal to those of the rollers T' and T<sup>2</sup> that when the shaft C is stopped the backward development of the card-rollers T' and T<sup>2</sup> will be exactly equal to the forward development of the drum—that is, they will not act on the cloth. This is the minimum of effect.

When the shaft C is driven in the direction of the arrow 1 in Fig. 1, the backward motion of the rollers T', by virtue of the crossed belt *c*', will be accelerated and the rollers T<sup>2</sup>, by virtue of the uncrossed belt *c*<sup>2</sup>, will have their backward motion diminished. The various speeds of the shaft may be produced by any known means.

It will be seen by referring to Fig. 1 that the driving-pulley C' for actuating the cross-belt *c*' and rollers T', that act against the nap, is larger than the driving-pulley C<sup>2</sup>, actuating the belt *c*<sup>2</sup> and rollers T<sup>2</sup>, working with the nap. The object of this arrangement is to compensate for the onward travel of the fabric, which diminishes the action or effect

of the rollers that work with the nap and increases such action or effect of the rollers that work against the nap. On the same shaft with pulley C<sup>x</sup> is a pulley C<sup>5</sup> of smaller diameter and a larger pulley C<sup>x</sup>, from which a belt *c*<sup>x</sup> passes to the pulley C<sup>x</sup>, on whose shaft is a smaller pulley C<sup>6</sup>. The pulleys C<sup>5</sup> and C<sup>6</sup>, in conjunction with the drum A, act to slowly feed forward the cloth D, which is guided in its movements by a series of idlers I and travels in the direction indicated by the arrows 2.

Where teasing-rollers in two sets working in opposite directions are employed, it becomes necessary to provide two strippers, one for each set of teasing-rollers. In the construction illustrated in Figs. 1, 2, and 3 I provide a rotary exterior stripper F of the old construction and an interior stripper H of novel construction. In order to enable each stripper to act on its series of teasing-rollers and not interfere with the other set, the rollers T' are placed at a greater distance from the center of drum A than the teasing-rollers T<sup>2</sup>. The former are thus acted upon only by the exterior stripper F, deriving its rotary motion through a belt *f*, acting on a pulley F' and running thence over a pulley on the drum A.

The rollers T<sup>2</sup> are stripped by the interior stripper H, which consists, essentially, of a card-plate having straight teeth, whose ends lie in a curve adapted to the path described by the rollers T<sup>2</sup>. The said stripper H is attached to a hanger H<sup>3</sup>, depending loosely from the shaft of the drum A, and may be adjusted in height by means of the binding-nuts *a'* *a'* on its shank *a*<sup>2</sup>, as shown. Instead of the card-plate a depending brush may be employed. The interior stripper is held in proper position by its weight, and as the rollers T<sup>2</sup> which act with the nap, successively come into contact with the stripper and are cleaned the flock or waste withdrawn from the cards of the teasing-rollers falls below the drum through the spaces between the rollers.

Various modifications may be effected without departing from the spirit and nature of my invention. For example, instead of having the rollers which work with the nap alternate with those which work against the nap I may place two or three or more rollers working with the nap between two working against the nap, and vice versa, the particular arrangement depending upon the nature of the fabric to be treated. Again, it may be useful in some cases to actuate the oppositely-revolving working rollers by belts which do not run over pulleys mounted on the same shaft. The devices illustrated in Figs. 6 and 6<sup>a</sup> are instances of such a construction. In the arrangement illustrated in Figs. 6 and 6<sup>a</sup> two shafts C C are employed, one for actuating the belt *c*<sup>2</sup>, operating the rollers T<sup>2</sup>, working with the nap, and the other the belt *c*', operating the rollers T', working against the nap. The two shafts are connected by two toothed



wheels  $x$   $x'$ , which are removably mounted upon the shafts for the purpose of interchangeability to vary the relative speed of the two shafts and for removability to cause one of the shafts to stop when desired.

If desired, there may be two belts for each set of napping-rolls, so arranged at opposite ends of the drum that there is always at least one belt operating on such rolls. Thus these two belts  $c'$   $c^3$ , Fig. 6, perform the same office; but as one belt passes to the right and the other to the left of the guide-pulley M one of the pulleys B' at one end or the other of a roll passing from beneath drum M' to beneath drum M<sup>2</sup> will be in contact with a belt. In like manner the two belts  $c^2$   $c^4$ , differently arranged at opposite ends of the drum, as indicated by dotted lines, serve to insure a contact of one pulley or the other of pulleys B<sup>2</sup> of each roll with one of the belts at all times. This arrangement is more expensive than that first described, but it offers several advantages. It admits of making the operation of teasing against the nap independent of teasing with the nap.

When one of the toothed wheels—say the wheel  $x'$ —is removed, which may be done by slipping it from the shaft to which it is secured, as by a set-screw  $t^3$ , the action of the one set of teasing-rollers T' immediately ceases, the other set T<sup>2</sup> only, which is actuated from the pulley C<sup>2</sup>, connected with the source of power, revolving. This is of advantage for certain fabrics. Motion is imparted from the shaft of the pulley C<sup>3</sup> through the medium of a pinion  $y^2$  of said shaft gearing with a toothed wheel  $v^3$  on the shaft of the pulley C<sup>2</sup>, as indicated by dotted lines in Fig. 6. When the toothed wheels are exchanged for others of different relative diameters, the working energy against the nap is modified in its relation to the working energy with the nap. This is also a very useful feature in treating certain classes of fabrics. The two shafts C C thus offer greater facility in the regulation of the machine, especially for manufacturers who produce goods of different kinds. Other known means may be employed instead of the toothed wheels to connect the shafts C C.

In the arrangement illustrated in Fig. 7, and which is useful for some purposes, the outer set of working or card rollers T', which have been described as those working against the nap, are driven by a fixed strap C'  $c'$ , one end of which is attached to the frame and the other end provided with a screw and nut C<sup>8</sup>, whereby its tension is regulated. It is necessary in order to cause these card or working rollers to work against the nap to make the diameter of their pulleys B' greater than that of the rollers themselves, and the difference should be in proportion to the forward speed of the fabric. Thus it will be understood that if the fabric is required to advance thirty-six feet per minute the rollers should turn backward the amount that the drum turns

forward less thirty-six feet. The other rollers T<sup>2</sup>, which work with the nap, are driven in the way first described by a belt  $c^2$ . It will be noted, also, that in this modification I have shown the card or working rollers T' as provided with straight teeth, so that they will act only as drawing-rollers for maintaining and regulating the tension of the fabric for the other working or teasing rollers. This modification is useful when the goods do not require simultaneous teasing in two directions.

It will be noted that the term "working" or "card" rollers wherever employed in this specification and claims is not confined to teasing-rollers, although it includes them, and includes such drawing-rollers as just described. Instead of being fitted with cards having straight teeth, these rollers T' may be covered with plush, emery, or other material to which the fabric has a tendency to adhere.

In Figs. 4 and 5 I show another form of internal stripper, which is adapted to fabrics that lose much flock in the teasing operation, and which consequently require a more energetic stripping device. It will be observed that I here employ a circular rotary stripper H', similar to the external stripper, and which is loosely suspended, like the stripper-plate H, (shown in Figs. 1, 3, and 7,) before described. A toothed wheel  $y$ , keyed on shaft  $v$  of drum A, meshing with the pinion  $h$ , keyed to the shaft of the rotary stripper H', which is kept in its downward position by its own weight, imparts the necessary rotary motion to the stripper. The cloth can be made to entirely or partially surround the drum A, according as it is or is not carried over the guide-drum I.

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

1. In a gig-mill, the combination of a drum with one series of working or card rollers mounted on said drum and having independent rotary movement in one direction and another series of working or card rollers having independent movement in the opposite direction and means for operating the two series of rollers, substantially as described.

2. In a gig-mill, the combination, with a drum, of a series of rotary teasing-rollers mounted on the same and working with the nap, and a second series of teasing-rollers also mounted on the drum and working against the nap, and means for operating the two series of rollers, all substantially as described.

3. In a gig-mill, the combination of a drum and two series of alternating teasing-rollers mounted on the drum, one series working with the nap and the other series working against the nap, and means for operating said rollers, all substantially as described.

4. The combination of a drum, two sets of napping-rolls carried thereby, and means for turning one set at a different speed from the other, substantially as described.

5. The combination of a drum, two sets of



napping-rolls carried thereby, with their teeth set in different directions, and means for turning those against the nap at a greater speed than those set with the nap, substantially as described.

6. The combination of a drum, two series of napping-rollers carried thereby, with teeth to act with and against the nap, and two sets of roller-actuating devices constructed to drive the rollers that act against the nap at the greatest speed, substantially as described.

7. In a gig-mill, a drum and two series of working rollers adapted to turn in opposite directions and mounted thereon and provided with pulleys of equal diameters with said working rollers, in combination with two pulleys, one for each series of working rollers, and two driving-belts for the pulleys, all substantially as described.

8. In a gig-mill, the combination of a drum and two series of teaseling-rollers mounted thereon and adapted to work with and against the nap, respectively, means for operating said rollers, and an external and an internal stripper, all substantially as described.

9. In a gig-mill, the combination of a drum and two series of teaseling-rollers mounted thereon and adapted to work with and against the nap, respectively, one series being mount-

ed at a greater distance from the center of the drum than the other, means for operating said rollers, and an external and an internal stripper, all substantially as and for the purpose set forth.

10. In a gig-mill, the combination of a drum carrying a series of teaseling-rollers with an internal stripper suspended from the shaft of the drum, all substantially as described.

11. In a gig-mill, the combination, with a drum carrying series of teaseling-rollers, of an internal stripper consisting of a rotary card-plate suspended from the shaft of the drum, all substantially as described.

12. In a gig-mill, the combination, with a drum carrying a series of teaseling-rollers, of an internal stripper consisting of a rotary card-plate suspended from the drum-shaft, a toothed wheel keyed to the drum-shaft, and a pinion attached to the stripper, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

NICOLAS HENRY GROSSELYN, Fils.

Witnesses:

LÉON LAMOTTE,

EDROTIN BEDUDUIN.