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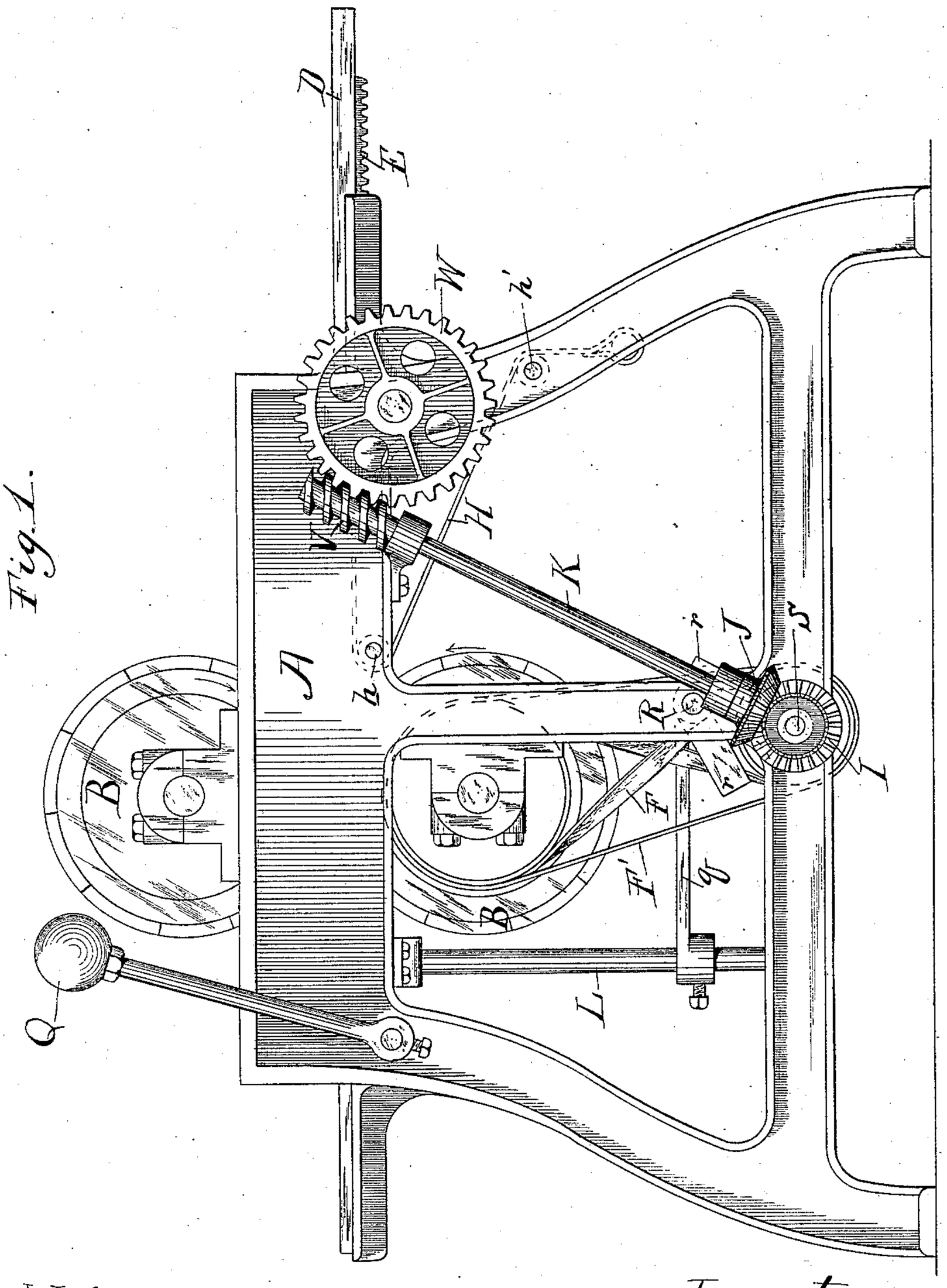
C. E. RAMUS.

HACKLING MACHINE.

No. 307,331. Patented Oct. 28, 1884.

Fig. 1.



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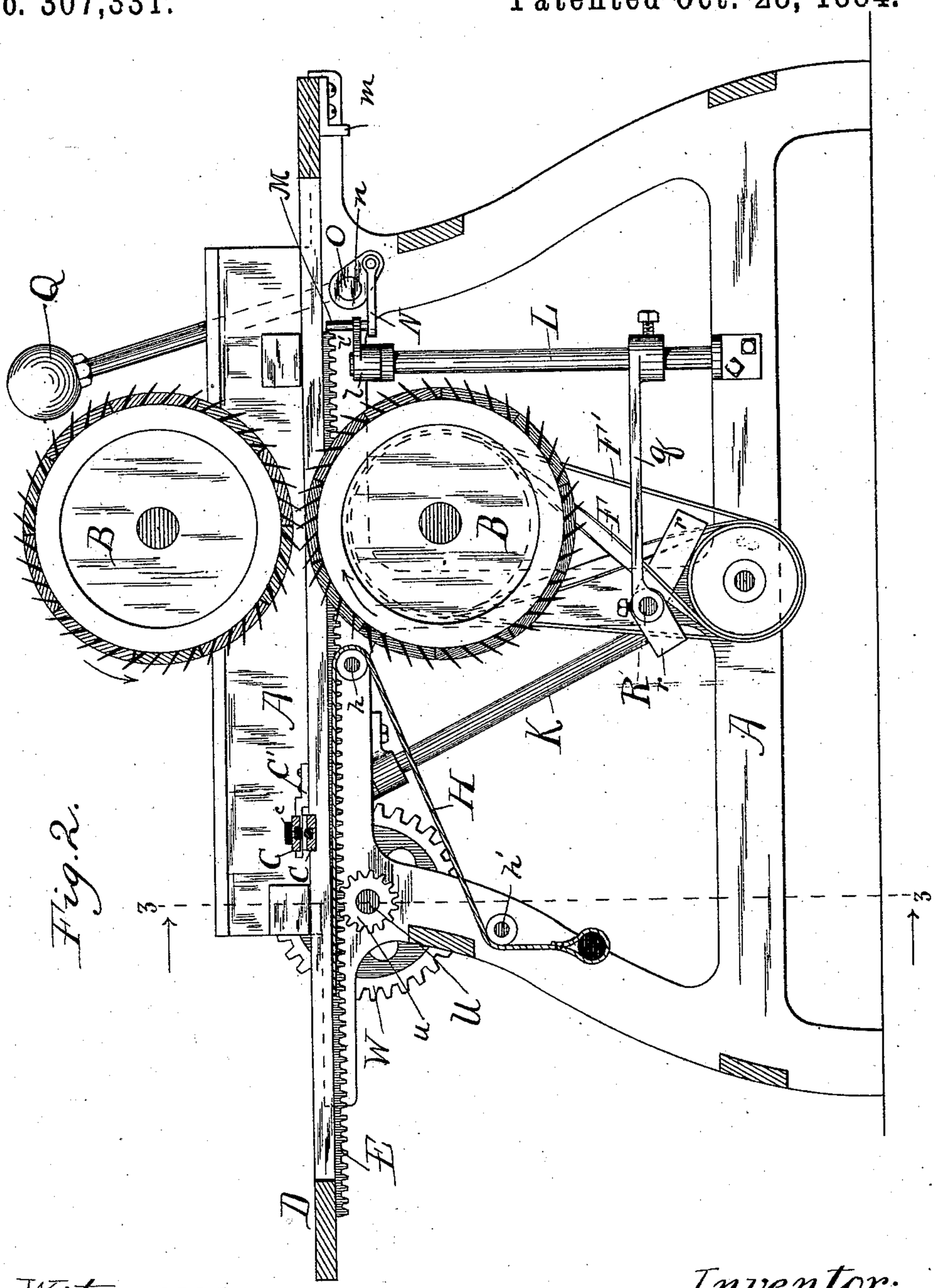

Fig. 2.

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Fig. 3.

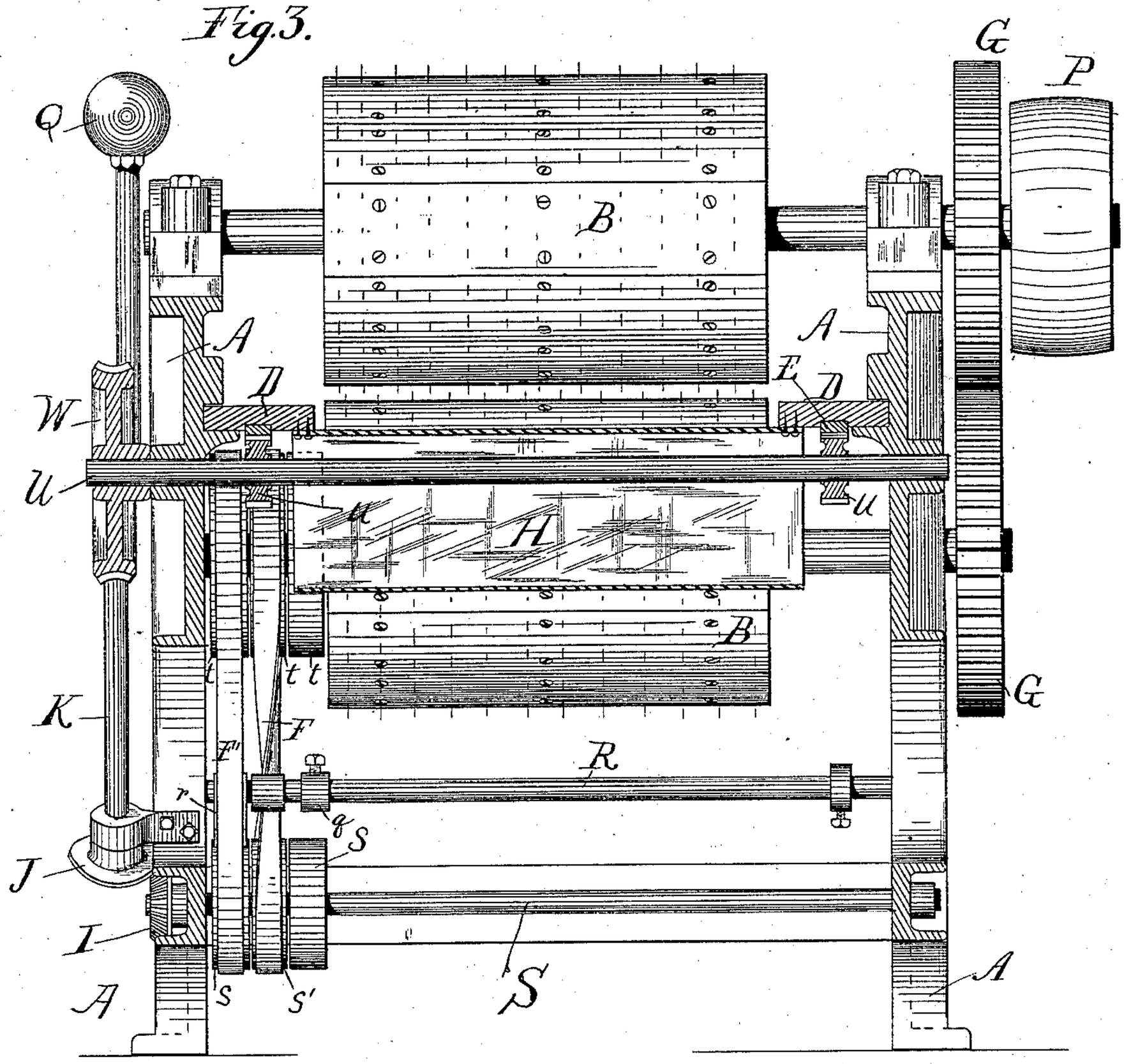
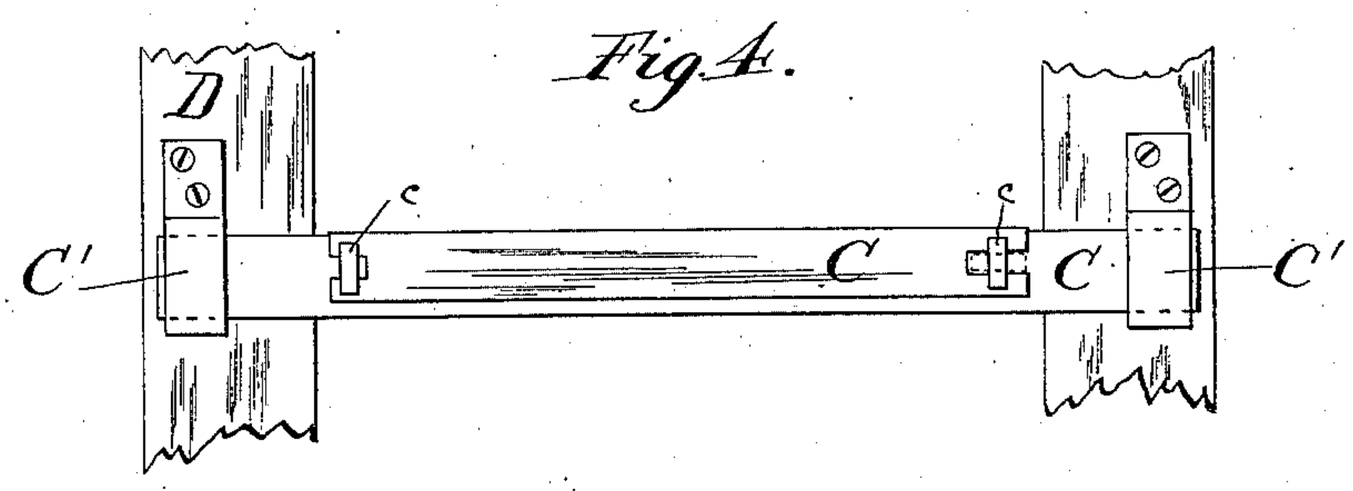


Fig. 4.



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(No Model.) 4 Sheets—Sheet 4.

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HACKLING MACHINE.

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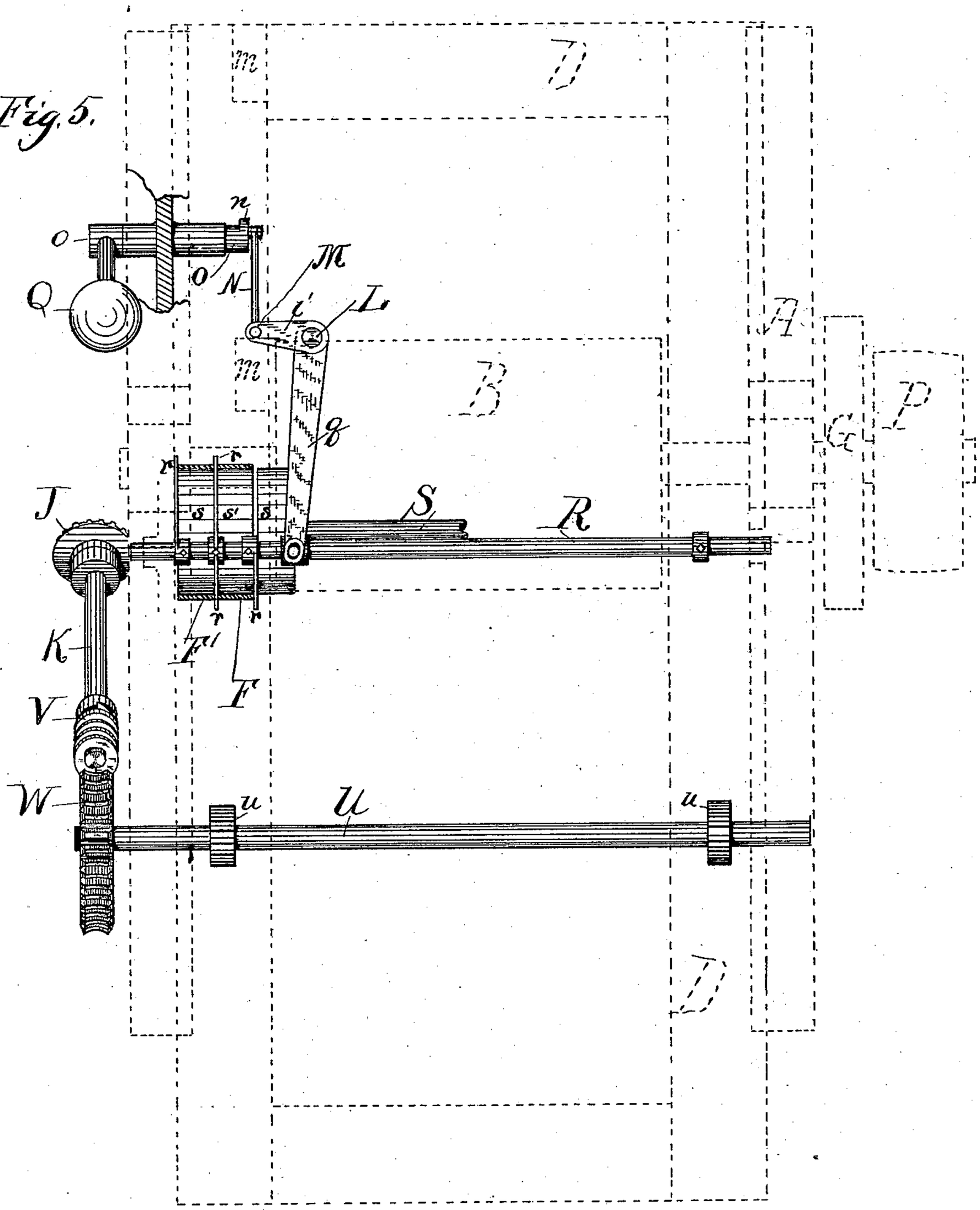
Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES E. RAMUS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF HARTFORD, CONNECTICUT.

HACKLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 307,331, dated October 28, 1884.

Application filed October 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. RAMUS, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hackling-Machines, of which the following is a specification.

The chief feature of my invention is the construction of a hackling-machine capable of separating the fibers of tender plants—such as the palmetto—rapidly and without injuring the fiber.

An important feature of the invention is the placing of the teeth at such an angle to the material operated upon that the teeth effectually clear themselves from the tow or wool of the plant.

In the accompanying drawings, Figure 1 is a side elevation of my hackling-machine. Fig. 2 is a central longitudinal sectional elevation of the machine. Fig. 3 is an end elevation of the machine, partly in section on line 3 3 of Fig. 2, looking in the direction indicated by the arrows of said figure. Fig. 4 is a detail view of the clamping-jaws hereinafter described; and Fig. 5 is a plan view of the devices for shifting the belt and causing the reciprocation of the feeding-frame.

In the drawings, A is a cast-iron frame-work, which supports the operating parts. Mounted on horizontal shafts carried in suitable boxing on such frame are two drums, B B. The frames of these drums may be of wood or cast-iron, and the outsides formed of staves or lags fastened to the frame-work in any suitable manner. These staves or lags are provided with projecting teeth, formed, preferably, of pointed wire. The teeth extend from the drums at an angle of, say, sixty degrees from the perpendicular, and in a direction opposite to the direction of motion of the drums. They may cover the entire surface or only each alternate stave; and their length is to be somewhat regulated by the character of the material to be operated upon. The drums are set close enough together so that their teeth cross each other at the point where they touch the entering material. At this point the teeth of both drums point toward the front of the machine. The teeth being set on the drums at an angle from the perpendicular opposite the direction of motion, as before described, they enter the material with a draw cut, instead of a piercing action. From this it results that the teeth clear themselves effectually from the tow or wool of the plant, thus avoiding all necessity for employing supplementary cleaning devices. The drums are geared to revolve at the same or practically the same rate of speed. I have found this to be of the first importance in operating upon tender fibrous plants, as the revolution of the two drums at different rates of speed breaks and destroys the fiber of such plants. The material to be operated upon is held by two jaws, C C, Fig. 4. The faces of these jaws may be lined with rubber to increase their hold on the material. The lower jaw of the pair has its ends secured under brackets C′ C′ on the feeding-frame, and carries T-bolts on its upper side, (marked *c c.*) The upper jaw is shorter than the lower, and has slotted ends which slip over the bolts *c c*, and is secured by the heads on such bolts when turned across said slots. When made in this manner, the jaws may be readily removed when the material they hold is hackled and new ones put in their places. A horizontal feeding-frame, D, is carried by flanges on the insides of the side rails of the frame. This frame D is about the length of the frame-work A. On the under sides of the side rails of this frame are racks E E, by which, through the pinions hereinafter described, the frame D is advanced and withdrawn to feed the material. Each of the drums B B is mounted on a shaft carried in boxing on the frame. Each of these shafts carries at one end a gear-wheel, G G, and the upper one has outside of the gear-wheel a band-pulley, P, which may be connected to the main shaft by a belt, whereby said pulley is revolved. When the pulley P is rotated, the drums are revolved, but in opposite directions. When the material is being fed in between the drums, the upper drum revolves in the direction indicated by the arrow, Fig. 2. A transverse shaft, S, extending across the frame of the machine near the floor, carries three band-pulleys, two of which, *s s*, are keyed, and the middle one, *s′*, is an idle-pul-

ley. The shaft of the lower drum also carries three band-pulleys, *t t t*. These pulleys are provided with a cross-belt, F, and a straight belt, F′. A shift-rod, R, having belt-prongs *r r*, shifts the belts F F′ at the proper time. Shaft S is carried through the frame-work at one side, and is provided at its extremity with a bevel gear-wheel, I, which meshes into the cogs of a pinion, J, on the lower end of a shaft, K, carried in suitable boxing on the outside of the frame-work. The upper end of shaft K has a worm or thread, V, cut on it, which turns a worm-wheel, W, mounted on the end of a counter-shaft, U, carried in suitable boxing across the front end of the frame-work. This shaft U carries two pinions, *u u*, which mesh into the teeth of the racks E E of frame D, and reciprocate said frame. When pulley P is connected with the main shaft, or otherwise revolved, it rotates the upper drum, and through the gear-wheels G G also causes the lower drum to rotate, but in the opposite direction. When the material is being fed between the drums, the straight band F′ is on the operating-pulleys, while band F is on the idler. The rotation of shaft S causes the revolving of shaft K, and through the worm-gear and racks and pinions above described the frame D is advanced, and the material is fed between the drums. When the jaws are carried up to the drums and the material is ready to be withdrawn, a dog on the frame is made to operate an automatic shifting device, hereinafter described, whereby the belts are shifted and the table carried back until it engages with another dog on the frame, when the belts are again shifted and the table again advances. The length of the travel of the table may be adjusted to the length of the material by the setting of the dogs, which, through the shifting device, shift the belts, and cause the table to travel the one way or the other. If not sufficiently hackled, the material may be passed again through the machine. When finished, the jaws C C can be removed by simply pulling them from under their brackets, and others holding material slipped into their place.

The devices for automatically shifting the belts are shown in Fig. 2 of the drawings. An upright, L, has on its upper end a sleeve, *l*, carrying a bracket, *l′*.

Inserted through the end of bracket *l′* is a pin, M, extending upward so as to engage with dogs *m m* on frame D. A link, N, has one of its ends fitted loosely on the lower end of pin M, and the other to a cam or disk, *n*, which latter is attached to a crank-pin, O, carried in boxing on the frame. Pin O carries on its outer end an upright arm, on the extremity of which is a weight, Q. An arm, *q*, connects upright L and shift-rod R. When the pin M engages with either of the dogs *m* on the table, it turns upright L, and through arm *q* throws shift-rod R and shifts the belt.

To prevent the belts from dragging on the pulleys while being shifted, I have provided the weight Q and the means for operating it above described. When the weight passes the point over the center of the cam, it assists to throw the shift-rod and insures the shifting of the belt.

To guide the free ends of the material to the teeth of the drums, I have arranged a canvas belt or table, H, under the frame D and jaws C C. This belt or canvas extends across under the frame from side to side. One end of it is fastened to the frame D just behind the jaws. The other end is passed over a roller, *h*, set in the frame-work A near the drums, and is thence carried back over a second roller, *h′*, set in the front end of the frame. The free end may be weighted. As the table is advanced, the weight acts upon canvas H, taking up the slack and keeping it tightly stretched over the rollers.

It is obvious that many of the details of construction above described may be supplanted by equivalent devices; and I do not therefore limit myself to the precise construction and arrangement of parts as here shown.

In practice the teeth should be set more thickly on the drums than they are shown in Fig. 3. Their number, length, and the angle at which they are set will be regulated by the character of the material to be operated upon; but I prefer to set them at an angle of about sixty degrees.

I claim—

1. In a hackling-machine, the combination, with suitable feeding devices, of two oppositely-revolving drums geared to revolve at practically the same rate of speed, and having teeth extending from their peripheries at an angle to the perpendicular opposite to the direction of motion, whereby said teeth operate on the material with a drawing cut, substantially as described.

2. In a hackling-machine, the combination, with the oppositely-revolving drums having teeth extending from their peripheries at an angle to the perpendicular opposite to the direction of motion, of a reciprocating feeding-frame and devices for causing said frame to reciprocate, substantially as described.

3. In a hackling-machine, the combination, with drums having teeth extending from their peripheries at an angle to the perpendicular opposite to the direction of motion, and a reciprocating feeding-frame, of a flexible belt for guiding and supporting the free ends of the material to be operated upon, substantially as described, and for the purpose set forth.

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