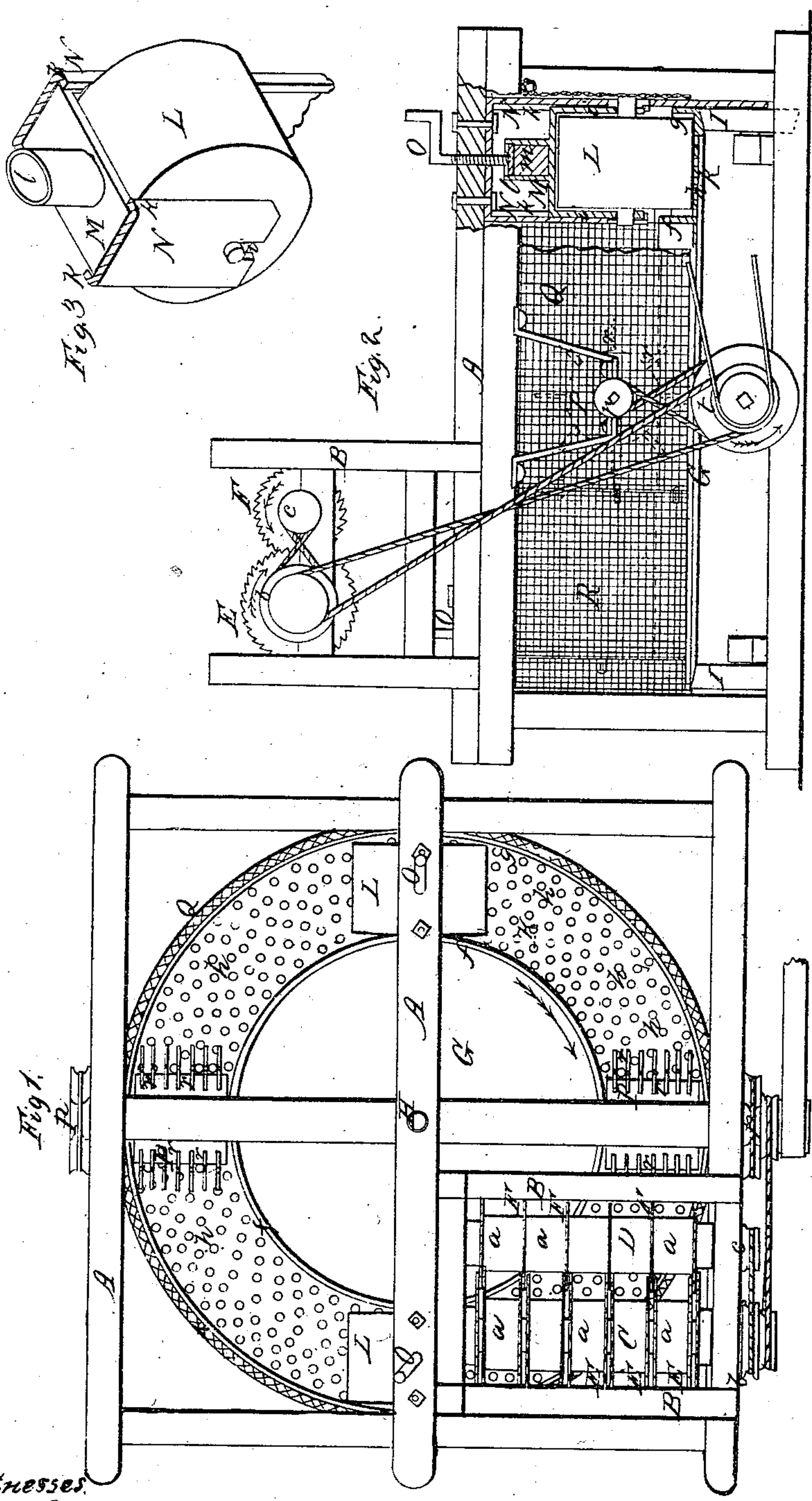


C. BEACH.
MACHINERY FOR PREPARING HEMP AND FLAX FOR CARDING.
No. 36,551. Patented Sept. 23, 1862.



Witnesses.
J. Fraser.
R. F. Osgood.

Inventor.
Charles Beach.

UNITED STATES PATENT OFFICE.

CHARLES BEACH, OF PENN YAN, NEW YORK, ASSIGNOR TO HIMSELF AND
S. C. CLEVELAND, OF SAME PLACE.

IMPROVEMENT IN MACHINERY FOR PREPARING HEMP AND FLAX FOR CARDING.

Specification forming part of Letters Patent No. 36,551, dated September 23, 1862.

To all whom it may concern:

Be it known that I, CHARLES BEACH, of Penn Yan, in the county of Yates and State of New York, have invented certain new and useful Improvements in Machines for Preparing Flax, Hemp, and other Material of Long Fiber for Carding and Spinning; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a plan of my improved machine; Fig. 2, an elevation thereof, with the parts connected with one of the pressure-rollers in section; Fig. 3, a perspective view of one of the pressure-rollers, with parts connected therewith detached.

Like letters designate corresponding parts in all the figures.

My machine as herein described resembles in principle that patented to myself, Joseph Beach, Thomas Beach, and William G. R. Mowry on the 29th day of August, 1848, and is intended as an improvement on that invention. The design of the improvements is to prepare flax, hemp, and other similar stalks having a long fiber from its rough or unbroken state in such a manner as to be carded, spun, and woven like cotton and wool and on similar machinery. To accomplish this it is necessary that the fiber be thoroughly separated from the woody portion of the stalk, and also that it be broken into short pieces or lengths for proper manipulation and to produce a perfect fabric. The frame A, in which the parts are mounted, may be of any suitable shape and construction adapted to the purpose, being represented in the drawings as square. At a suitable position on this frame is situated a secondary frame, B, having mounted therein two shafts, C and D, parallel with each other and at a proper distance apart for the purpose designed. On the shaft C, at suitable distances apart, are mounted a set of saws, E E, each unit of the set being made up of two saws placed near together, leaving only space enough, or a little more, intermediate to allow the saw on the other shaft, D, to run freely between them, as shown most clearly in Fig. 1. The saws F F on the shaft D are of smaller size than those above described, and they are arranged singly in positions corresponding with

the spaces between the proximate saws E E, so as to run therein. The saws of each set, when thus arranged, reach nearly to the shaft of the opposite set. The spaces between the units of each set are filled by collars or rings *a a* on the shafts, and these spaces may be varied to greater or less extent by the use of collars or rings of greater or less size at any time when desired, or by the use of a greater or less number of them. The saws revolve inward toward each other, and the motion may be applied in any desirable manner. In the drawings two pulleys, *b c*, of unequal sizes, are represented secured, respectively, to the ends of the shafts and connected by a crossed band, and these pulleys may be operated either by a crank or by means of another pulley on the end of the larger shaft, having a crossed band passing over it and connecting with a pulley, *t*, on the shaft of the driving-drum. The saws F F have therefore a greater velocity than the saws E E. The teeth of both sets of saws point in the direction of their motion, so the double set E E feed or convey the stalks in while they are being acted upon by the others. Thus arranged, the unbroken flax or hemp is fed on the saws and carried between them. The set F, by rotating at a greater rate of speed than the set E, catches the stalks, which are held or retained by the teeth of the latter, and the fibers are thus stripped or broken into shreds or pieces of suitable length for carding, spinning, and weaving.

It has been found by experience that cutting the flax or fiber with a sharp edge or knife leaves the ends of the filaments blunt or square, which prevents their closing in smoothly in spinning; but by the use of saws operating in the manner described the ends of the fibers are left sharp-pointed and irregular where they are pulled apart, thus entirely obviating this objection, and producing a staple perfectly adapted to manufacturing on cotton machinery. The stalks or straw being thus broken or separated, is next to be operated on for the purpose of removing the fiber perfectly from the hard and woody portion thereof.

At a suitable position in the frame A is mounted a horizontal revolving circular wheel, G, turning on an axis, H, and having in its outer edge a trough, K, bounded on

either side by vertical flanges *f* and *g*, of suitable height to retain the broken flax that falls therein from the saws above. The bottom edge of the wheel is usually beveled upward and outward, and this bevel rests on correspondingly-beveled friction-rollers, *I I*, (usually four in number,) by the action of one of which serving as the driver the said wheel receives its motion, as represented in Fig. 2. The driving-wheel may, if necessary, be provided with gearing meshing with cogs on the under side of the trough *K*, and additional wheels or rollers may be placed directly under the pressure-rollers *L L* to receive the weight. The bottom of the trough is filled with perforations *h h h* for the purpose of allowing the dust and shives of the flax to fall through as they are separated by the pressure-rollers and pickers, presently to be described. On the opposite sides of the trough are situated wooden rollers *L L*, (usually two in number, but more, if desired,) of suitable size, resting on the floor of the trough and filling the space between its sides. The journals of these rollers turn in right-angled projections or arms *i i* of a bearing, *M*, the said projections or arms sliding in guide-supports *N N*, having their edges *k k* turned in at right angles, thereby forming a groove or bed by which the bearing *M* is always retained in place, but allowed to slide up and down vertically. This arrangement is represented most clearly in Fig. 3, in which the guide-supports are shown in cross-section. The guide-supports may be secured to one of the cross-pieces of the frame by means of screw-bolts, as indicated in Fig. 2, or in any convenient manner.

On top of the horizontal portion of the bearing *M* is situated a box, *l*, in which rests a rubber or coiled spring, *m*, or equivalent, having bearing thereon a follower, *n*, operated by a pressure-screw, *O*, passing up through the cross-piece. By the use of this device, as the trough containing the broken flax is revolved under the pressure-rollers, motion is transferred to the latter by the driving-wheel, and the pressure is such as to separate the fiber from the woody portion after sufficient action.

In the ordinary method of working flax the hard and woody portion of the stalk is prepared for a ready separation from the fiber by fermentation or "retting," as it is termed, which decomposes the gluten, or by the use of chemical preparations for effecting the same purpose; but I accomplish the same result by a process wholly mechanical, and in a short space of time. I also dispense with the subsequent operations of swingling and hackling to clear the fiber from shives, and to reduce it to the proper condition. The passing of the mass under the rollers *L L*, subjected to a crushing-pressure of as many tons as may be employed to advantage, has the effect to pulverize the woody portions of the stalk until it is reduced to powder, while the fibers are too tenacious to be broken or injured under

the pressure. A large portion of the powdered refuse thus produced falls through the holes *h h* in the bottom of the revolving trough, while much that is lighter is thrown out through the perforated cylinder, as will be presently described. Thus the grinding and separating are being effected at the same time, and by the time the woody portion of the stalk is thoroughly reduced to powder that powder has passed off by the means here described, leaving the fiber in a clean state. The only preparation the flax requires before being subjected to this process is that of drying, and this condition is not absolutely indispensable, as even wet or green flax may be worked with good effect, it only requiring a longer time to complete the action, as the drying may be effected while the operation proceeds by the action of the pickers, hereinafter described, and when sufficiently dry pulverization takes place, and the fiber is separated. By means of the screws *O O* and the bearings *M M*, resting in the guide-supports *N N*, the rollers are adjusted to any degree of the pressure required. The use of the springs *m m* allows sufficient elasticity of the rollers to enable them to yield when inequalities of the material pass under them.

This device is not only very cheap, but by its lightness and portability it enables the machine to be transported and moved easily without the trouble experienced where heavy iron or other wheels are used in their stead.

Intermediate with the pressure-rollers above described, are situated smaller rollers *P P*, that I denominate "pickers." They turn in the direction with the motion of the trough, and are conveniently actuated by having cross-bands pass around the pulleys *p p* on the ends of their shafts respectively, and around similar pulleys on the ends of the shafts of the friction-rollers *I I*, or suitable gearing. The surfaces of the pickers are covered with radial teeth or projections *r r* of sufficient length to reach nearly to the bottom of the trough, and the office of these teeth is to stir up and lighten the material after it has passed under one pressure-roller, and preparatory to its passing under the next, and thus to keep it in proper condition to receive the best effect of the pressure.

Around the outside of the trough, and fitting closely to it, but not turning with it, is situated a perforated cylinder, *Q*, conveniently and preferably made of woven wire, and extending from near the lower edge of the trough (around the flange *g*) vertically to a suitable height to retain the fibers from being thrown out by any action of the operating parts. This perforated screen is held in place by being rigidly secured to the top pieces of the frame *A*, or in any other convenient manner. It is provided with a door, *R*, on one side, Fig. 2, of the same material, for the purpose of removing the fiber from the trough after it is thoroughly separated from the shives. The perforations or meshes are of

suitable size for the passage of the dust and shives to be blown out, but not sufficient to allow the escape of the filaments. The pickers are made to revolve quite rapidly, thereby stirring up the mass quickly, and their revolution creates sufficient blast to blow a large portion of the trash and dirt out through the perforations, and thus assist in a great measure the cleansing of the material. This cylinder, in connection with the circular trough, thus serves to retain the fibers, while the woody portions are removed through the opening h in said trough and through the perforations of the cylinder.

The perforated cylinder or case Q being stationary, the door R may be opened and the fiber removed with entire safety and convenience, while the trough and other working parts are in motion, thus obviating the necessity of stopping the machine for this purpose.

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

1. The two sets of saws E E and F F, running at unequal rates of speed when the same intermatch, as described, for the purpose of breaking the stalks and fibers without cutting them abruptly, substantially as herein set forth.

2. The pressure-rollers L L, having their bearing M M, resting in the guides-supports N N, and adjustable to different degrees of pressure, and yielding to inequalities of the material being acted on by means of the spring m and screw O, the whole arranged in combination with the trough K, substantially as herein described.

3. The perforated cylinder Q, in combination with the circular trough K, for the purpose of retaining the filaments, while the shives and dust are allowed to escape, substantially as herein set forth.

4. In combination with the perforated cylinder Q, the pickers P P, whereby the blast created by the latter removes the trash without the fibers, substantially as herein specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHAS. BEACH.

Witnesses:

J. FRASER,
R. F. OSGOOD.