

(No Model.)

4 Sheets—Sheet 1.

M. TOULMIN.
COTTON GIN.

No. 362,125.

Patented May 3, 1887.

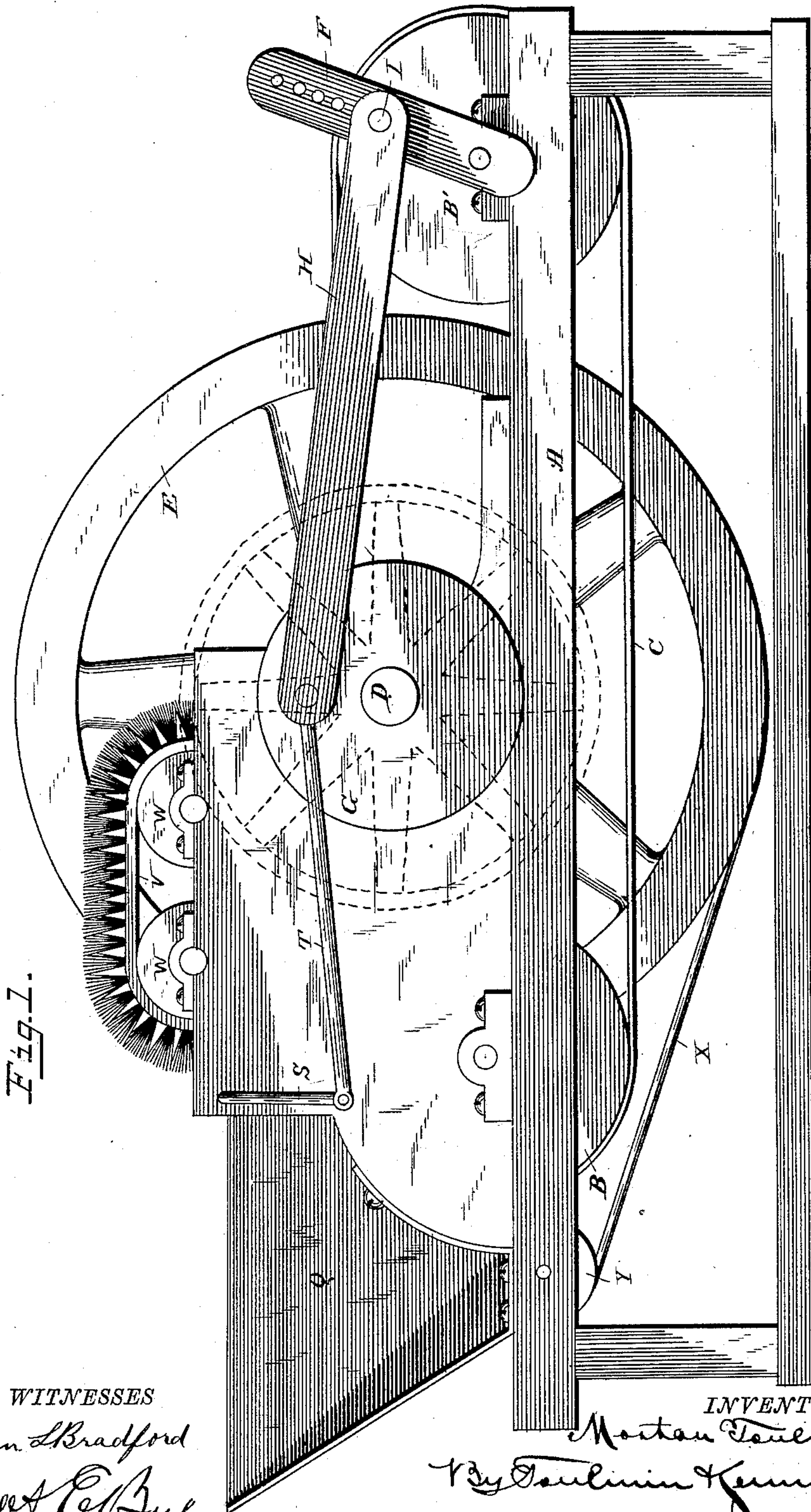


Fig. 1.

WITNESSES

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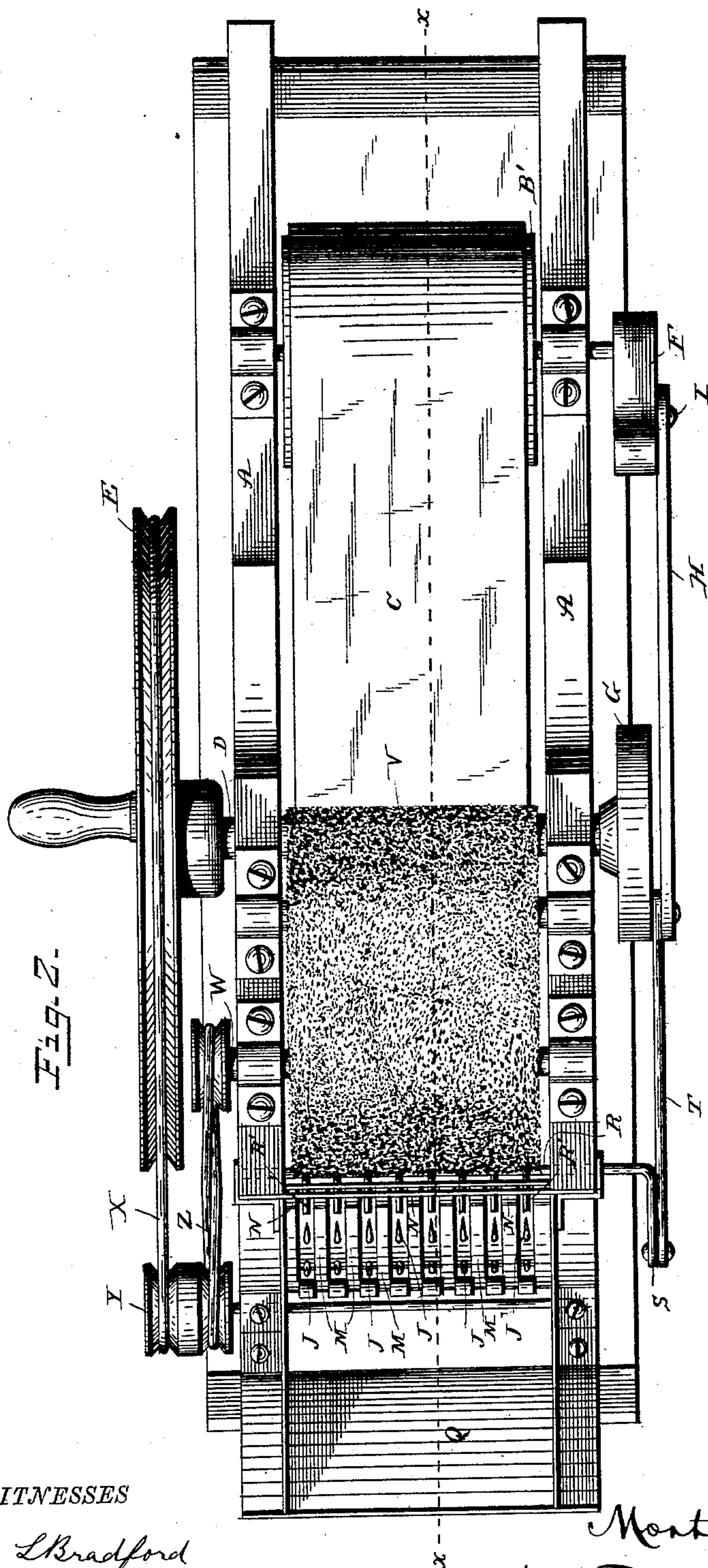
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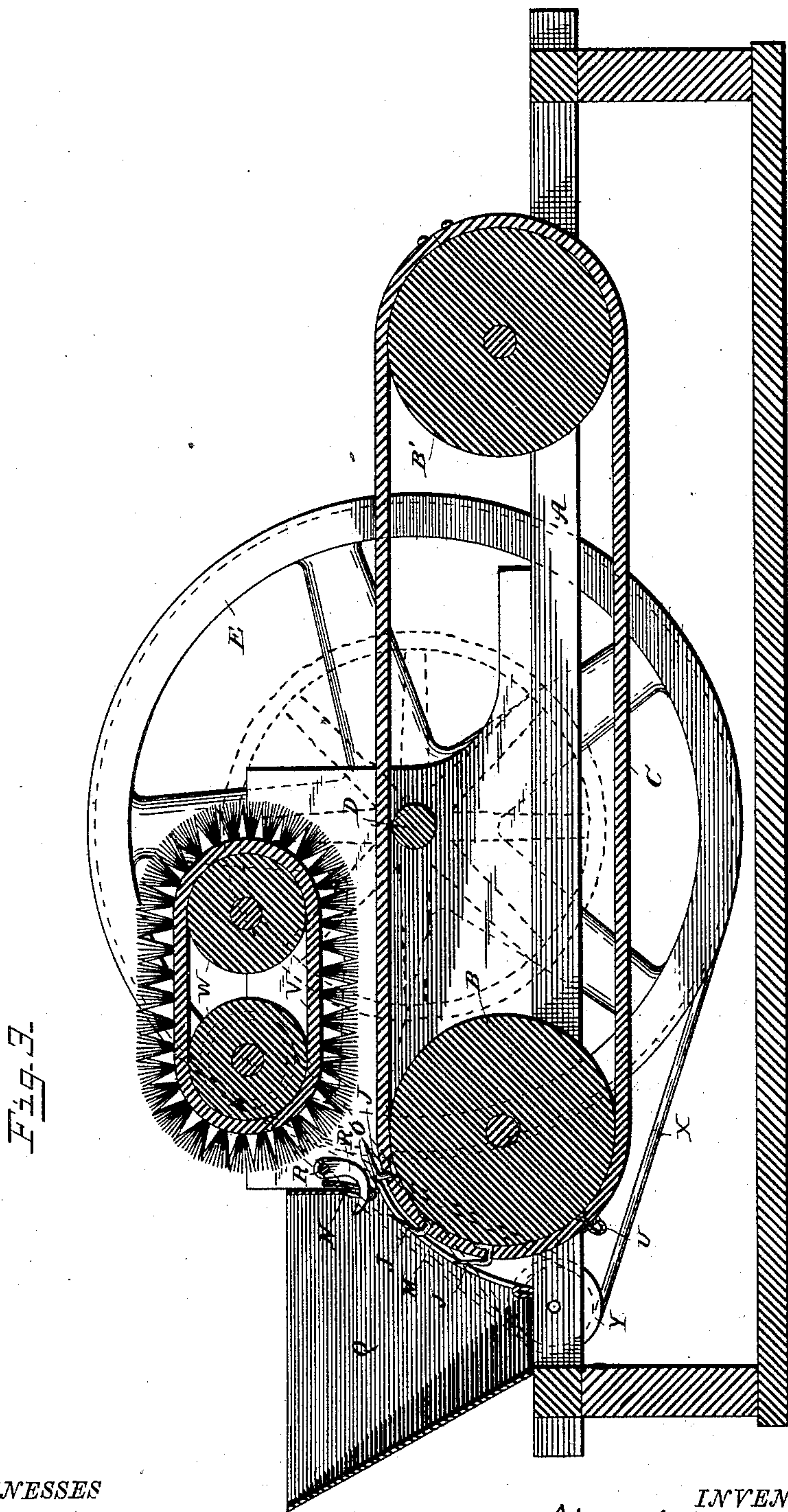
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Fig. 4.

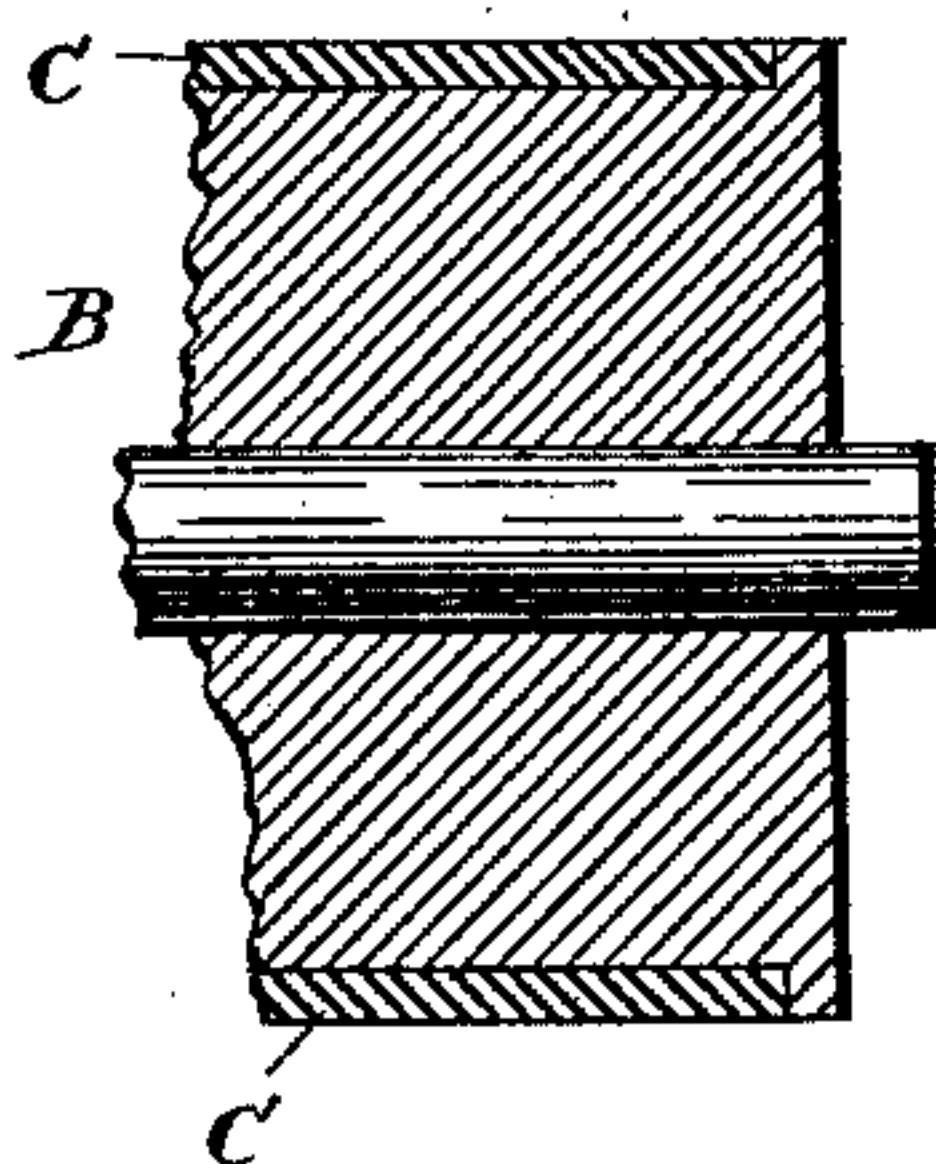


Fig. 5.

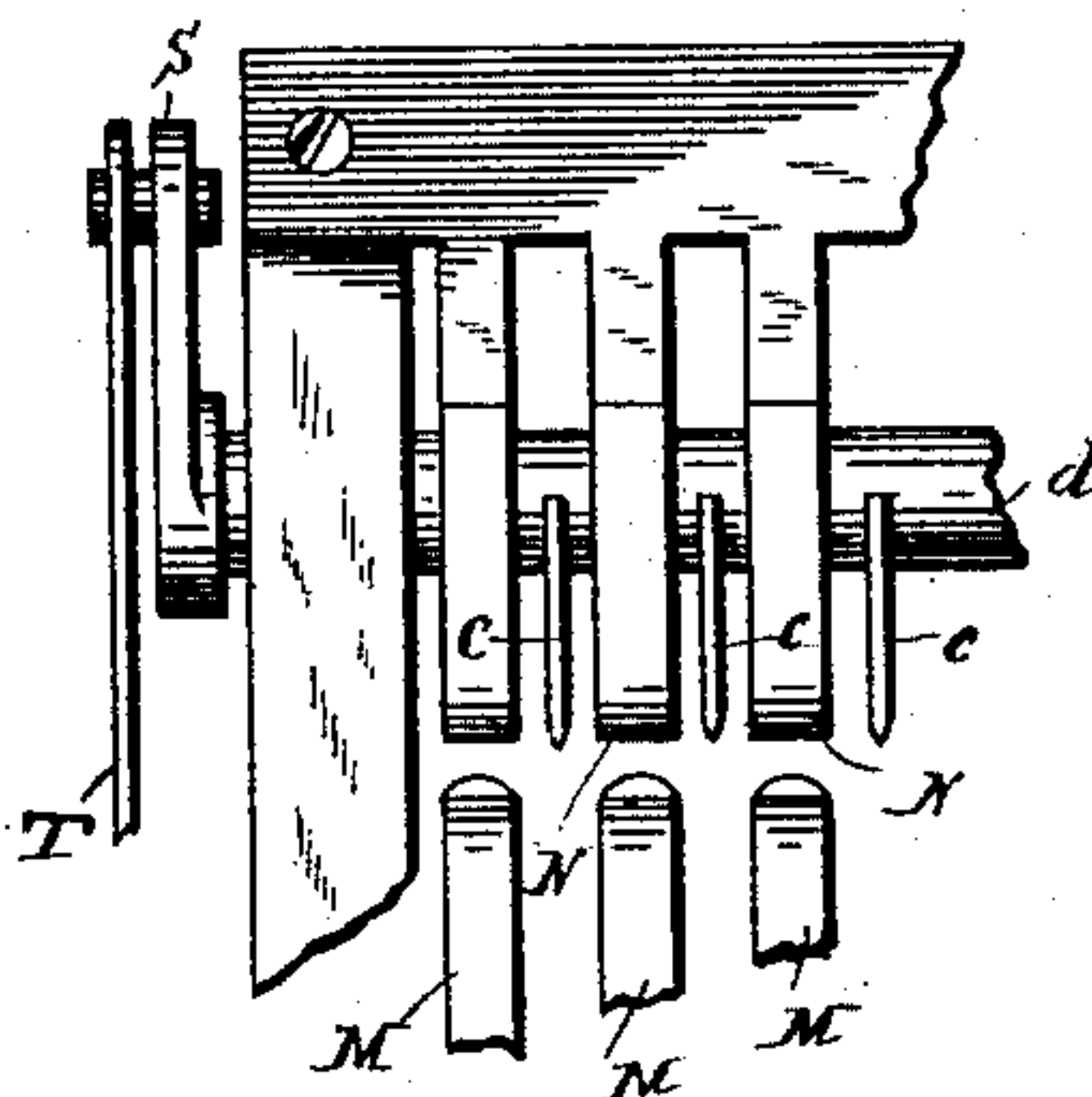


Fig. 6.

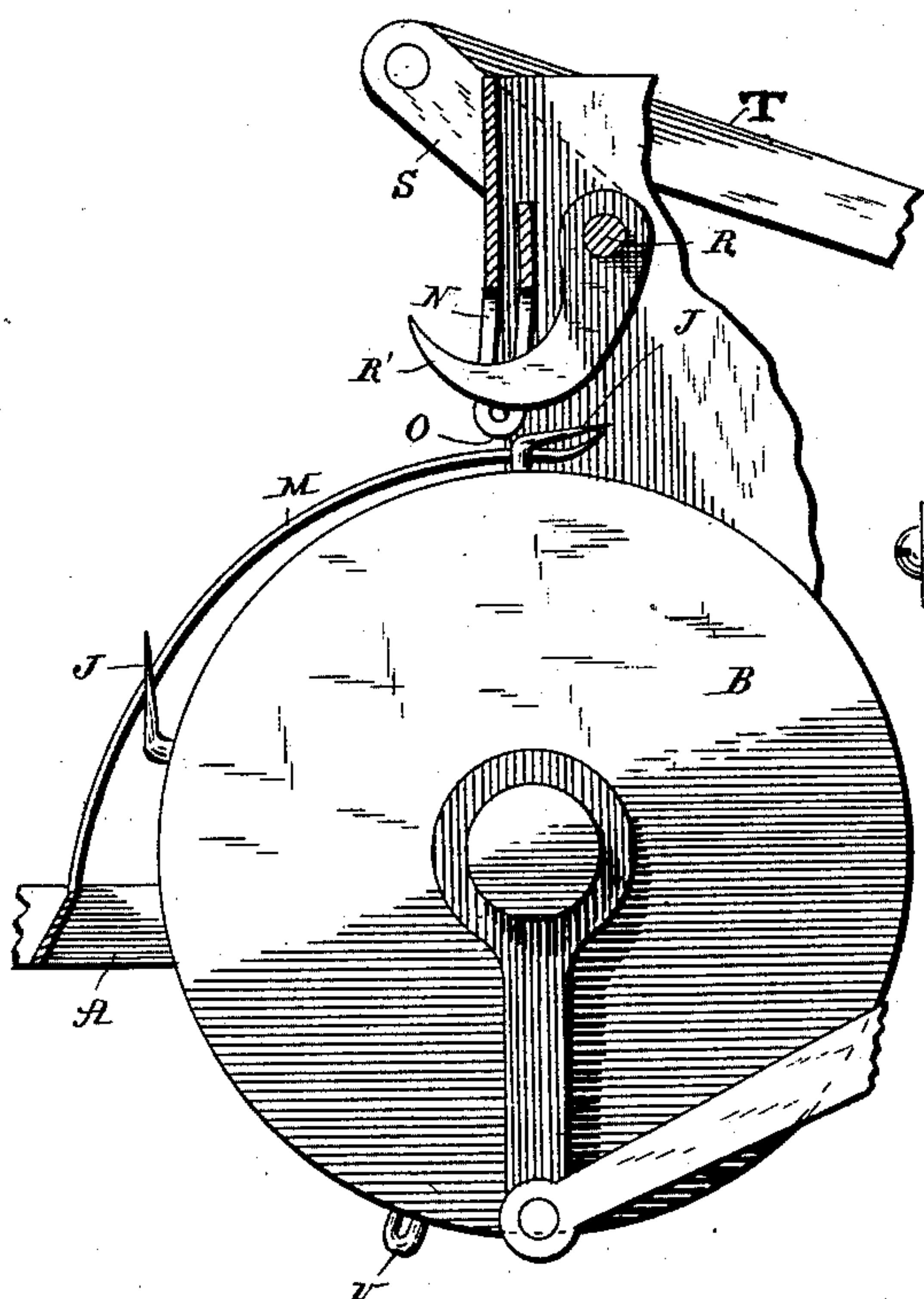


Fig-7.

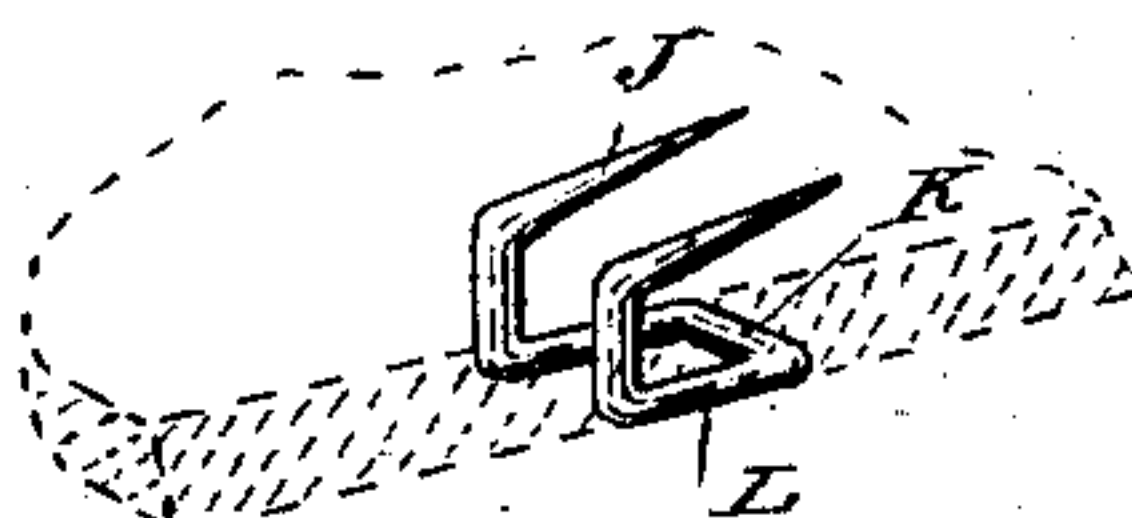
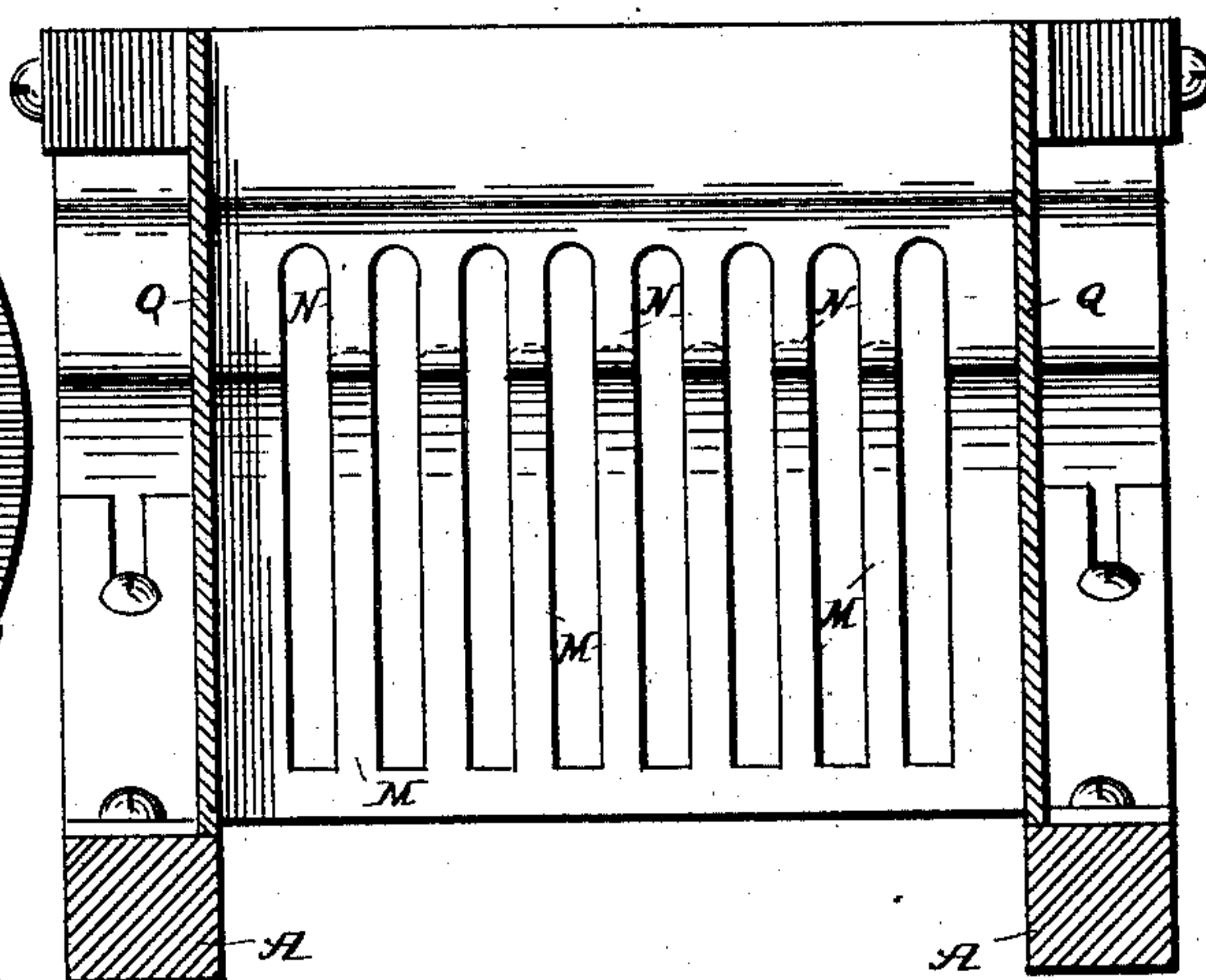


Fig. 8.



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UNITED STATES PATENT OFFICE.

MORTON TOULMIN, OF WASHINGTON, DISTRICT OF COLUMBIA.

COTTON-GIN.

SPECIFICATION forming part of Letters Patent No. 362,125, dated May 3, 1887.

Application filed April 24, 1886. Serial No. 200,059. (No model.)

To all whom it may concern:

Be it known that I, MORTON TOULMIN, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Cotton-Gins, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in cotton-gins, being designed with special reference to what is known as "long-staple" or sea-island cotton, though capable of ginning short staple cotton; and it has for its object to provide reciprocating ginning mechanism—that is to say, to so construct and mount the mechanism which does the stripping of the staple from the seed that the same shall move back and forth in contact with the cotton, the motion in one direction serving to strip the staple and that in the other serving to agitate or partially roll the seed-cotton over.

In the accompanying drawings, forming a part of this specification, and on which similar letters of reference indicate the same or corresponding features, Figure 1 represents a side elevation of my improved machine; Fig. 2, a plan view thereof; Fig. 3, a vertical longitudinal section taken on the line *xx* of Fig. 2; Fig. 4, a sectional view of the belt and a portion of one of the rollers; Fig. 5, a detached view of the agitating mechanism and the upper and lower ribs as they appear during the operation of ginning; Fig. 6, a vertical sectional view showing a modified form of the ginning mechanism proper; Fig. 7, a perspective sectional view of the belt in dotted lines and of a pair of teeth in full lines; Fig. 8, a vertical cross-sectional view of the hopper, showing the construction of the upper and lower series of ribs, and in dotted lines the extreme ends of the lower series of ribs extending below and beyond the upper series as said lower series of ribs would appear when the gin is not in operation.

The letter A designates a frame, designed to be of wood or metal and of any convenient form, upon which are mounted two rollers, B and B', constructed of metal or wood, and over these rollers passes a belt, C, preferably of leather, to one of which rollers, B', it is so connected as to insure its moving in unison with

the roller. In Fig. 3 the belt is shown held to the roller by screws; but a preferred plan to this will be hereinafter described. Upon the frame is also mounted the driving-shaft D, which carries a driving-wheel, E, and a belt-pulley, (the latter being shown in dotted lines in Figs. 1 and 3.) The roller B' is provided with a crank-arm, F, which is connected with the wheel G, mounted on the shaft D by a pitman, H. The length of the radius of the wrist-pin on the wheel G is shorter than the radius of the connecting-pin I on the arm F, whereby rotary motion imparted to the wheel G will effect a reciprocating rotary motion of the roller B', and a like movement will be given to the belt C, as also to the roller B, the latter forming a mere support for the belt. This belt is armed with a series of rows of teeth, J, secured thereto in any convenient manner, but preferably in the manner illustrated in Fig. 7, which consists in bending or forming each pair of teeth of a single piece of wire having a cross portion, K, and side portions, L, which run horizontally and then upwardly and through the belt and terminate in points, forming the teeth proper.

The object in placing the cross portions forward of the vertical portions is to give an elongated bearing of the teeth against the under side of the belt, for the purpose of preventing the points from being sprung out from the belt when undergoing the strain of stripping cotton from the seeds. These rows of teeth are preferably placed a distance apart about equal to the average length of the cotton-staple, and when the belt is undergoing a rapid reciprocating motion these teeth alternately advance forwardly and backwardly through the cotton, engaging it positively in the forward direction, and somewhat stirring or agitating it in a backward direction.

It is obvious that various forms of teeth may be employed, as well as various manners of securing them, and I do not therefore wish to be understood as confining myself to the teeth shown. An essential characteristic of the teeth, however, is that they should be tapering, smooth, and devoid of corners or sharp edges, so as to prevent cutting the fiber.

Secured to the frame in any convenient manner are a number of ribs, M, which constitute what I term the "lower series" of ribs.

These are formed, preferably, of steel, and may be cut from a plate, as shown in Fig. 8, or may be separate ribs suitably mounted. These ribs at their lower ends stand a short distance from the roller B, and are preferably curved to follow the contour of the belt on the upper portion of the roller, and stand either in slight contact with the belt or a short distance from it. These ribs are arranged so that one stands between each two teeth of a row, and they constitute a supporting-surface for that portion of the cotton which is engaged by the teeth, as also partially a means of preventing the escape of the seed with the staple.

The letter N designates the upper series of ribs, these latter being located as shown in Figs. 3, 5, and 6, and being constructed of a plate or of separate ribs, as above described.

It is preferable to round the lower ends of the upper series of ribs, to prevent the fiber from catching on them and to allow its more easily passing between them and the upper surface of the lower series of ribs. It is obvious, and I have ascertained it by experiment, that the form of these ribs, their relative arrangement, and the position of the two series with respect to each other may all be more or less varied, and therefore, while I have particularly described the ribs shown, it is not to be understood that I limit myself to their exact construction or arrangement.

The letter Q designates the hopper or feeding-receptacle arranged in front of and adjacent to the series of ribs, and into this hopper the cotton to be ginned is placed. A rock-shaft, R, is mounted in proximity to the upper series of the seed-stopping ribs, and upon it are secured a number of clearers, R', one for each space between the bars N. These clearers act to force back such cotton as accumulates or tends to pack against the upper ribs, and also act to change the position of the adjacent mass and effect a partial turning over or revolution of the seed-cotton, which assists in presenting fresh sides of the seeds to the action of the teeth J. The shaft R receives motion through the crank S and the pitman T, connecting said crank with the wrist-pin on the wheel G, and therefore moves in unison with the belt, it being preferable to have the clearers act as the teeth J return into the hopper.

As an additional means of agitating the cotton, I provide the belt beneath the teeth J with a row of staple-like projections, U, having perfectly smooth surfaces, which act against the cotton as the teeth J return toward the hopper. These projections are disposed so as to pass through the spaces between the ribs M.

In connection with the action of the teeth upon the cotton, I desire to say that I find by actual experiment that the rapid motion of the teeth through the cotton in both directions acts to loosen the staple and render it more easily stripped from the seed.

As a means of freeing the teeth of the cotton after it is drawn beyond the seed-stopping ribs, I provide an endless belt, V, carrying stiff brushes and mounted upon rollers W, whose shafts have bearings in the frame A, and to one of which rapid rotary motion is imparted. One means of imparting this motion consists of the belt X, passing over the driving-wheel E and double pulley Y, from the latter of which motion is imparted to one of the rollers W by a belt, Z. The teeth J being nearly or quite horizontal when in position to be reached by the brushes, the cotton can be easily stripped from them.

In Fig. 6 I have illustrated a modified form of ginning or stripping mechanism, which consists in securing the teeth J directly to the roller B without the belt and in imparting a rapid reciprocating motion to said roller in the manner that motion is imparted to the roller B', as illustrated in Figs. 1 and 2.

I have also discovered that the teeth J may be mounted so as to rotate continuously, as distinguished from traveling back and forth through the hopper, as set forth in my application filed August 21, 1886, Serial No. 211,505.

It will be observed that the ginning action is intermittent, and that during the intervals the cotton is being agitated in the hopper.

The advantage of intermittently acting upon the cotton to gin it and occupying the intervals by an agitating action is of great value, as the two operations or actions work peculiarly well together for the end in view, the agitating action serving to loosen and separate, as it were, the staple and render it in a loose and airy state, enabling the ginning force to accomplish its function without destruction to the integrity or natural state of the staple.

It is to be observed that the upper and lower series of ribs which act to stop the seed constitute a skeleton structure and are arranged adjacent to the stripping-teeth, and this skeleton structure is divided into two portions, called the "upper" and "lower" series of ribs.

The staple-like projections U, besides assisting in agitating the cotton, also aid in effecting the descent of the seed after the staple is stripped from them, because the projections as they move down strike against such seed as may lie in their path, and thereby start them from the hopper. It should be stated further that when the staple is stripped from the seed the latter roll or work their way down the lower series of ribs and finally drop out of the hopper.

I may construct the lower series of ribs to yield somewhat, so as to increase or decrease the size of the spaces between them and the upper series, more or less, according to the quantity of staple that may collect upon one or more of the teeth. It is also well to extend the lower series of ribs beyond the upper series, as this construction assists in preventing the passage of the seed.

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

1. In a cotton-gin, the combination, with the
5 reciprocating teeth, of a hopper and ribs constructed and arranged to hold the cotton adjacent to the teeth and to permit the teeth to engage the cotton and draw out the staple and the ribs to resist the passage of the seed.

10 2. In a cotton-gin, the combination, with the reciprocating teeth, of a hopper and ribs constructed in distinct portions and arranged with a space between the ribs of one portion and the ribs of the other portion, whereby the
15 teeth are permitted to enter and engage the cotton and draw it out and the ribs are caused to resist the passage of the seed.

3. In a cotton-gin, the combination, with the reciprocating teeth, of a hopper and a double
20 series of ribs, one of the series being yielding and one having their ends rounded, and arranged with a space between the adjacent portions of each series, whereby the teeth are permitted to enter and engage the cotton and
25 draw it out and the ribs are caused to resist the passage of the seed.

4. In a cotton-gin, the combination, with the reciprocating teeth and clearers, of a hopper and ribs constructed adjacent to the teeth to
30 permit the teeth to enter and draw out the cotton, said ribs being arranged to resist the passage of the seed.

5. In a cotton-gin, the combination, with the reciprocating teeth and clearers, of a hopper
35 and a double series of ribs arranged with a space between their adjacent portions, whereby the teeth are permitted to enter and engage the cotton and draw it between the ribs, and through the said space and the ribs are caused
40 to resist the passage of the seed.

6. In a cotton-gin, the combination, with a belt provided with teeth, rollers upon which said belt is mounted, and means to reciprocate said rollers of a hopper and the ribs con-

structed to hold the cotton adjacent to the teeth 45 and to permit the teeth to engage and draw out the staple, and arranged to resist the passage of the seed.

7. In a cotton-gin, the combination, with a belt provided with teeth, rollers upon which 50 the belt is mounted, and means to reciprocate the said rollers, of a hopper and a double series of ribs arranged with a space between their adjacent portions, one of said series of ribs being constructed to permit the teeth to enter the 55 hopper, engage the cotton, and draw out the staple, the other series being arranged to resist the passage of the seed, and the said space permitting the staple to be drawn through it.

8. In a cotton-gin, the combination, with a 6c belt provided with teeth, the rollers upon which it is mounted, mechanism to operate the rollers, and a rock-shaft provided with clearers, of the hopper and a double series of ribs, one of said series of ribs being constructed 65 to permit the teeth to enter the hopper, engage the cotton, and draw out the staple, and the other series being arranged to resist the passage of the seed.

9. In a cotton-gin, the combination, with the reciprocating rollers, of a belt mounted thereon 70 and provided with teeth.

10. In a cotton-gin, the combination, with a belt having teeth, and reciprocating rollers, of a fan-brush having its brushes engaging the 75 teeth and constructed to strip the staple from the teeth.

11. In a cotton-gin, the combination, with a hopper and a series of ribs, of a rock-shaft having a number of agitators secured thereto and 80 constructed to work through the spaces between the ribs to prevent clogging.

In testimony whereof I affix my signature in presence of two witnesses.

MORTON TOULMIN.

Witnesses:

EDWIN L. BRADFORD,
CHAS. E. HALBURN.