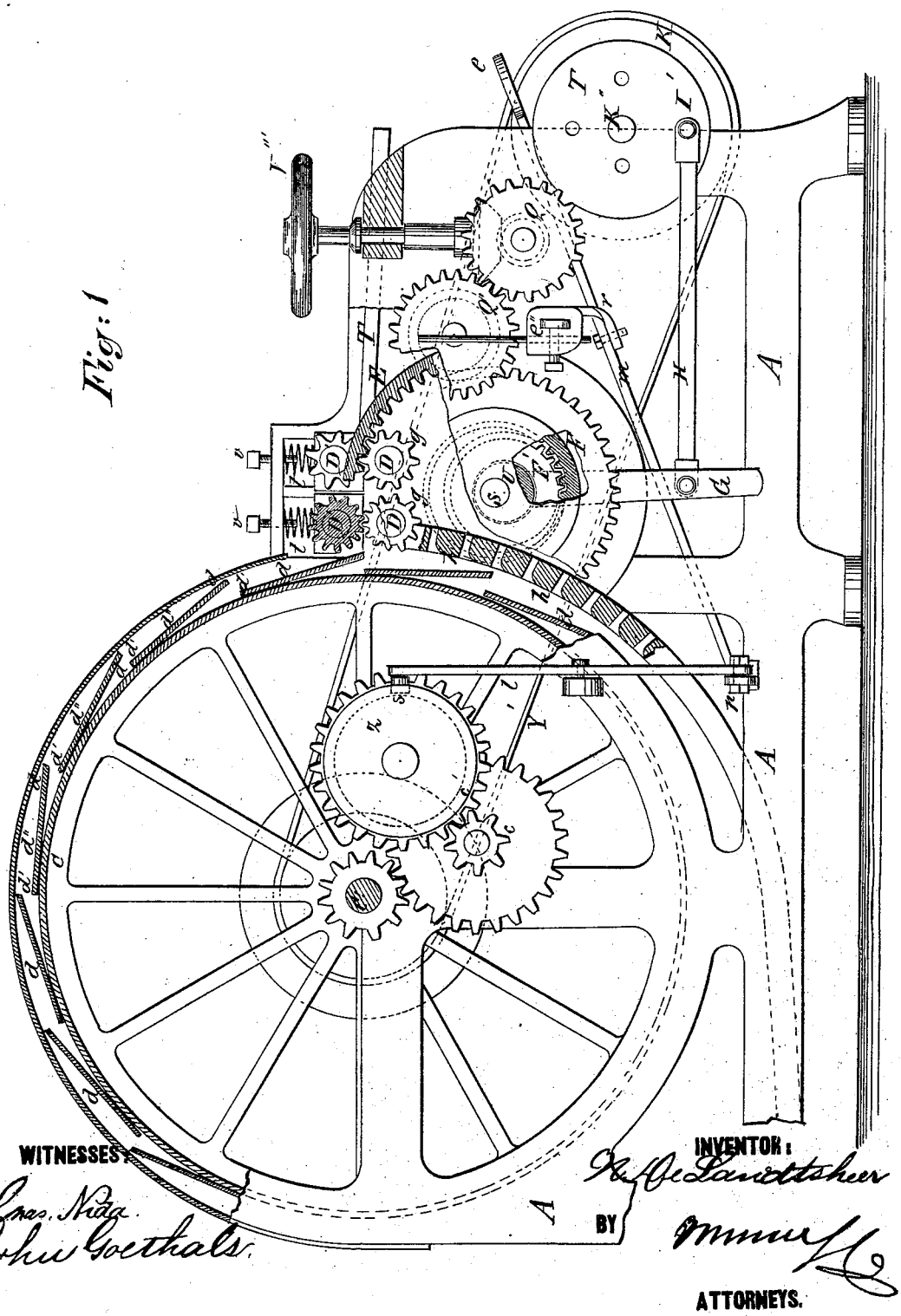
2 Sheets—Sheet 1.

N. De LANDTSHEER.

MACHINE FOR TREATING FLAX, HEMP, AND OTHER SIMILAR PLANTS.

No. 190,476. Patented May 8, 1877.

Fig: 1



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2 Sheets—Sheet 2.

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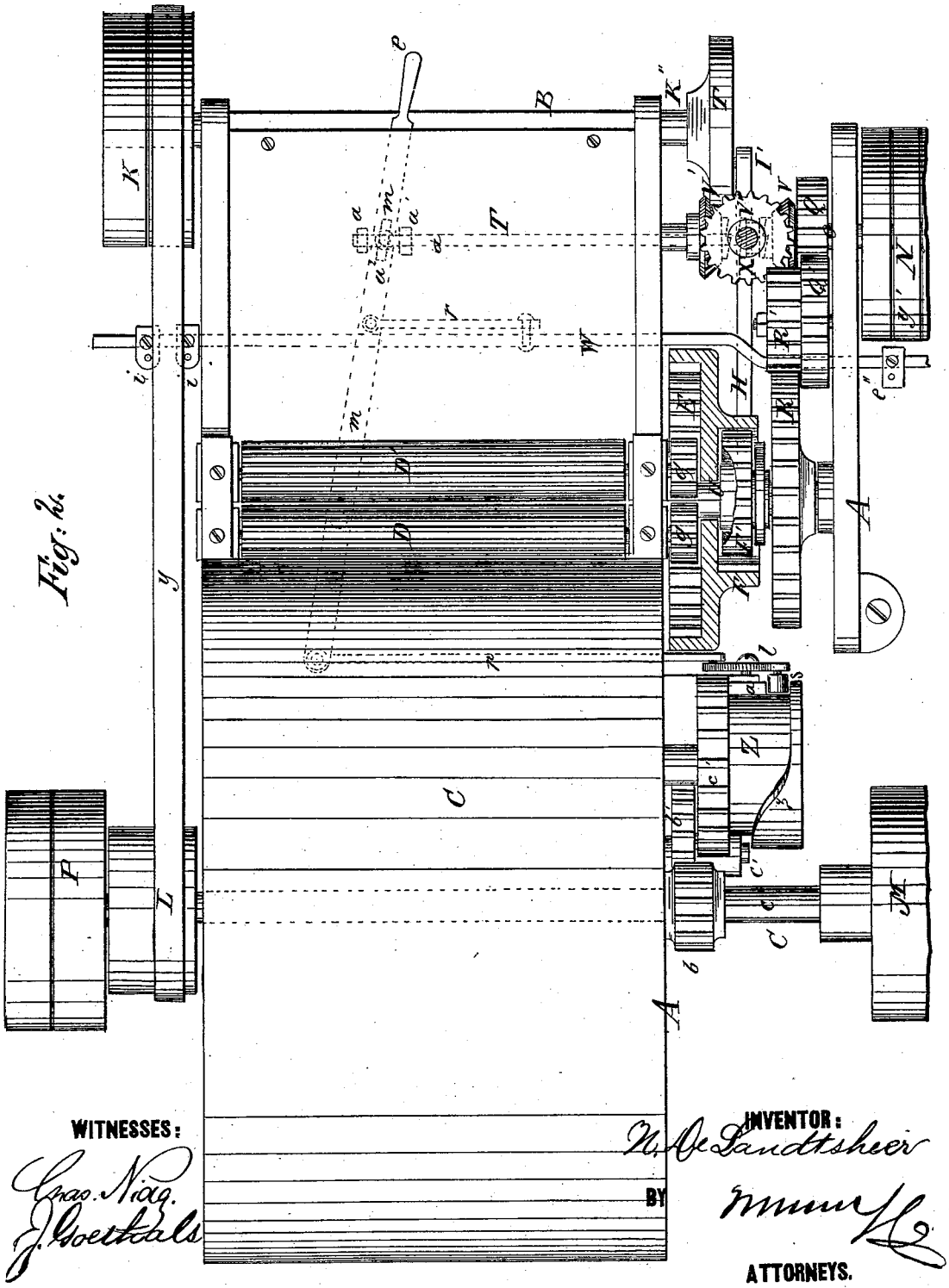
Fig: 2.



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UNITED STATES PATENT OFFICE.

NORBERT DE LANDTSHEER, OF PARIS, FRANCE, ASSIGNOR TO CHARLES COUTURE, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR TREATING FLAX, HEMP, AND OTHER SIMILAR PLANTS.

Specification forming part of Letters Patent No. **190,476**, dated May 8, 1877; application filed September 2, 1876.

To all whom it may concern:

Be it known that I, NORBERT DE LANDTSHEER, of Paris, France, have invented a new and Improved Machine for Breaking, Scutching, and Hackling Flax and other Fibrous Material, of which the following is a specification:

This invention relates to improvements in the treatment or preparation of flax, hemp, or other textile matters, and to apparatus to be employed for this purpose.

The invention mainly consists in cleaning, softening, and separating the fibers by the processes of breaking, scutching, and hackling. These several operations are performed by a machine working automatically.

In the drawing, Figure 1 is a side elevation of my improved machine, and Fig. 2 is a plan.

Similar letters of reference indicate corresponding parts.

A A are the side frames of the machine; B B′, cross-bars; C, sheet-metal drum, having blades *d*, and mounted on the shaft C′.

D D′ are fluted rollers, to which a double-reciprocating motion is imparted, said rollers being adjusted relatively to the scutching-drum while in operation.

E is a wheel, having an internal ring of teeth for driving the pinion *g* of the fluted rolls D. This wheel also carries on its opposite side another internal-toothed ring, F, gearing with a toothed wheel, F′, which turns eccentrically to the shaft *s* on a stud on the wheel R.

G is a lever-arm attached to the wheel F.

H is a connecting-rod, imparting motion from the crank-pin I′ to the lever-arm G.

T is a disk, having four holes at different distances from the center, in either one of which the crank-pin I′ may be fixed.

K is a pulley, fast to the shaft K″ of the disk T; and L is a pulley, fast to the shaft C′ of the breaking-drum.

M is a pulley, fast on the opposite end of the shaft C′, by which the mechanism for feeding and withdrawing the scutched material is operated.

N is a pulley, fast on the hollow shaft O, on which are mounted the bevel-pinions V, and geared by a clutch, X, in such a manner as to rotate the pinion Q in one or other direction, according as the clutch gears with pinion V or V′. V‴ is a wheel for moving the wheel Q by hand.

P is the main driving-pulley.

Q Q′ R R′ are spur-wheels.

R′ is the change pinion, by which to regulate the scutching operation.

T is a table, whereon the material to be scutched is spread.

U is a sleeve, turning eccentrically on the shaft S. On this sleeve a wheel, F′, is mounted loosely, which, by the rotation of the said sleeve, is caused to displace the wheel F.

V V′ V″ are bevel-pinions. The pinion V′ is fixed on its shaft, which also carries the wheel V″, by which to regulate any irregularity in the working of the machine.

W is a bar, to which longitudinal motion is imparted by the cam Z, the latter serving to control the whole of the working parts of the machine through the agency of the levers *l m*, rods *r p*, and parts *e e″* attached to the bar W, the inclined surfaces *a b* of the cam Z serving to regulate by their position the time at which the material to be scutched is to be introduced, retained, and discharged from the machine, according to the mode of treatment desired.

Y Y′ are belts of the pulleys K N. *a* is the rod of the clutch X, provided with two collars, *a′*, operating on the lever *n* through the part *a″*.

b b′ c c′ are spur-gearing for driving the cam Z, the pinion *c′* being exchangeable for another, to suit the length of the material to be scutched.

d d are blades, fixed on the scutching-drum by their edges *d′*. The said blades are made flexible, and the portion from *d* to *d″* may be removable, in order to regulate the scutching of the ends of the fibers.

e is a handle, for shifting the bar W by hand, for instantly throwing the clutch X out of gear, when desired.

h is a grating, by whose position, in relation with that of the drum, the scutching is regulated.

i i are arms, fixed on the bar W for shifting the belt Y, whereby the breaking operation may be performed as the material enters the machine, but suspended on passing out.

l is a lever, carrying a friction-roller, *s*, and operated by the cam Z.

p is a rod, connecting the lever *m* to the lever *l*.

t is a spring, of steel or rubber, compressed by the screw *v*.

The work of the machine consists of two distinct operations, breaking and scutching.

The breaking of the straw is effected by passing through the fluted rolls D D′, which receive an alternate circular motion, the rolls being coarsely fluted, and meshing but slightly one in the other, whereby the material is subjected to a succession of blows, which breaks the "boon" adhering thereto. This alternate circular motion is obtained through the belt Y, shaft K″, and disk T, crank-pin I′, and connecting-rod H, which impart an alternate motion through the lever G to the wheel F, and thence to the pinions *g* by the wheel E.

The crank-pin I′, being adjustable at different radii, enables the extent of the alternate breaking motion to be regulated as desired. The same differential motion may also be obtained by varying the length of the lever G.

The material to be scutched is fed to and removed from the machine by means of mechanism operated through the belt Y, pulley N, shaft O, bevel-wheels V V″, spur-wheels Q Q′ R R′, and wheel E, gearing with the pinions *g*, mounted on the fluted rolls D D′. The clutch X, when connected with the wheel V, imparts motion for feeding the material to be scutched, and when connected with the wheel V′ the said clutch serves to operate the withdrawal of the scutched material. The size of the pinion R is regulated according to the rate of feed of the material, and the extent to which it is to be scutched.

The speed of the eccentric Z regulates the the time during which the material is under treatment. The change-pinion *c* enables this movement to be regulated according to the length of the material.

The scutching-drum is composed of two rings, of cast metal, covered with sheet metal, on the circumference of which are attached eight, twelve, sixteen, or even a larger number of blades, if desired. These blades beat the material as it is delivered from the fluted rolls D D′. The material is beaten by the blades upon the slats *h*, forming a cage or grated surface, answering the purpose of a table, on which the scutcher places the material to be scutched.

The rounded form given to the bars *h* conducts the air-current created by the motion of the drum in such a way as to entrain the material to be scutched, as also to carry off the dust produced by the operation. Owing to this rounded form also the bars *h* have a softening action on the fibers.

The blades may be made of any material to suit the textile matters under treatment, and may be either fixed or rendered flexible by means of springs. They may be also undulated or toothed, and intermixed with a few hackle-teeth and hard brushes.

The blades may be made of any width by leaving a space between them and the surface of the drum, the extent of this opening and the degree of inclination of the blades regulating the degree to which the end of the material under treatment is scutched.

By placing the blades upon a cylindrical surface concentric with the drum they may be brought as close together as may be necessary to avoid injuring the weak flax by cutting off the ends. The slats or bars *h* may also be replaced by bars of polished iron, either plain, undulated, or twisted, and be held in place by springs, to modify the force of the stroke of the blades.

The first pair of fluted rolls D D′ should be more coarsely fluted than the other pair next the drum, the former acting as breakers while the latter serve rather to hold the material while being scutched.

The holding-rolls are made with finer grooves for separating the greater portion of the boon after it has been broken. They should mesh together so as to hold the material while scutching. The upper roll D′ may be covered with india-rubber, if desired.

For short-stapled fibers, one pair of fluted rolls are used upon the lower one D, another roll, D′, of small diameter, for holding, is covered with rubber.

The bearings of the fluted rolls are moved horizontally away from the drum, when the material is first introduced, and gradually moved back again toward the drum as the material is fed in. This movemont is obtained by means of an eccentric groove made in the side of the cam *z*. A similar movement may also be imparted to the cage *h*.

Instead of the cage *h* with fixed bars, as described, a series of polished metal cylinders may be used, having spiral grooves running in opposite direction, and intersecting each other, the said cylinders turning eccentrically to vary the intensity of the blows during the scutching operation.

I may also, with advantage, employ flat metal bars, rounded and undulated, and pivoted at their upper edge, and held in position by springs.

By placing hackle-teeth on a portion of the surface of the drum the cleaning is better effected while the material is to a certain extent hackled.

As the ends of the material being cleaned or scutched are first treated, it will be evident that the portions separated from the material by scutching will be scutched also. The products obtained will thus consist of long-stapled material more or less perfectly scutched, as well as a long tow which is also scutched. In this manner great advantages are obtained over those systems now in use.

The scutching of textile matters may be operated in this machine by inexperienced hands, or by women or boys, which is also a great

advantage in places where skilled labor is scarce, and growers are prevented from raising such large quantities of flax as they otherwise would.

This improved machine is therefore calculated to give increased impetus to the culture of flax which will lead to cheapness of the raw material, with increased profit, not only to the grower but also to the manufacturer, as the cost of breaking and scutching on this improved system will be about one-third less than ordinary.

The action of this improved scutcher is such that the ends of the straw are first operated on, and so on to the middle of its length, whereby a better and larger product of long-stapled scutched fiber is obtained, while the value of the tow obtained is more than double that produced in scutching generally.

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

1. The combination of fluted rolls D D′, having a double-reciprocating motion, with a scutching-drum, having beaters *d*, and an adjustable grating *h*, as and for the purpose described.

2. The grating *h*, constructed as described, and made adjustable with respect to the scutching-drum, as and for the purpose set forth.

3. The blades *d*, fixed at *d′*, made flexible, and placed at an inclination to the periphery of drum, as and for the purpose specified.

4. The combination of the disk T, rod H, lever G, eccentric sleeve V, wheels F′ and F, wheel E, and fluted rolls D, substantially as specified.

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