

(No Model.)

5 Sheets—Sheet 1.

E. LYCAN.

DECORTICATING MACHINE.

No. 355,188.

Patented Dec. 28, 1886.

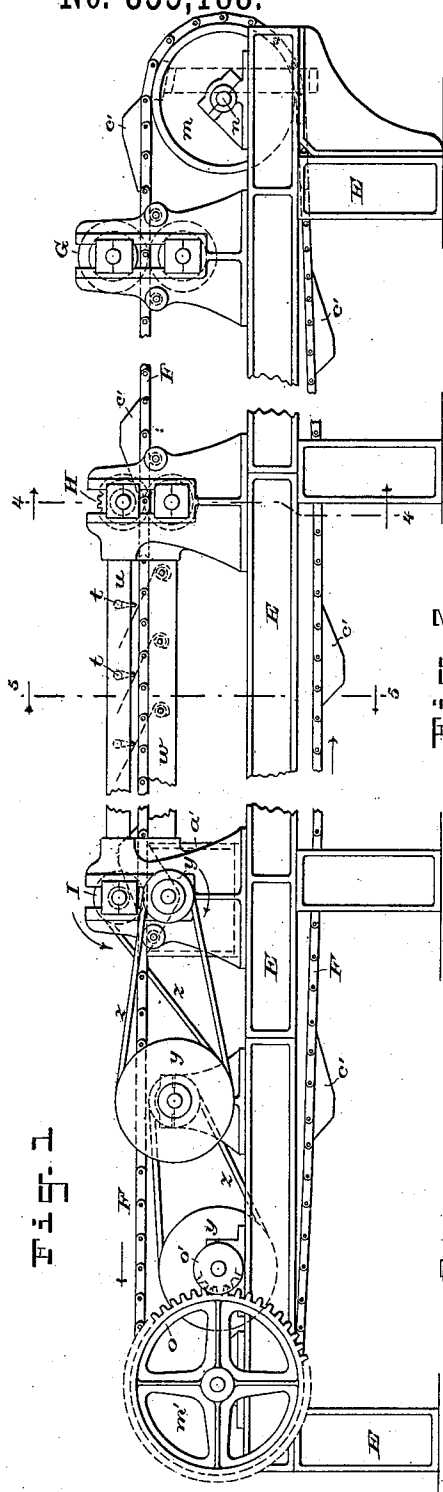
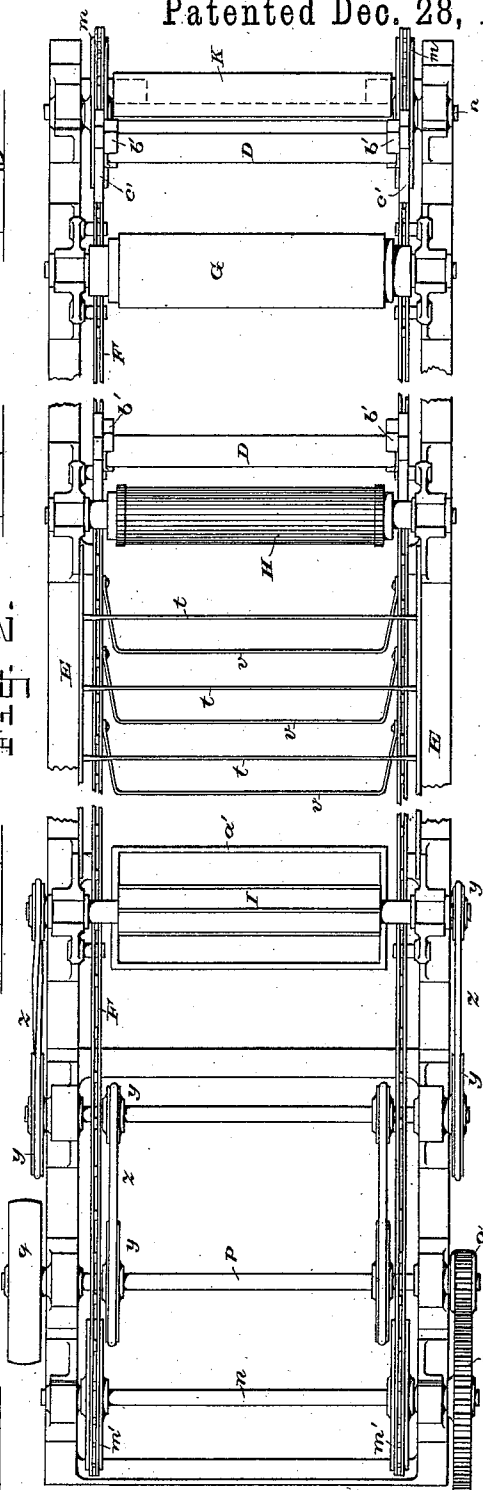


FIG. 1

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FIG. 2



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By his Attorneys,

Burke, Fraser & Connell

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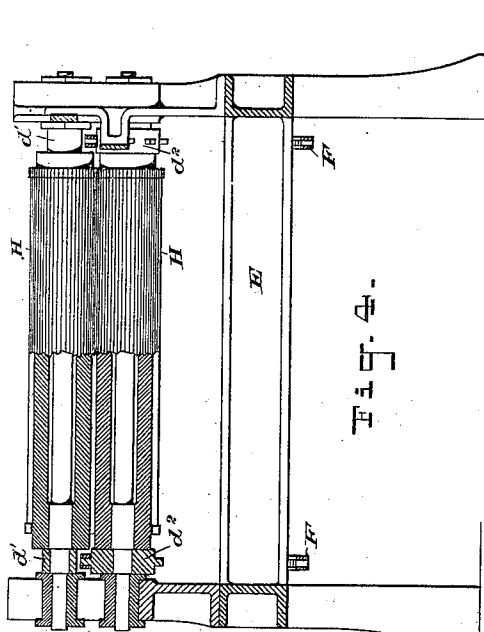


Fig. 4.

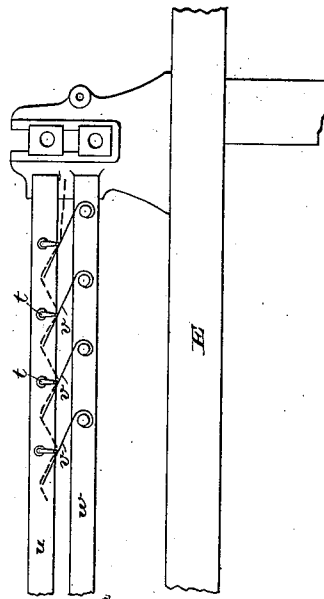


Fig. 5.

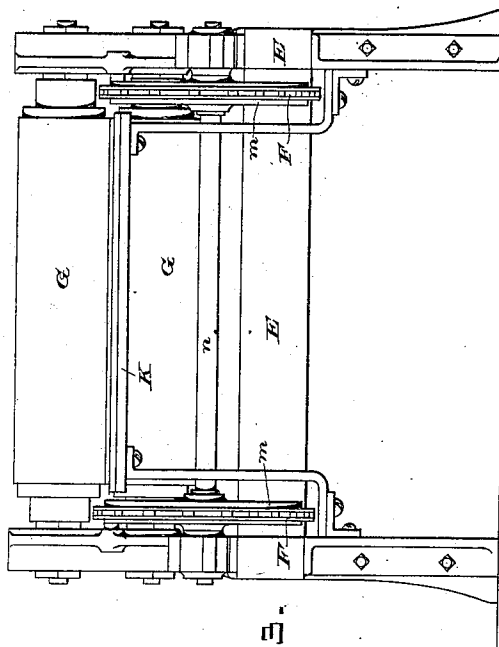


Fig. 6.

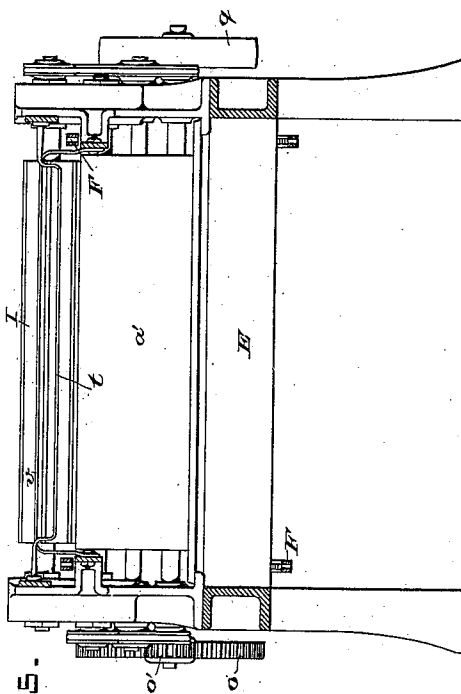


Fig. 7.

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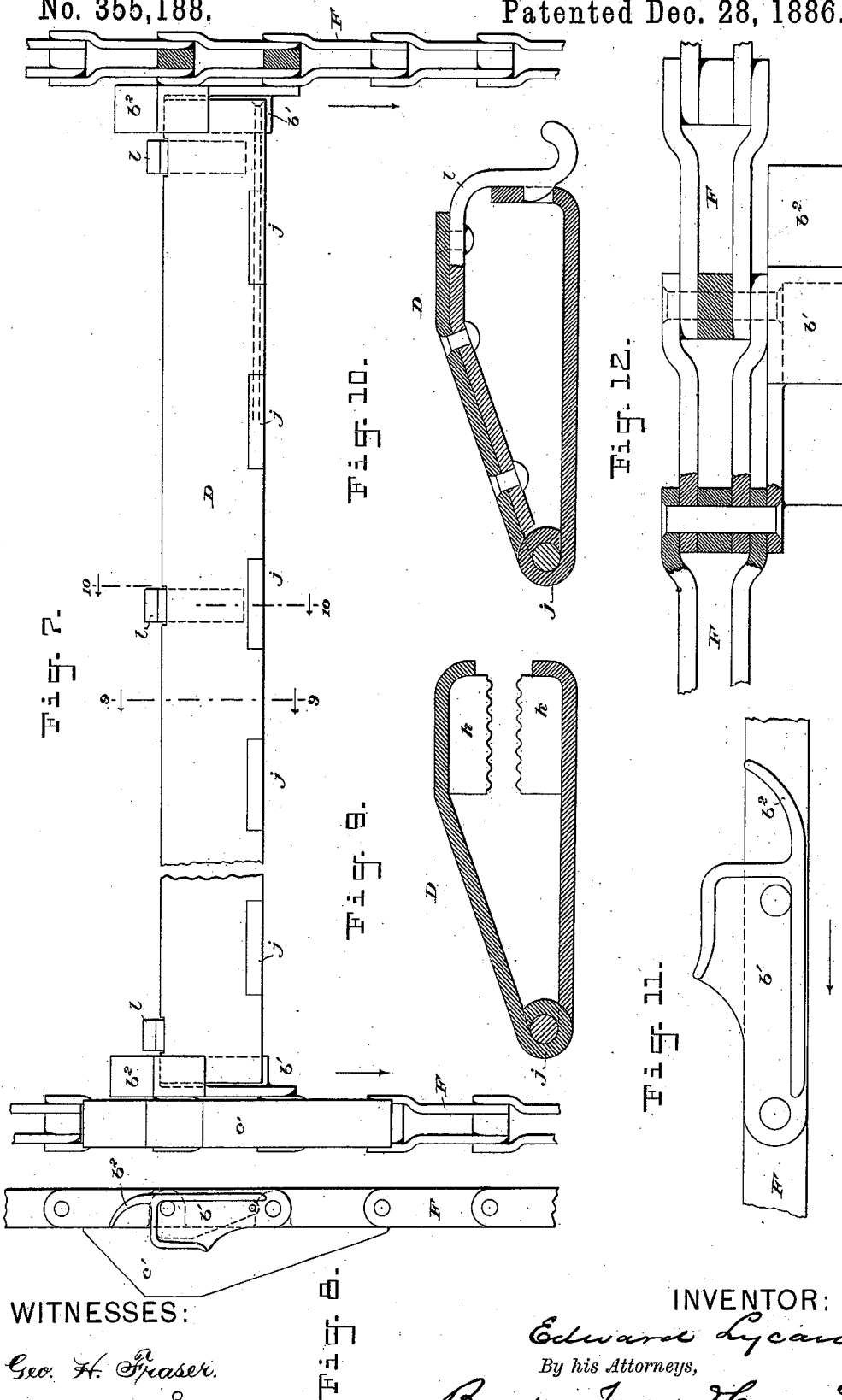
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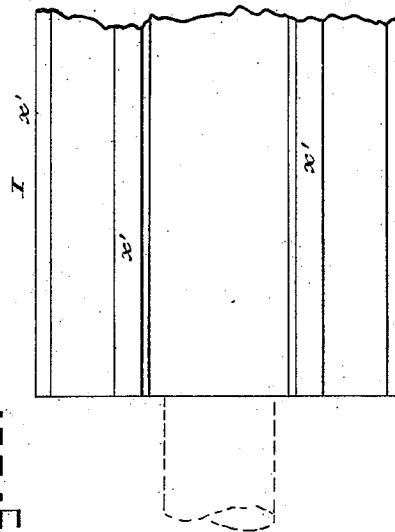
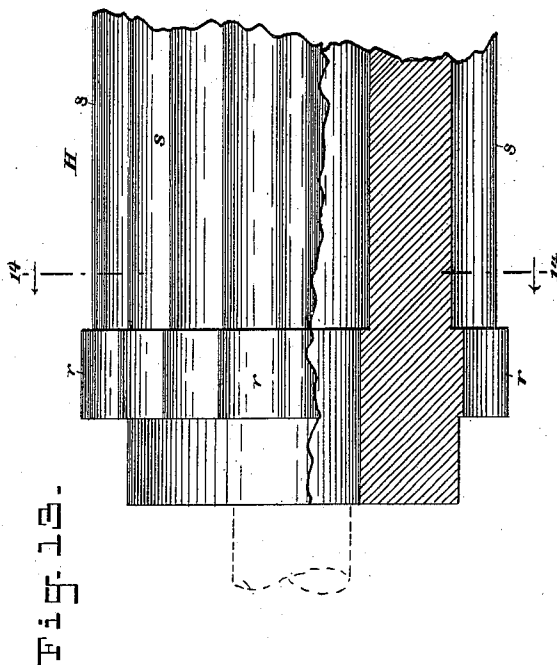
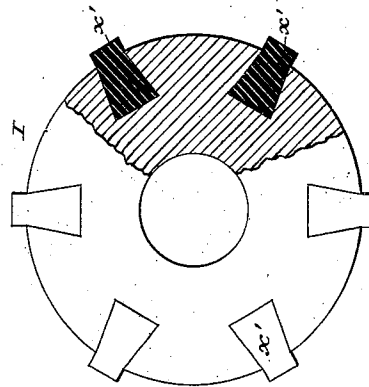
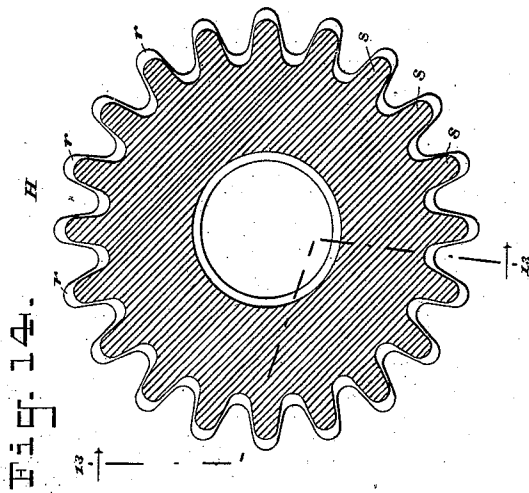
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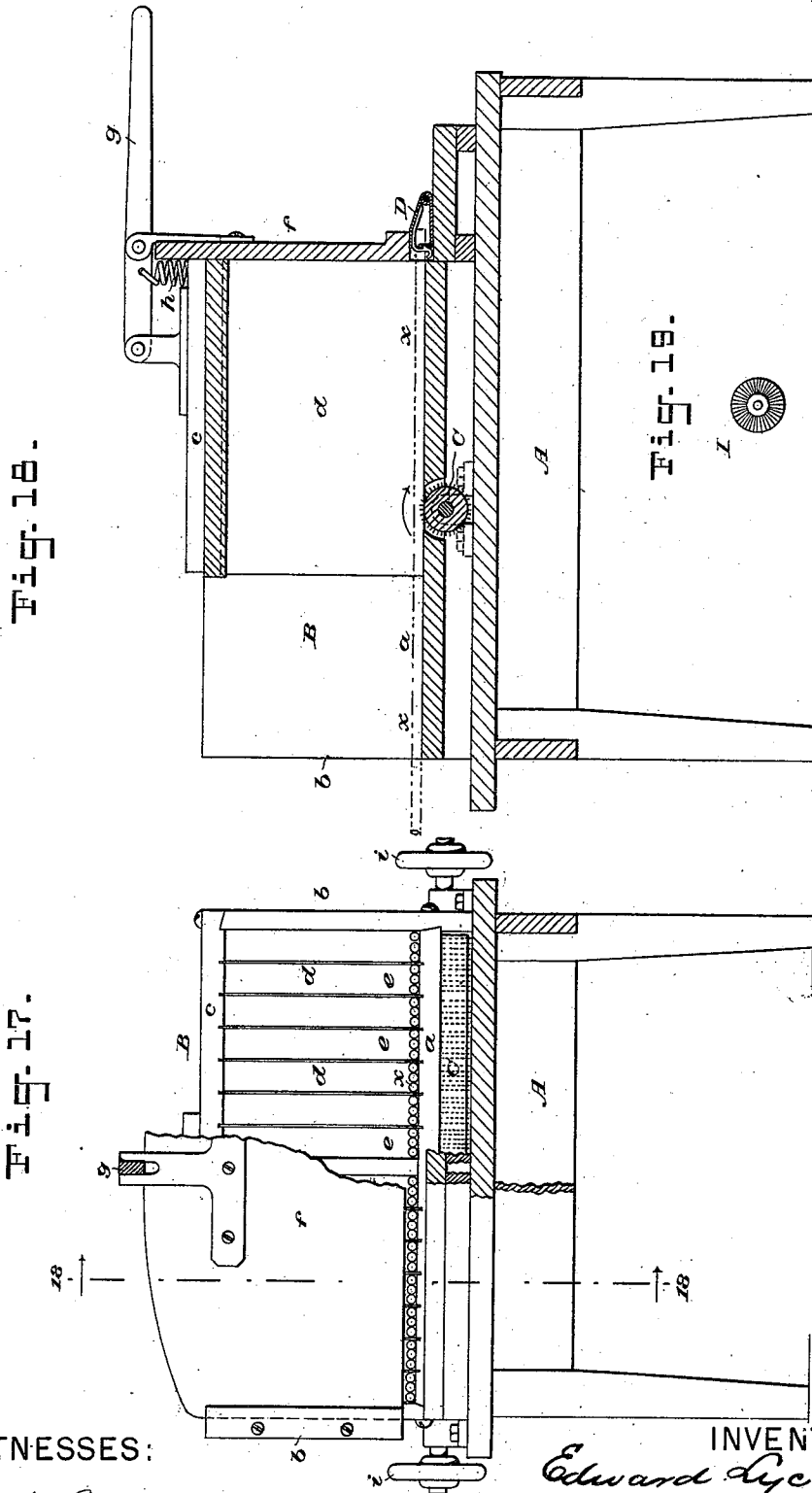
(No Model.)

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E. LYCAN.
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No. 355,188.

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INVENTOR:

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UNITED STATES PATENT OFFICE.

EDWARD LYCAN, OF HONOLULU, HAWAII, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE HAWAIIAN RAMIE COMPANY, OF SAME PLACE.

DECORTICATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 355,188, dated December 28, 1886.

Application filed April 30, 1886. Serial No. 200,678. (No model.)

To all whom it may concern:

Be it known that I, EDWARD LYCAN, a citizen of the United States, and a resident of Honolulu, in the Hawaiian Islands, have invented certain new and useful Improvements in Machines for Decorticating Ramie and other Fibrous Plants, of which the following is a specification.

My invention, as its title indicates, relates to that class of machines designed for the decortication and treatment of fibrous plants, and particularly that plant known as "ramie;" and the object is to remove from the stalks of the plant the outer bark and the inner woody portion of the same.

My machine will be hereinafter fully described, and its novel features carefully defined in the claims.

In the drawings which serve to illustrate my invention, Figure 1 is a side elevation of my machine, broken across at two points for lack of room. The parts removed have the same construction as the parts adjacent to the break. Fig. 2 is a plan of Fig. 1. Fig. 3 is an elevation of the right-hand end of the machine as seen in Figs. 1 and 2. Fig. 4 is a transverse section on line 4 4 in Fig. 1, the rollers being partly in elevation and partly in axial section. Fig. 5 is a transverse section on line 5 5 in Fig. 1. Fig. 6 is a detail view showing the scraper-bars. Fig. 7 is an enlarged plan view, detached, illustrating the construction of the carrying-chains, holder, and holder-boxes. Fig. 8 is an elevation of the chain, holder-box, and lifting-wedge, on the same scale as Fig. 1. Figs. 9 and 10 are enlarged sectional views of the holder. These sections may be considered as taken on lines 9 9 and 10 10 in Fig. 7, but drawn to a much larger scale than the latter figure. Fig. 11 is a side view of the holder-box on the carrying-chain, drawn to a larger scale than Fig. 8, and Fig. 12 is a plan of Fig. 11, showing parts of the chain in section. Figs. 13 and 14 illustrate, on a large scale, the construction of one of the corrugated rollers. Fig. 13 is a sectional elevation, the section being taken on line 13 13 in Fig. 14, and the latter figure is a transverse section on line 14 14 in Fig. 13. Figs. 15 and 16 are respectively a side elevation of a part of one of the stripping-rollers and a sectional end elevation

of same, on a large scale. Figs. 17 and 18 illustrate the construction of the charging-box. Fig. 17 is a front view or elevation of the charging-box with one-half of the lifting-door broken away, disclosing the partitions and feeding-roller, and Fig. 18 is a vertical section of same on line 18 18 in Fig. 17. Fig. 19 illustrates a modification of the stripping device.

My machine comprises two parts, the first part consisting of a charging-box for properly charging the holders of the machine with the fibrous stalks, and the second part consisting of the decorticating-machine proper. The charging-box is illustrated in Figs. 17 and 18.

A is a suitable supporting-table of the proper height.

B is the box proper, mounted on table A. This box comprises a bottom, *a*, two sides, *b b*, a cover, *c*, which extends back about two-thirds the length of the box, and thin vertical partitions *d d*, arranged between the bottom *a* and cover *c*, wide enough apart to form cells *e* for the reception of the stalks, and adapted to permit two or more stalks to lie side by side. The small circles *x* in Fig. 17 and the dotted lines *x* in Fig. 18 indicate the lower layer of the stalks. At the front of the box is a vertical sliding door, *f*, mounted in keepers and adapted to be operated by a lever or handle, *g*, fulcrumed on the box-cover. A spring, *h*, under the lever serves to counterbalance the weight of the door and raise it high enough to leave a space under it wide enough for the lower layer of stalks to pass out through.

C is a toothed roller mounted rotatively in bearings on the table, with its teeth projecting up through a slit or cut in the bottom of the box. This is a feed-roller, and when rotated by a suitable crank or hand-wheel, *i*, in the direction of bent arrow in Fig. 18 the roller feeds the first or bottom layer of stalks out under the door into the holders, which I will now describe with especial reference to Figs. 9 and 10.

D is the holder, composed of two jaw-plates hinged together at one edge, (at *j*,) and provided at their free edges with jaws *k k*, of some suitable holding material—as india-rubber, for example—usually roughened or corrugated on their faces, as shown. In Fig. 18 one of these

holders D is shown placed in position to receive the ends of the lower layers of stalks when they are protruded from under the door. When the ends of the stalks are fed into the jaws of the holder, the upper jaw-plate is forced down and held down by spring-latches *l l*, three of which are shown in Fig. 7. This operation causes the holder to clamp fast the ends of the stalks. The charged holder is now placed in the decorticating-machine, which I will proceed to describe with reference to the drawings in general.

E is a suitable frame, generally quite long, at each end of which are mounted rotatively two chain-wheels, *m m*, on a shaft, *n*, and at the other end two chain-wheels, *m' m'*, on a shaft, *n'*. On these wheels are borne two like endless carrying-chains, F F, which move in unison. On the shaft *n'* is a spur-wheel, *o*, which meshes with a driving-pinion, *o'*, on a shaft, *p*, bearing a driving-pulley, *q*. Thus the chains may be driven from any source of power.

At the front end of the machine (at the right in Fig. 1) are mounted two plain crushing-rollers, G G, the upper roller being fitted to rise and fall in its bearings. At a suitable distance back from the rollers G are mounted two corrugated rollers, H H, the upper one being also fitted to rise and fall in its bearings. The construction of these rollers is clearly shown in Figs. 13 and 14, where *r r* represent the intermeshing teeth on the ends of the rollers, and *s s* the corrugations on their bodies. Next, back of the rollers H are arranged the scrapers, as many as may be necessary or desirable. These are designed to remove the woody part of the stalks broken and crushed by the rollers they have passed through. Each scraper is composed of an upper row of downwardly-bent cross-bars, *t t*, fixed at their ends in side rails, *u*, and extending across the machine-bed, and a lower row of bars, *v v*, bent in the form of bails, with their arms coiled to form springs at their points of attachment to side rails, *w*. The bars *v* each press upward elastically against a bar, *t*, its bent arms bearing on the latter. Next, after the scrapers is arranged a pair of stripping-rollers, I I. (Shown in detail in Figs. 15 and 16.) Each of these rollers is fitted with projecting ribs or strips *x' x'*, of india-rubber or other similar material of yielding character. These rollers are geared to run at greater speed than the other pairs of rollers, and in a direction opposite to the movement of the chains. (See arrows in Fig. 1.) The pulleys *y y* and belts *z z*, (clearly shown in Figs. 1 and 2) serve as a convenient means of driving these rollers from the driving-shaft. The upper roller I is adapted to move up and down in its bearings, and the lower roller I rotates in a tank, *a'*, of water or a liquid cleansing-bath.

I will now describe the means employed for mounting the holders D when charged in the carrying-chains F F, so that they may carry the stalks through the rollers. Attached to

the inner faces or sides of the chains, and oppositely, are pairs of devices which I will call "holder-boxes" *b' b'*. These are clearly shown in Figs. 7, 8, 11, and 12. Each holder-box is riveted or otherwise securely fastened to the chain, usually as seen in Fig. 12, and projects inwardly far enough to form a secure support for the end of the holder D. In Fig. 7 a holder D is seen in place in its boxes *b'*. At the back of the box *b'* is a curved wipe, *b''*, the function of which will be hereinafter described. On the chains F F, over each holder-box *b'*, is mounted an incline or lifting-wedge, *c'*, (seen best in Figs. 1, 7, and 8,) the object of which is to lift the upper rollers G, H, and I, so as to allow the holders to pass under them as the chains move along. To this end said rollers are provided with loosely-mounted rings *d'* on their axes, between the ends of the rollers and their bearings, and in the paths of said wedges *c'*, to form anti-friction devices, as will be well understood. On the axes of the lower rollers H, in the same longitudinal vertical plane as the chains F and the rings *d'*, I mount sprocket-wheels *d'*, the studs on which engage the links of the chains as the latter move along and avoid chafing.

The scraper-bars *t* are set just high enough for the holders D to pass under and clear them as the latter move along. The spring-bars *v* are usually made from steel wire, and these will be depressed by the holder-boxes *b'* as the holders move along, the curved wipe *b''* acting to prevent the bars *v* from springing up too suddenly when the holder has passed.

In order to prevent the corrugated rollers H from breaking or cutting the fiber as the stalks pass between them, I provide these rollers, as before stated, with enlargements at the ends having teeth *r r*, somewhat in the nature of two toothed wheels. These prevent actual contact of the rollers at their middle portions, where the stalks pass between them.

I will now describe the operation of the machine. The cells *e e* of the charging-boxes B are filled with the stalks of ramie or other fibrous plant, the butts being pushed in against the door *f*, which is held down close by lever *g* during the filling. When the lever is released, the spring *h* lifts the door up to the height seen in Figs. 17 and 18, so that the lower layer of stalks may pass out under it. This is the function of spring *h*. The holder D, with its jaws open, is now placed, as seen in Fig. 18, under the raised door and the feed-roller C turned in the proper direction. This feeds the bottom layer of stalks out into the holder D. The door *f* is now forced down in the upper jaw-plate of the holder, so as to cause the latter to clamp on the stalks, and the spring-latches *l* snap into their sockets and hold the jaw so clamped. The holder thus charged with stalks is now placed in the holder-boxes *b'* on the chains, and the chains being in motion the holder moves forward through the machine. I have already described the devices

for allowing the holders to pass between the rollers, and it will only be necessary to say that the inclines or wedges *c'* let the upper rollers down gradually upon the stalks when the holder passes. The first pair of rollers, G G, crush the stalks flat. The second pair of rollers, H H, which are corrugated or fluted, break up the woody portion of the stalks. The stalks pass between the rollers H a little faster than the holder moves, in order that there may be some slack fiber between the holder and the rollers as the holder passes under the first pair of scraper-bars. The holder presses down the elastic bars *v* of the scraper, and the wipe *b'* allows these bars to rise gradually and compress the crushed and broken stalks against the bars *t*. The stalks will pass under and over the bars of the scrapers in a zigzag course, somewhat as indicated by the zigzag dotted lines in Fig. 6. Being drawn through the scraper in this manner, all of the woody parts of the fiber and much of its outer bark are removed and fall down through the machine to the floor. If it should be found that parts of the fiber curl around and adhere to the scraper-bars, this may be prevented by making those portions of the bars which extend across the machine quite wide, so that the ends of the fiber will not reach around it.

The fiber, freed from its woody parts and rougher bark, next passes between the stripping-rollers I, which, as before stated, rotate in a direction opposite to that in which the chains are moving, and have a much greater surface-speed. The ribs or strips *x'*, of rubber, set in these rollers, strip off from the fiber the remaining outer bark and remove any small bits of wood which may have passed the scraper. In lieu of stripping-rollers with soft elastic ribs, I may employ revolving brushes, such as may be seen in Fig. 19. The rapid rotation of these brushes or rollers throws a spray of liquid up from the tank *a'* onto the fiber and aids the stripping operation by softening the fiber and bark. When the fiber passes through the stripping-rollers, the holder is taken out of its holder-boxes and the fiber removed from it, to be afterward dried and baled.

It should be understood that my machine may be made of any convenient length, and that the charged holders are placed in their boxes at one end of the machine and removed at the other end to be recharged. Several holders may be passing through the machine at once.

At the front end of the machine is a feeding-platform, K. (Seen best in Figs. 2 and 3.) This platform is designed to support the charged holder while it is being set in the chains.

Having thus described my invention, I claim—

1. The charging-box B, provided with partitions *d d* and a feed-roller, C, arranged at its bottom, as shown.

2. The charging-box B, provided with partitions to separate the stalks, a feed-roller to

feed out the lower layer of stalks, a sliding door, *f*, and a spring for raising said door high enough to permit the lower layer of stalks to pass out, as set forth.

3. The holder D, comprising two jaw-plates hinged together at one edge and provided with jaws of rubber or other like material to clamp the stalks, and with means for securing said jaw-plates together when clamped.

4. The combination, with the carrying-chains provided with holder-boxes *b'*, of the holders D, constructed substantially as set forth.

5. The combination, with the endless carrying-chains and suitable holders for clamping the ends of the stalks carried by said chains, of the smooth crushing-rollers, the corrugated rollers for breaking the stalks, the scraper for separating the woody portion of the stalk from the fiber, and the stripping mechanism for removing the outer bark, all constructed and arranged substantially as described, to operate in the succession named.

6. The combination, with the endless-chain carrier provided with means for clamping on and carrying the stalks, and with inclines or wedges *c'*, of the pairs of rollers G, H, and I, the upper roller of each pair being free to move up and down in its bearings, to permit of the passage of the holders which clamp the stalks.

7. The corrugated rollers H H, each provided with ribs *s s* at its middle part, and with teeth *r r* at its ends, which project a little beyond the ribs *s*, as shown.

8. In a machine for decorticating fibers, the combination, with an endless carrier for the stalks, of the two rollers I I, provided with projecting ribs *x'*, of rubber or similar material, said rollers being arranged to rotate in an opposite direction to that in which the fiber moves, and at a greater speed.

9. The combination, with the endless carrier for the stalks, of the rollers I I, between which the carrier moves, arranged to rotate in a direction opposite to that of the carrier, and the tank *a'*, for containing a liquid, in which the lower of the rollers I revolves, as set forth.

10. The scraper comprising two or more pairs of scraper-bars, each pair comprising a fixed bar, *t*, and a spring-bar, *v*, substantially as set forth.

11. The combination, with the scraper having an elastically-mounted bar, *v*, of the carrying-chains provided with holder-boxes, each of which has a curved wipe, *b'*, and the holder D, mounted in said boxes.

12. The holder D, comprising two jaw-plates hinged together at their one edge, jaws *k k*, of rubber, with corrugated faces, and two or more spring-latches, *l*, substantially as set forth.

13. The combination of the bent fixed bars *t*, two or more extending across the machine, and the bent bail-like bars *v*, two or more extending across the machine, and their ends coiled to

form springs at their points of attachment, the pairs of bars forming scrapers, as set forth.

14. The combination, with a series of rollers arranged in pairs for operating successively on the stalks of fibrous plants, of two endless chains, F F, and their carrying-wheels, said chains moving between the upper and lower rollers of said pairs, and holders carried by said chains for clamping on the ends of the stalks and drawing them through the machine.

15. The combination, with the endless chains F F, provided with holder-boxes *b'*, and inclines or wedges *c'*, attached to them at the same points as the holder-boxes, of a holder for the fibrous stalks carried by the chains, and a pair of rollers, between which the holder is carried, the upper roller of said pair being mounted to move up and down in its bearings

and provided with loose rings *d'* on its axes, which roll over the wedges *c'*.

16. The combination, with the endless carrier for the stalks, and the scraper, of the corrugated rollers H H, and mechanism for driving said rollers at a little greater peripheral speed than the speed at which the carrier moves, said parts being arranged relatively to each other and operating substantially as set forth.

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

EDWARD LYCAN.

Witnesses:

L. OHLO,

JONA. AUSTIN.