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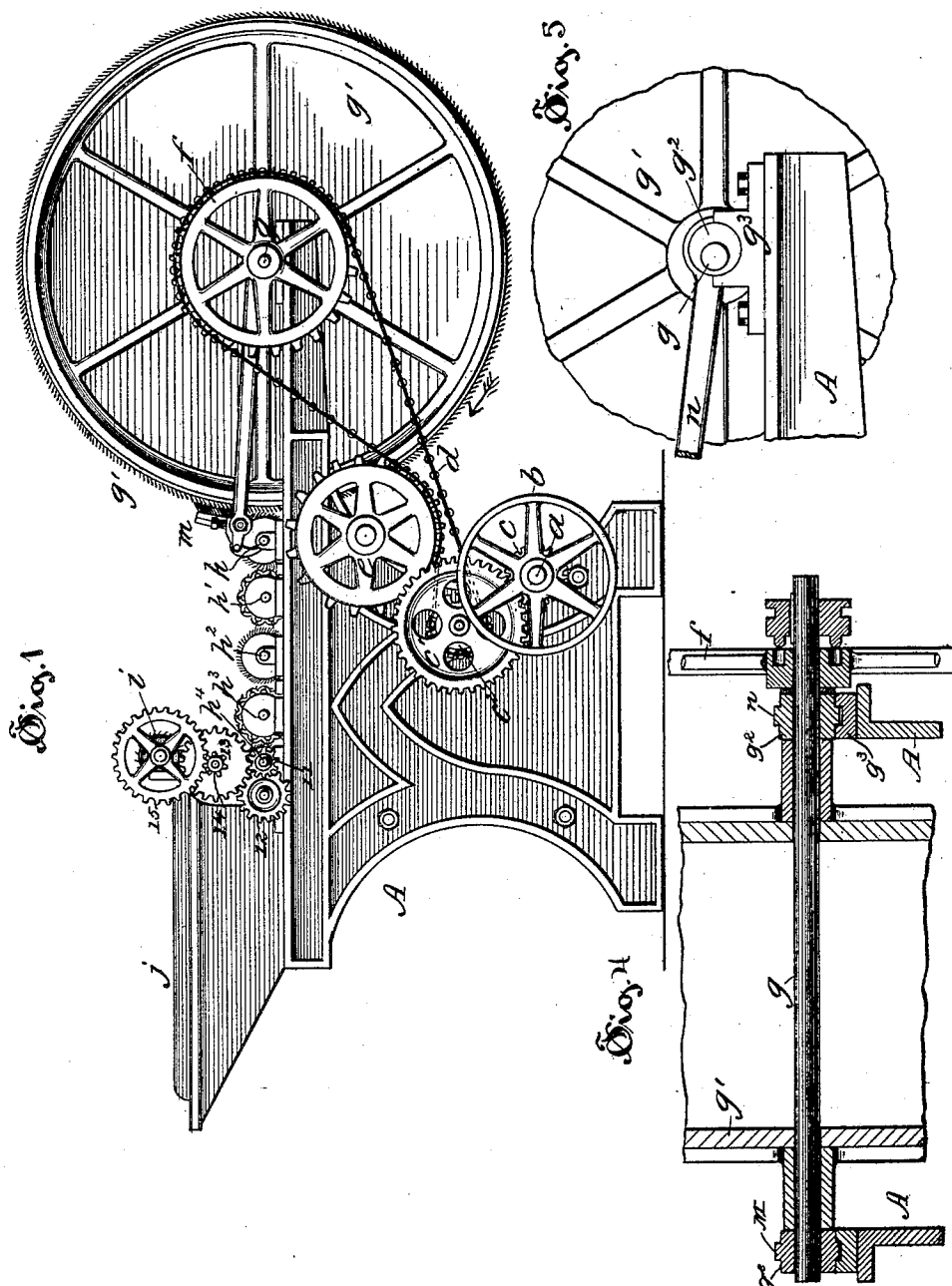
4 Sheets—Sheet 1.

W. H. JONES.

MACHINE FOR WORKING SILK AND OTHER FIBERS.

No. 462,867.

Patented Nov. 10, 1891.



Witnesses:

Harry R. Williams.
Arthur B. Jenkins.

Inventor, W

William H. Jones
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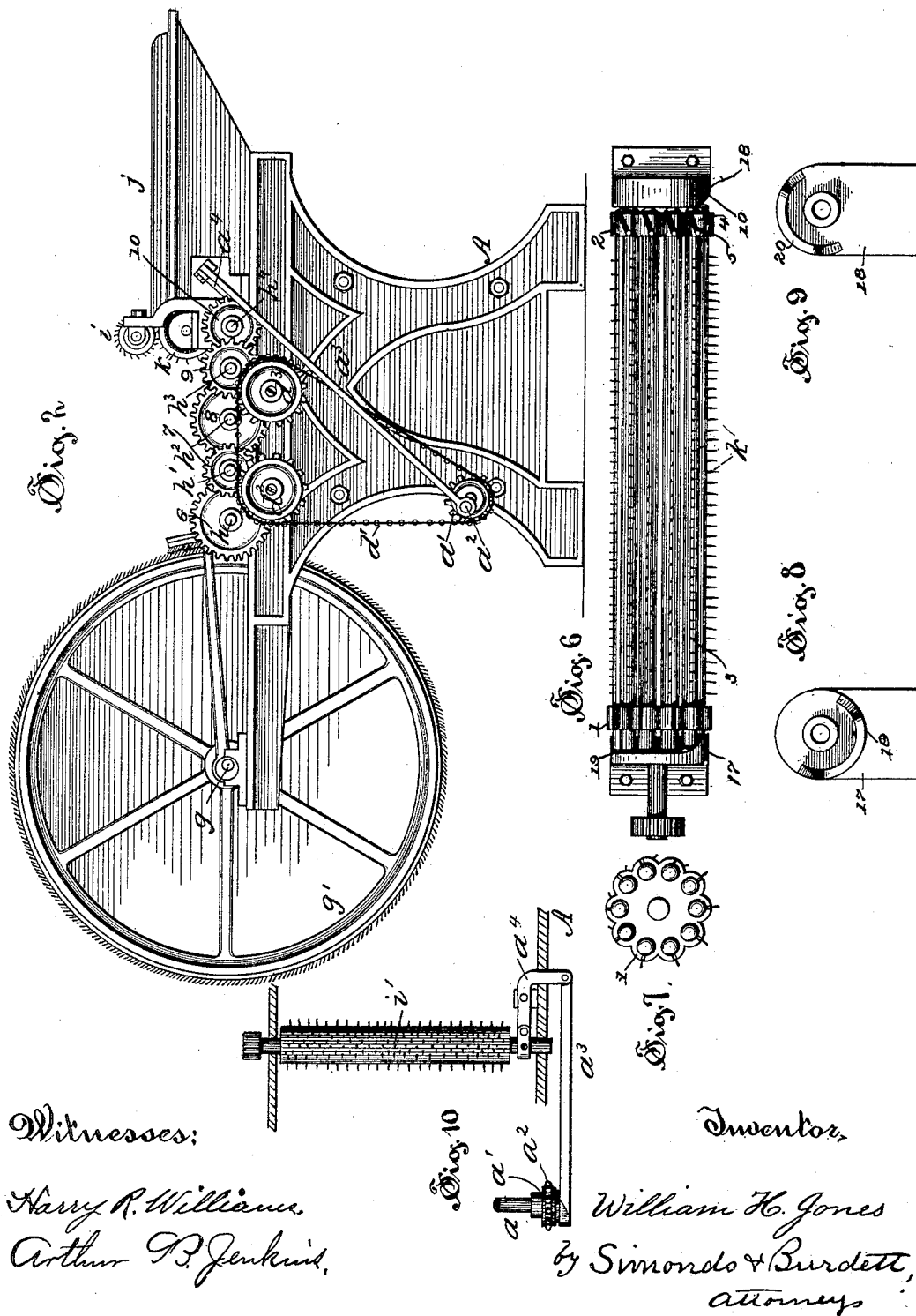
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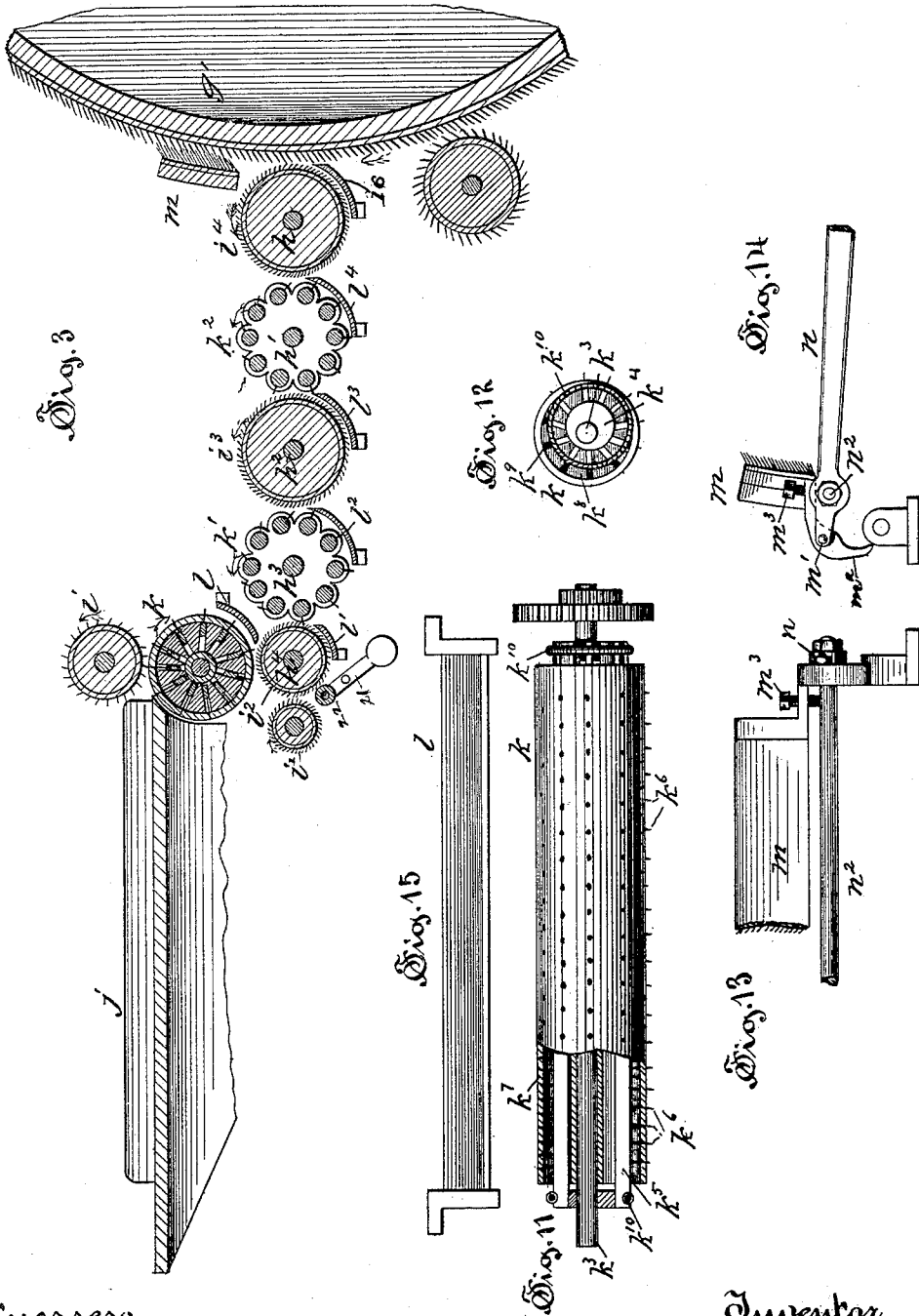
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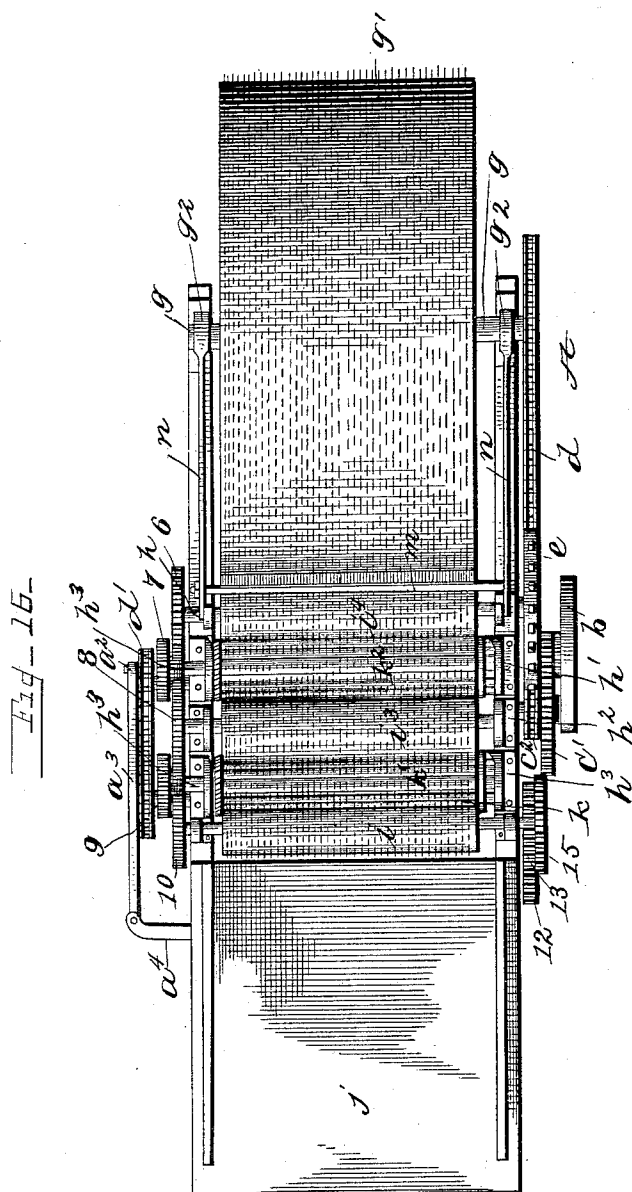
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Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM H. JONES, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE NEW ENGLAND SILK MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR WORKING SILK AND OTHER FIBERS.

SPECIFICATION forming part of Letters Patent No. 462,867, dated November 10, 1891.

Application filed January 23, 1889. Serial No. 297,321. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. JONES, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Working Silk and other Fibers, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is especially to provide a machine in which cocoons of the silk-worm can be treated in such manner as to produce a bat of comparatively long unbroken fiber in good condition for treatment in the subsequent processes of silk manufacture.

To this end my invention consists in the embodiment in a fiber-working machine of a roller having projecting from its surface a series of retractible teeth.

It further consists in the combination in such a machine, of the fiber-feed devices, the roller with retractible teeth, and the carding-cylinder.

It further consists in the combination of the fiber-feed devices, the clearing devices, and the card-cylinder.

It further consists in details of the several feed-rollers and card-cylinder, with means for suspending and adjusting the card-cylinder.

It further consists in details of the several parts of the machine and their combination, as more particularly hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a view in elevation of the machine looking from the right. Fig. 2 is a like view in elevation of the machine looking from the left. Fig. 3 is a view on enlarged scale in lengthwise vertical section through the table, the several cylinders, and a portion of the card-cylinder, illustrating the relative arrangement of the several feed devices and rollers in the machine. Fig. 4 is a view in central section through the card-cylinder, with parts broken away to show construction. Fig. 5 is a view showing the eccentric bearing of the card-cylinder. Fig. 6 is a top view of a feed-roller with retractible teeth. Fig. 7 is an end view of the same. Figs. 8 and 9 are face views of

the corresponding cams located at opposite ends of the rollers. Fig. 10 is a view of one of the feed-cylinders, showing its oscillating mechanism. Fig. 11 is a view in elevation of one of the forms of feed-cylinders, with part cut away near the end to show construction. Fig. 12 is a view in central crosswise section of a modified form of feed-cylinder. Fig. 13 is a view of the end of the clearer and of the end of the card-cylinder lever. Fig. 14 is a side view of the clearer, &c., showing the adjusting device. Fig. 15 is a front view of one of the draw-bars. Fig. 16 is a plan of the machine.

In the accompanying drawings, the letter A denotes the base or frame of the machine, preferably made of metal cast to shape and provided with bearings that support a driving-shaft *a*, fast to which is a pulley *b*, adapted to be driven by a belt from any suitable source of power. To the shaft *a* is fast a cog-wheel *c*, in mesh with a cog-wheel *c'*, fast to a shaft bearing a toothed wheel *c''*, over which passes the chain *d*, that also extends under and partly around the toothed wheel *e* and around a toothed wheel *f*, the latter being fast to the shaft *g* of the card-cylinder *g'*. The shaft *a* extends across the frame and has fast to the other end a toothed wheel *a'*, and also bears an eccentric-pin *a''*, that is connected by the rod *a'''* with the end of the bent lever *a''''*, that is pivoted to the frame A and is connected at one end to the shaft of the feed-roll *i'* and serves as a means of vibrating the said roll in its bearings. A chain *d'* extends from the wheel *a'* around the toothed wheels *d''* *d'''*, upon the shafts of which are pinions which drive the train of gears 6, 7, 8, 9, and 10 on the shafts *h*, *h'*, *h''*, *h'''*, and *h''''*, and thus revolve said shafts and the rolls supported thereon.

On the end of the shaft *h''''*, on the side of the machine opposite to the gears 6, 7, 8, 9, and 10, is a gear-wheel 11, which forms part of a train of gearing (which includes the gears 12, 13, 14, and 15) for driving the feed-cylinder *i* and roll *k'*. The several inter-meshing gears are so arranged and proportioned that the cylinder *i* turns in the same direction at adjacent points as the roll *k*, but

moves at about half the speed of the latter, and as a result of this arrangement the mass of cocoons or other fiber to be worked, that is placed upon the table *j*, is fed along by the rolls and drawn down past the draw-plate *l* and between the cylinders *i'* *i*², that are covered with card-cloth or the like material. The feed-roll *k* is of peculiar construction in that it is provided with a series of sharp-pointed teeth that are capable of being projected beyond the face of the roll or cylinder gradually and as gradually withdrawn at certain points in the path of rotary movement of the roll or cylinder. By the use of these peculiar retractible points or teeth the cocoons or fiber to be worked by the machine are fed in automatically in the proper amount and are subjected to a preliminary combing or tearing apart prior to being passed between the subsequent rolls and over draw-bars in the progress of the mass of fibers through the machine. This cylinder and its method of operation form important features of my invention. After the material has passed the guard or draw-bar *l* it is fed along by the cylinders *i'* *i*², the former having a vibratory motion imparted by the means already described. The mass of fibers passes around underneath the cylinder *i*², over the edge of the draw-bar *l'*, then turning downward is caught by the projecting teeth of the roll *k'* and passed up and over the edge of a draw-bar *l*², then passes downward again under the cylinder *i*³, moved along by the roughened or toothed surface thereof, and is passed over another draw-bar *l*³, and then downward under the roller *k*² and upward between this roller and the draw-bar *l*⁴ to the cylinder *i*⁴, and carried between this cylinder and the draw-bar *l*⁶, beyond which it is deposited upon the surface of the card-cylinder *g'* and passes upward beneath the clearer *m*, supported on the end of the levers *n*. The cylinder-card *g'* is mounted on a shaft, the ends of which are arranged eccentrically in the round-bearings *g*², supported in boxes *g*³ in the frame. (See Figs. 4 and 5.) When the levers *n*, which are rigidly secured to or form part of these bearings *g*², one being arranged on each side on the cylinder, are in the position shown in Fig. 1, the surface of the card is in operative position with reference to the series of rolls, cylinders, and guards making up the feed and fiber-working mechanism, and by lifting the levers and turning the bearings with them the cylinder *g'* is moved out of connection with the rest of the mechanism, so that the bat of fibers can be readily removed from the card. The inner ends of the levers *n* support the clearer *m*, that extends between them across the face of the cylinder-card *g'* on pivots *m'*, that pass through the arms *m*², extending from the clearer parallel to the levers. The lower ends of these arms rest on the frame or projections on it, while the adjusting-screws *m*³ so connect the clearer *m* and the cross-bar *n*² that the card-clothed face of the clearer may be adjusted

to the desired distance from the surface of the cylinder *g'* when the parts are in operative position, as shown in Figs. 1 and 3.

The fiber-working mechanism consists of a series of at least one roll with retractible teeth and one cylinder with a card-clothed or similar surface and the guard or drawing-bar; but several sets may be used in combination, as shown, depending on the grade of work desired.

The machine constructed as described and shown herein is particularly adapted for working silk-fibers cleaned by it from the cocoon form, and in operating on this or any other mass of fibrous material the machine picks apart from the mass the individual fibers, straightens them out, and draws them out, laying them practically in lines substantially parallel to each other and extending in the line of direction in which the fibers in the sheet or bat form move along through the machine.

The feed-rollers with retractible teeth in the within-described machine are arranged in alternation with feed-rolls that are covered with card-cloth or like projecting teeth having a fixed relation to the surface of the roll, and these rolls are so geared up and driven that the roll taking the material from the one next back of it runs at a somewhat greater speed than the latter, so that the sheet of fibers is drawn out over the edge of the guard or drawing-bar, untangling the threads of fiber from the mass or knotted form and thinning out the sheet as it passes over successive drawing-bars.

In the within-described machine two forms of feed-rolls with retractible teeth are shown, the roller *k* having the teeth arranged so as to be protruded and retracted on substantially radial lines, while the feed-rollers *k'* *k*² are made up of a series of bars supported in end disks on the shaft supporting the roller, these peripheral bars having a slight rotary movement that allows the projecting teeth to be changed in position with relation to the radial lines or rolled over, so that while they project radially in order to take the fibers from the roll next back of it they are rotated and substantially retracted by rolling, so as to let go of the sheet of fibers and permit it to be fed farther along by the next succeeding roll. It is immaterial, however, to my invention what means are employed to operate the movable teeth so as to change their position and enable them at a certain point to let go of the fiber, and by the term "retractible," as used herein, I mean to cover and include all forms of teeth that are movable with the result effected by the retractible teeth. The roller *k* has a central shaft *k*³, and loosely arranged upon it at each end is an eccentrically-arranged disk *k*⁴, and about the periphery of this disk are grouped the ends of teeth-bars *k*⁵, bearing the teeth *k*⁶, adapted to be protruded through holes in the cylindrical shell *k*⁷ of the roller. This shell is supported at op-

posite ends on the heads k^8 , fast to the shaft and provided with radial slots k^9 , in which the ends of the teeth-bars are supported and in which the said bars have a radial movement as the shaft is turned. The teeth-bars are held in contact with the surface of the eccentric or cam by means of springs or by the keepers or elastic band k^{10} , embracing the ends of the bars, as shown in Figs. 11 and 12 of the drawings.

In Figs. 6 and 7 is illustrated a feed-roller of the construction shown in rollers k' k^2 of Fig. 3. This roller consists of a shaft having mounted thereon end disks 1 2, having apertures formed thereon to receive and hold sliding and partially-rotating bars 3, having teeth or prongs which project radially outward to engage the material being acted upon. The end disk 2 has formed in it a number of transversely-inclined slots 4, in which studs 5 of the bars 3 engage and operate to give these bars a partial rotation, so as to cause the teeth to project more or less as the roll is revolved, as shown in Figs. 6 and 7.

To effect the endwise movements of the bars 3 and at the same time give them a partial rotation in their movement, I fix on the bearing-boxes of the roller blocks 17 18, having on their inner faces oppositely-arranged cam-surfaces 19 20, arranged so that the bars on the under portion of the roll are moved to throw the teeth outward, substantially as indicated in the drawings. A weighted frame 21, carrying a roller 22, is arranged under the roller h^4 for the usual purpose of directing the material under the roller at this stage of the operation.

I claim as my invention—

1. In a fiber-working machine, the combination, with the cylinder i and draw-bar l , of a feed-roller consisting of a shaft k^3 , disks loosely arranged upon said shaft eccentric therewith, toothed bars supported upon the peripheries of said disks and held by elastic keepers, and a perforated cylinder secured upon heads formed with radial slots, within which said bars have a radial movement, substantially as set forth.

2. In a fiber-working machine, in combination with a fiber-supporting table, a feed-roller having retractible teeth, means, as specified, to retract the teeth of the feed-roller, a feed-cylinder i , having its surface in position to operate in connection with that of said roller and turning at a slower speed, a guard-bar l , the vibratory roll i' , means, as specified,

to vibrate the roll, the cylinder i^2 , and the guard or drawing bar l' , and means to rotate the said rolls and cylinders, all substantially as described.

3. In combination, in a fiber-working machine, a card-cylinder g' , the feed-cylinders having card-clothing or like roughened surface, the feed-rollers with retractible teeth, the guard or drawing bars located partly underneath and behind the respective rolls, and the cylinder and roll operating mechanism, all substantially as described.

4. In a fiber-working machine, the combination, with a feed-cylinder and draw-bar, of a card-cylinder g' , rotatable bearings having the shaft of said cylinder eccentrically mounted therein, and levers fixed to and projecting from said bearings, substantially as set forth.

5. In a fiber-working machine, the combination, with the feed-cylinder i and the rolls i' , i^2 , i^3 , and i^4 , of the rolls k , k' , and k^2 and their guard or draw bars, the card-cylinder, rotatable bearings having the shaft of said cylinder eccentrically mounted therein, the levers connected to said bearings, and the clearer m , borne on and extending between the outer ends of said levers across the surface of the cylinder, substantially as set forth.

6. In a fiber-working machine, in combination with the feed-cylinders with teeth-covered surface, the rollers having retractible teeth, means for retracting the teeth of the rollers, the guard or drawing bars located in operative connection with said feed cylinders and rollers, the card-cylinder, rotatable bearings having the shaft of said card-cylinder eccentrically arranged therein, the levers secured to said bearings, and the adjustable clearer borne on and extending between the outer ends of said levers across the surface of the cylinder, and means for adjusting the clearer m , all substantially as described.

7. In a fiber-working machine, in combination with a feed-roll having a surface provided with fixed teeth, a feed-roller having retractible teeth, and mechanism for turning said feed-roller at a greater rate of speed than the first roll, and means, as specified, for retracting the teeth, as described, and the guide or drawing bar arranged between the rolls, all substantially as described.

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Witnesses:

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