2 Sheets—Sheet 1.

R. DANIELS.

MACHINE FOR SEPARATING CLOTH AND FIBROUS MATERIAL TO FIBRE.

No. 31,154. Patented Jan. 22, 1861.

Fig. 2.

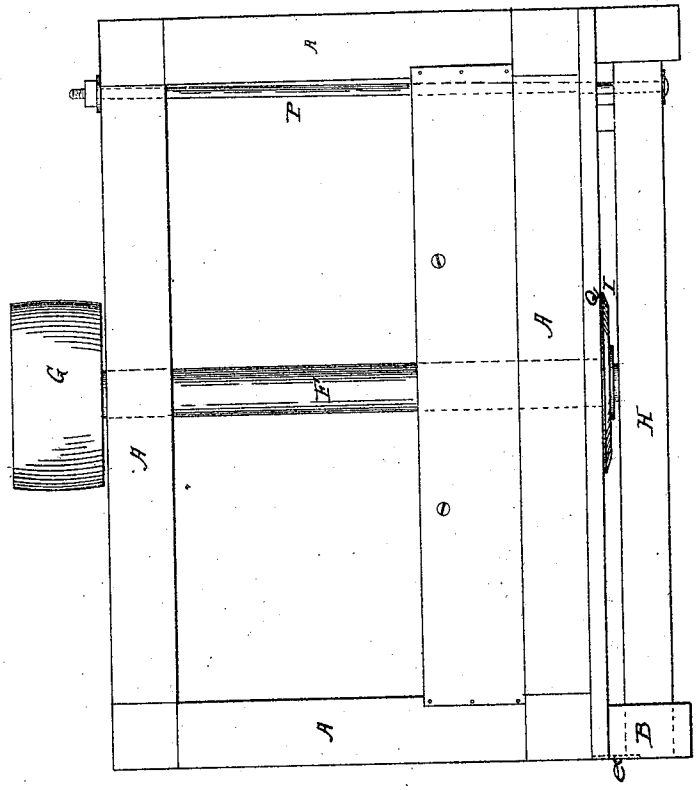
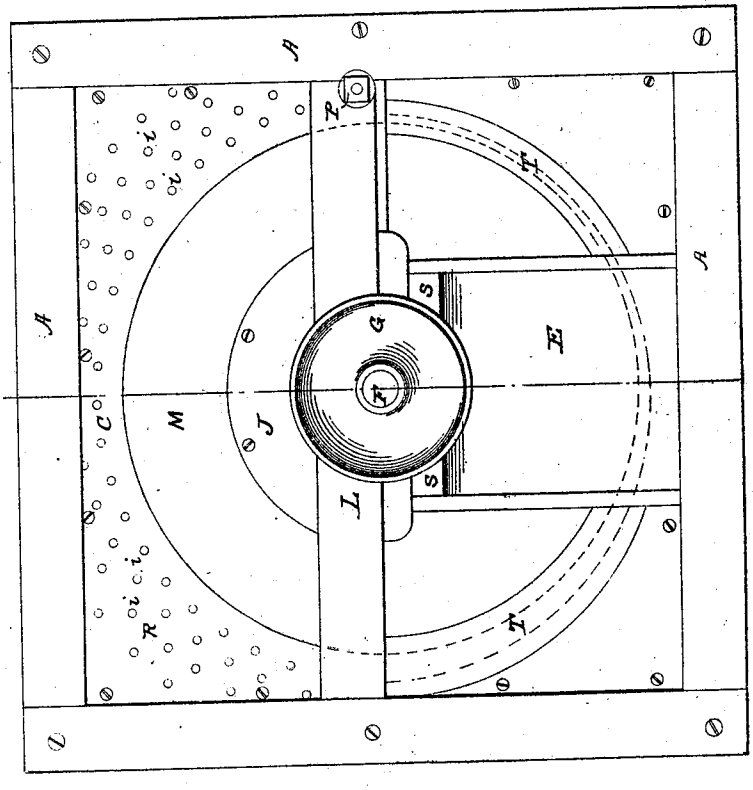


Fig. 1.



Witnesses:
J. Schon
F. C. Johnson

2 Sheets—Sheet 2.

R. DANIELS.

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Fig. 4.

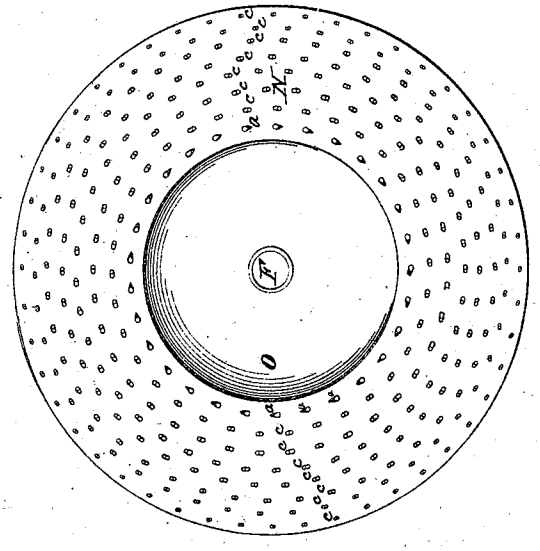
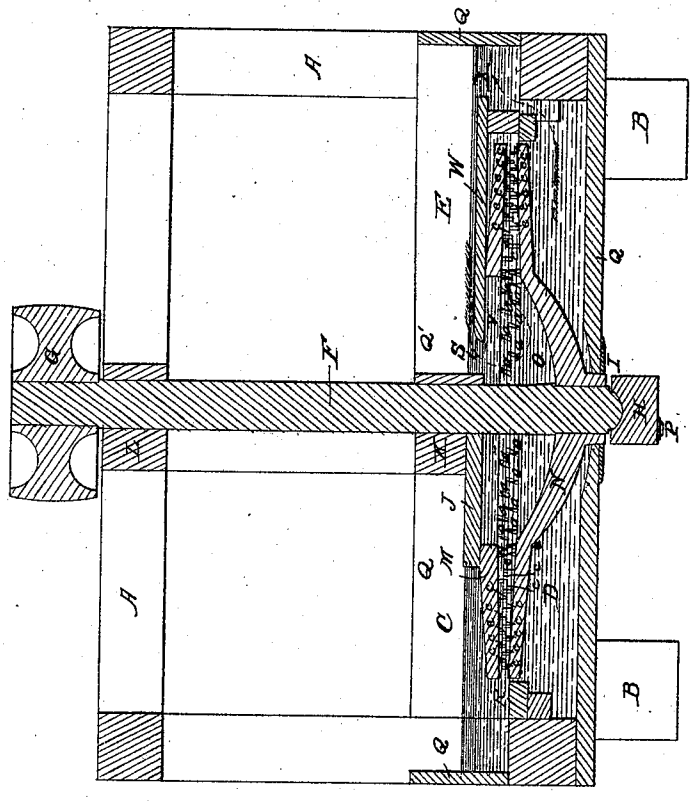


Fig. 3.



Witnesses:
J. Schnurr
F. C. Johnson

UNITED STATES PATENT OFFICE.

REUBEN DANIELS, OF WOODSTOCK, VERMONT.

MACHINE FOR REDUCING FIBROUS MATERIAL.

Specification of Letters Patent No. 31,154, dated January 22, 1861.

To all whom it may concern:

Be it known that I, REUBEN DANIELS, of Woodstock, in the county of Windsor and State of Vermont, have invented a new and useful Machine for Separating Cloth and Fibrous Material to Fiber; and I hereby declare that the following specification, in connection with the accompanying drawings and letters of reference thereon, constitutes a lucid, clear, and exact description of the construction and use of the same.

In referring to the said drawings, Figure 1, denotes a plan or top view. Fig. 2, a side elevation. Fig. 3, a central vertical section on line A, B, Fig. 1. Fig. 4, a view of the revolving wheel disconnected from the machine and inverted.

The object of my invention is to effectually separate and refiber, cast off cloth and other fibrous material and reproduce (not destroy) the longest possible staple, at one operation, or once running through the machine. And its nature consists of two fiber separating wheels; the working face of each being made concave and provided with peculiar sharp pointed teeth, secured thereto, angular with their face surfaces; and operated to separate worn out cloths and fibrous material; to reproduce (not destroy) the longest possible staple in a fit state for carding; these wheels being made adjustable to, and with, each other substantially as described, and hereinafter set forth.

Construction.

To enable persons skilled in the construction of machinery, and in the art to which my invention appertains to construct and carry out the same I will describe it as follows:

I construct a frame of wood seen at A, and supported on blocks B, in and across the central portion of which frame two bars K, and L, are firmly fastened. I then construct two fiber wheels M, and N, of iron, the wheel M is secured firmly to plate J, so as not to turn or revolve, this plate J being secured firmly to stationary bar K. The wheel N, is strongly secured to its shaft F, and positioned in my machine as seen at Fig. 3, the shaft F turning freely in journal boxes secured to bars K, and L.

The lower end of the shaft F, and hub to wheel N, pass water tight and revolve through plate I, and rest in a cavity drilled or formed in the adjustable bar H, so as to freely turn therein, this bar being hinged at one of its ends as seen at *e*, Fig. 2, while the other can be effectually moved up or down to constitute an adjustable step, by screw rod and nut P, to elevate or depress the fiber wheel N, at pleasure.

The faces of each of the wheels M, and N, are made slightly concave from their periphery about half way to the axis of shaft F, and provided with different sized teeth made of steel and set angularly as seen at Fig. 3, in order to catch, operate upon, and separate the cloth, or fibrous material readily and easily, and deliver it.

The teeth are, or may be all made of round steel wire or rods, the larger ones being nearest the center and seen at *a*, and those seen at *c*, gradually diminishing in length and size of the wire toward the periphery of the wheels. These teeth being firmly secured and so positioned in the face surface of each wheel at an acute angle, that their points will stand or reach forward of a perpendicular line, when the wheels are worked with their faces level; the shaft and its wheel and teeth are then placed, and set revolving in an engine lathe, and the teeth turned, or ground, by a cutting tool, or an emery board, or any suitable means, in the plane of revolution, and as near at right angles with the axis of motion as is convenient; thus quickly and cheaply forming a very sharp, durable and effectual point to all the teeth, and while the fiber wheel is revolving in the lathe. In addition to the shape, or point, now given the teeth, such of them as may be desired and seen at *a*, can be beveled to a circumferential line in the center of these teeth, and on the sides of them toward, and from, their axis of motion; this is done with a suitable cutting tool properly placed to so operate upon the teeth; forming their points the shape indicated at *a*, Fig. 4. Teeth may be constructed to effect the desired purpose by forming them on the edge of a steel plate, the points standing forward of their base line, which plates are afterward bent and secured by circular grooves formed in the face of the wheels, or such teeth may be formed on the segment of a circle to be secured to the wheels by grooves or otherwise. The rows of teeth, by the ad-

justability of each wheel may interpass between those of the other wheel, so that the face of each wheel will come nearly in contact with the ends of the teeth on the opposite wheel, at their periphery, but not so toward the center, where the teeth are larger and the spaces between them also larger than at the periphery. The object of enlarged spaces between the faces of the wheels and teeth nearest the center of the wheels being to instantly engage and operate upon the cloth or fibrous matter after it is fed into or between the fiber wheels M, and N.

The wheel N, has a water cavity formed in it, seen at O, to retain a quantity of water or liquid for the purpose of saturating the material as it is fed therein by means of feed cavity E, separated by plate W, and sides Q′ from wheel and throat S, through hole V, in wheel M. A passage for the water or liquid is formed as seen at X, Fig. 3, to allow a free circulation, when the machine is in operation, meaning that the water or liquid which is put in motion by turning the wheel N, will thereby pass through passage X, over plate W, and then through throat S, back into the center cavity O, and between the wheels, to both feed in the material for separation, and to nicely and slowly move this same material outward between the wheels M and N.

The points of the teeth may be pointed as seen at *a*, for those of the larger size, and occupying the inner ring, while the others or any portion of them may be left with the points formed by being ground or faced in their inclined position, which forms sharp points on their ends by being so ground, in a plane at right angles with the axis of motion, when secured angularly in such plane, and in the concave face of the wheels M, and N.

The frame A, has a water tank or basin C, formed at its lower part by the bottom and side boards Q, the water or liquid being seen at D, which partially submerges both fiber wheels M and N, to admit air for relieving the pressure of liquid which would otherwise tend to press the wheels apart, and thus consume power. This water apartment is divided at the periphery and face or upper surface of wheel N, by partition R, perforated as seen at *i*, to retain the fiber above, and in basin C, as it is delivered from wheels M, and N, and trough T, shown in dotted lines, and allow the dirt, refuse and sediment to settle through holes *i*, into water cavity below and from which it can be drawn off by a gate or stop cock (not shown) and not waste the fiber or staple.

A pulley G, is secured to top of shaft F, by which my machine is driven from any convenient motor, and at a speed of about three hundred revolutions per minute, when the fiber wheels do not exceed four feet in diameter.

Operation.

The wheel N, is put in motion, and by that means the water or liquid D and a quantity of air are also moved constantly in a powerful current from the center of wheels M, and N, and of cavity O, and between the wheels and their teeth, and toward and from their periphery. The substance or material being properly prepared is run through an ordinary picker, and from thence discharged into water cavity E, and over plate W, the material is then instantly carried forward by the current, as the upper red arrow points, and through the throat S into the center of the fiber wheels M, and N, and cavity O, the current of water or fluid and air carries the stock then at once in contact with the teeth *a*, and *c*, and toward the periphery of these wheels the coarse or large teeth *a*, by their sharp points, at once begin to separate the fiber, the tendency of the current, and centrifugal force of wheel being to continually and easily move the fiber outward, and to separate, but not to break or shorten it, by the action of the teeth in the fluid as the teeth grow finer and smaller, until the fiber is delivered from the wheels, thoroughly separated and with the longest possible staple. The vertical adjustments or position of wheels N, for the different kinds of material or substance, will readily suggest itself to a competent operator. The fiber when separated is easily skimmed from the water or fluid in cavity O.

Various modifications may be made of my invention and yet retain the principle therein exemplified, for example the upper wheel may be revolved instead of the lower one, or they may both be revolved and operated without water.

Having thus described my invention I will state my disclaimer and claim as follows.

I make no claim to pulp grinding wheels, having their faces armed with cutters, or bars of steel, used in making paper, as such have long been known and used. Neither do I claim rasp shaped teeth, raised on the faces of steel plates, when operated upon fibrous material, without a continuous feed or delivery, and having no continuous current from the center to periphery of wheels. Nor any device, having for its object, to shorten the staple; for they are entirely different from, and would defeat the very purpose, and cannot be made to answer the object of my invention.

What I do claim as my invention and desire to secure by Letters Patent is—

In fiber separating wheels like M, and N, is providing the working face of each with

pointed teeth *a*, and *c*, or their equivalents secured thereto, and set substantially in the manner described, when operated with a current of fluid freely passing through and toward the periphery, to separate worn out cloth and fibrous material, to reproduce (and not destroy) the longest possible staple in a suitable state for carding, these wheels being made adjustable to, and with, each other substantially as described and for the purposes set forth.

REUBEN DANIELS.

Witnesses:
E. W. SCOTT,
M. A. SCOTT.