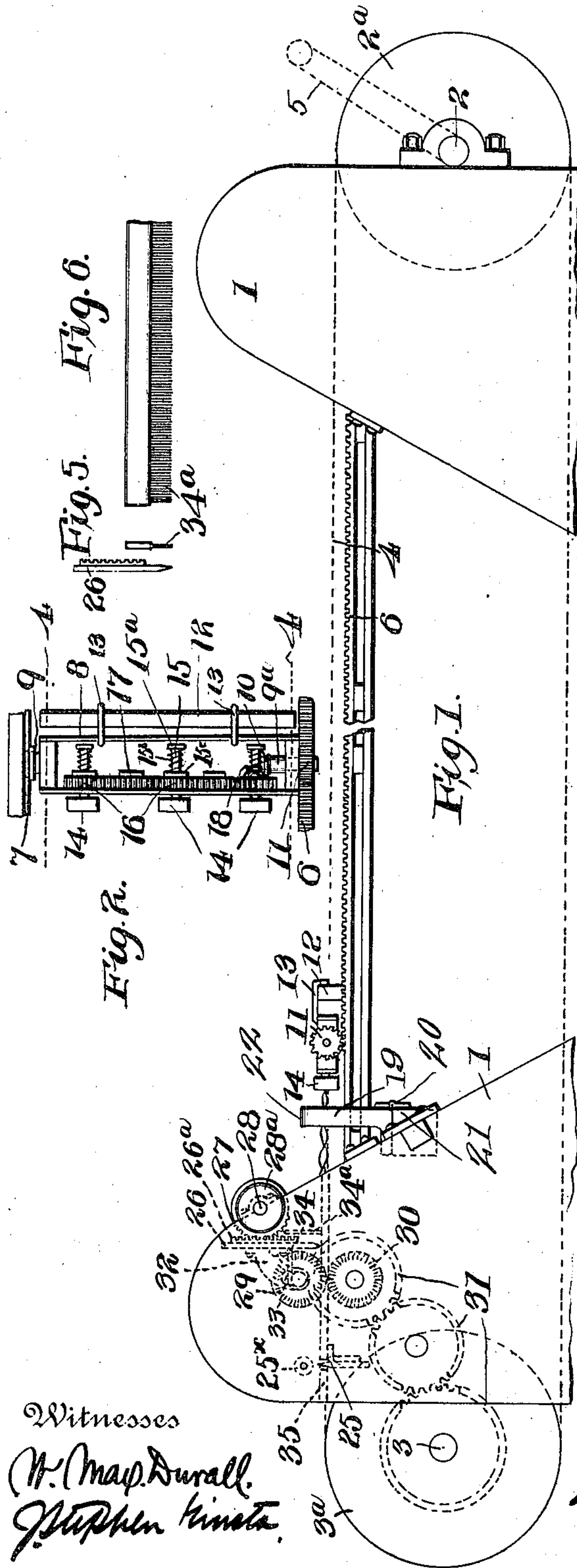


No. 859,878.

PATENTED JULY 9, 1907.

J. S. GILLIES.
DEFIBRATING MACHINE.
APPLICATION FILED JUNE 5, 1906.

2 SHEETS—SHEET 1.



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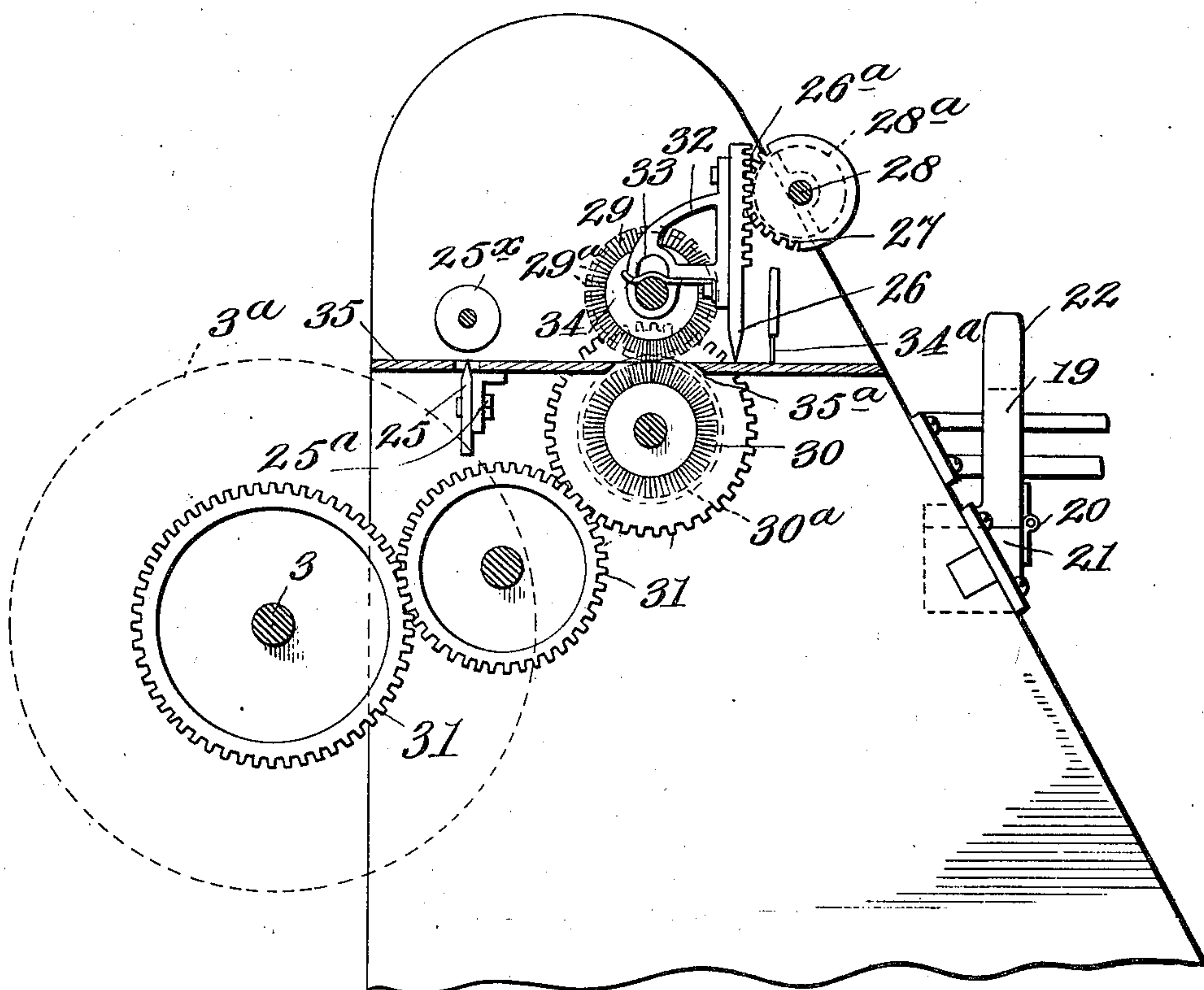
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2 SHEETS—SHEET 2.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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DEFIBRATING-MACHINE.

No. 859,878.

Specification of Letters Patent.

Patented July 9, 1907.

Original application filed September 27, 1905, Serial No. 280,362. Divided and this application filed June 5, 1906.
Serial No. 320,354.

To all whom it may concern:

Be it known that I, JOHN S. GILLIES, a citizen of the United States, residing at Manila, in the Philippine Islands, have invented certain new and useful Improvements in Defibrating-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

10 This invention relates to improvements in machines for the treatment of fibrous plants, and is especially adapted for use in separating the refuse matter from the fibers contained in the stalks of the abaca and similar fiber bearing plants.

15 In my former application, filed September 27, 1905, Serial No. 280,362, now matured as Patent No. 832,476 of Oct. 2, 1906 and of which this is a division, the primary object was to provide means for twisting the clean fibers into a loose strand, while the uncleaned portion of the plant was being denuded of its viscous matter and the containing skin or integument, the object being to take the strain off individual fibers and thereby preventing breakage.

20 In the present application, one of the objects of the invention is to first pass the denuded fibers through a combing device before the twisting operation is performed, whereby the fibrous material of each stalk is separated into a plurality of groups, and each group twisted into a loose strand.

25 Another object of the invention is to further lessen the strain on the fibers by providing means to keep the stalk free from trash or refuse matter adjacent the operating knives or scrapers, and thus prevent any clogging thereof.

30 Other objects and advantages will appear from the following specification, and the particular features of novelty will be pointed out in the claims.

To more fully understand the invention, reference is had to the accompanying drawings, illustrating a practical embodiment of same, in which like letters designate the same parts in the several views and in which:—

Figure 1 is a fragmentary view in side elevation. Fig. 2 is a fragmentary view, showing the particular form of twister heads illustrated in plan. Fig. 3 is a detail front elevation of the yieldingly mounted comb. Fig. 4 is a fragmentary view in elevation, looking to the left in Fig. 1, with the comb omitted and a portion of the upper knife broken away to show the rotary brushes. Fig. 5 is a local edge view of the upper or second knife and an adjacent auxiliary comb, Fig. 6 is a front elevation of said auxiliary comb, Fig. 7 is a detail sectional view through the table and shafting, on an enlarged

scale, and showing the cleaning and scraping mechanism in side elevation.

In carrying out the invention, a suitable frame, preferably of angle iron, may be employed, and in the drawings there is illustrated the upright standards 1 for supporting the operating parts.

2 and 3 designate transverse shafts at the forward and rear end, respectively, on which are mounted the end sprocket wheels 2^a and 3^a at each side of the frame-work construction. Around these sprockets reeve the endless belts or sprocket chains 4. The sprocket chain may be driven by any suitable power, but for the purpose of illustration, I have shown (in dotted lines Fig. 1) a crank 5 connected to the shaft 2.

In carrying out the present invention any suitable means may be employed for twisting the groups of fibers into loose strands, but for the purpose of disclosure I have simply illustrated the means shown in my former application above referred to and which may be briefly described as follows.

6 is a rack extending longitudinally along the top of one side of the frame-work, and 7 (Fig. 2) is a rail extending longitudinally along the other side of the frame-work.

8 is a twister head frame, on one end of which is mounted the guide wheel 9 adapted to ride along the rail 7, and provided at the other end with the rotary stud shaft 9^a carrying beveled gear wheel 10 and the pinion 11, which latter is adapted to mesh with rack 6.

12 designates one of a plurality of cross bars transversely connecting the sprocket chains to which is detachably secured, as by the connections 13, the twister head frame.

14 designate the twister heads, adapted to engage the end of the stalk, which are carried by the spindles 15 having the gear wheels 16 thereon, between which gears are interposed the idler gear wheels 17. The end spindle is provided with a beveled gear wheel 18 meshing with the beveled gear wheel 10. The inner end of the spindles 15 are headed as at 15^a and interposed between said heads 15^a is a coil spring 15^b engaging a loose washer 15^c lying adjacent the gear wheel. It will be understood of course that the spindles 15 are so splined with respect to their gear wheels that they may reciprocate longitudinally but are locked against independent rotation. The object of this is to provide means for yieldingly mounting the twister heads independently of each other to compensate for longitudinal strains on the clean fibers.

19 is a comb, preferably of wood and yieldingly mounted as by means of the spring hinge connection 20 interposed between the comb and a transverse support 21. This comb is provided with the teeth

22 and the spaces between the teeth are lined with rubber as at 23.

25 designates the first knife or scraper and 26 the second one which may be vertically adjustable as by means of the rack 26^a thereon, engaging a segmentally toothed pinion 27 on the headed spindle 28 provided with a knob 28^a. If desired the knife 25 may also be vertically adjustable in any suitable way. In the drawings (Fig. 7), this is illustrated conventionally by clamping bolts 25^a. It is also desirable to provide a roller as at 25^x above the knife so that the hemp in its passage through the machine goes between said roller and knife, the roller serving as a table or guide.

Interposed between the knives 25 and 26 and adjacent the knife 26 are a pair of rotary brushes 29 and 30, the spindle of the brush 29 being provided with a pinion 29^a meshing with a pinion 30^a, on the spindle of the brush 30, on which latter spindle is carried one of a plurality of transmission gears 31 operated by the shaft of the sprocket wheel 3^a. While both of these brushes 29 and 30 are designed to brush the plant as it is being denuded and thereby assist in cleaning same, still the primary object of the upper brush 29, being located immediately adjacent the knife or scraper 26, is to maintain an approximately clean space at the plant entrance side of the knife (or at that position where the plant enters beneath the knife) by brushing away from the knife the glutinous mass which might otherwise accumulate there and form a clogging mass impairing the effectiveness of the device.

The upper roller 29 may be mounted so as to be vertically adjustable in any suitable manner. In the drawings, this has been shown by supporting brackets 32 depending from the knife 26 and provided with elongated slots 33 in their lower ends to receive the spindle. The outer end of the spindle may be guided in slots formed in the frame-work, and is yieldingly held down in the slots 33 by means of suitable springs 34 carried by the knife 26. By this arrangement, the roller 29 will be held down in position, and at the same time the knife 26 may be moved downwardly independently of the roller 29, when the same is in the position shown in Figs. 1 and 7. At the same time, when the knife is elevated to allow the twister head to pass beneath same, the roller is also elevated and while I do not limit myself to this conjoint operation, the same may in some instances be desirable. It may also be desirable to provide a fine comb between the knife 26 and the yielding comb 19. In the drawings this comb is designated at 34^a and is preferably located immediately adjacent the rear face of the upper knife 26. In Figs. 5 and 6, this fine comb is shown in edge and front elevation, and consists of a backing provided with teeth like an ordinary sewing needle.

35 designates a shelf or feeding table which is transversely slotted to receive the knife 25 and which is also slotted as at 35^a to admit of the cooperation of the rotary brushes, it being understood that these brushes, as illustrated, are preferably disposed in vertical alignment on opposite sides of the shelf or table.

To now describe the operation of the machine illustrated in the drawings, it will be understood that initially the knife 26 and brush 29 is jacked up to an ele-

vated position above the table 35 to allow the twister head frame to be brought up adjacent the knife 25. The stalks of abaca being now firmly secured in the twister heads 14, upon the operation of the sprocket chain, the twister head frame will be moved forwardly beneath the elevated brush and knife, and after it has been passed beneath same, the brush 29 and knife 26 are lowered into operative relation with the strips of abaca. Also the comb 19 may be swung forwardly to allow of the passage of the twister head frame. It will be seen that during the forward movement of the strips of abaca, the lower knife 25 gouges out the viscous matter of the plant, and the upper knife 26 scrapes off the integument on the upper side, so that as the abaca leaves the upper knife, it is in the comparative form of a ribbon of fibers. These clean fibers passing through the teeth of the comb are separated into groups, the rubber lining at the base of each division between the teeth closing gently on the fiber and exerting a slight yielding pressure (like the pressure for instance by passing flax through the fingers of one's hands), minimizing the tendency towards breaking which the fiber possesses. The object of the fine comb 34^a previously referred to is because of the necessity for certain grades of cordage to have coarse fibers. To make these coarse fibers, I relax the pressure on knife 26 and the fibers come under the knife without being entirely separated. The function of the fine comb is to puncture the ribbons of fibers and as the strands or ribbons are pulled through the needle-like teeth to separate them into coarse fibers. When the pinion 11 reaches the rack 6, the twister heads will be rotated and the groups of fibers will be twisted into an enlarged loose strand as the remaining portions of the stalks are being denuded of waste material. As the abaca is being passed beneath the knife 26, the rotary brushes 29 and 30 will engage the plant on opposite sides, immediately adjacent the plant entrance side of the knife preventing the accumulation of waste material at that side of the knife, which will otherwise form into a hard mass, owing to the sticky nature of the waste matter, and obstruct the free passage of the abaca beneath the knife. This will also to a great extent reduce the strain on the cleaned fibers, the passage of the abaca beneath the knife not being impeded by congesting masses.

It will be understood that any suitable form of twister head might be employed, the particular construction shown in the drawings being for purposes of illustration only. It will also be understood that the comb may be moved closer to the knife, if desired, and indeed other changes in detail might be made without departing from the spirit of the invention.

What I claim is:—

1. The combination in a machine for defibrating fibrous plants, of means for denuding the fibers of the plant of waste vegetable matter, a comb for separating the cleaned fibers into groups, and means cooperating to feed and twist said groups of fibers into a loose strand while the remainder of the plant is being denuded of waste material, substantially as described.

2. The combination in a machine for defibrating fibrous plants, of means for denuding the fibers of the plant of waste vegetable matter, a comb for separating the cleaned fibers into groups, a yielding lining between the teeth of said comb, and means cooperating to feed and twist said groups of fibers into a loose strand during the denuding operation, substantially as described.

3. The combination in a machine for defibrating fibrous

plants, of a knife or scraper for denuding the fibers of waste vegetable matter, and a rotary brush operating immediately adjacent the plant entrance side of said knife or scraper, substantially as described.

5 4. The combination in a machine for defibrating fibrous plants, of a knife or scraper for denuding the fibers of waste vegetable matter, and a pair of rotary brushes operating immediately adjacent the plant entrance side of said knife or scraper and located on opposite sides of the
10 path of travel of the plant being treated, substantially as described.

5 5. The combination in a machine for defibrating fibrous plants, of a knife or scraper, a rotary brush operating adjacent said knife or scraper, means for withdrawing said
15 brush from contact with the plant being treated, and means for similarly withdrawing said knife, substantially as described.

20 6. The combination in a machine for defibrating fibrous plants, of an adjustable knife, an adjustable brush rotatably mounted adjacent said knife, and means cooperating with said knife and brush to conjointly adjust same and to provide for a further movement of the knife in one direction independently of said brush, substantially as described.

25 7. The combination in a machine for defibrating fibrous plants, of a knife, a rotary brush carried thereby immediately adjacent the plant entrance side thereof, and means for operating said knife and holding same in varied positions of adjustment, comprising a rack carried by
30 said knife and a pinion engaging said rack, substantially as described.

8. The combination in a machine for defibrating fibrous plants, of an adjustable knife and means for operating same, slotted bracket arms carried by said knife, a rotary
35 brush journaled in the slots of said bracket arm, and a spring member carried by said knife and engaging the spindle of said rotary brush for normally holding same down in said slots, substantially as described.

40 9. The combination in a machine for defibrating fibrous plants, of means for denuding the fibers of waste matter, a rotary brush operating adjacent said denuding means, a

comb for separating the clean fibers into groups, and means cooperating to feed and twist said groups of cleaned fibers into a loose strand while the remainder of the plant is being denuded of waste material, substantially
45 as described.

10. The combination in a machine for defibrating fibrous plants, of a pair of knives disposed on opposite sides of the path of travel of the plants being treated, a pair of rotary brushes disposed between said knives and on opposite
50 sides of the path of travel of said plants, said knives and brushes cooperating to clean the fibers of waste material, a yieldingly mounted comb disposed in the path of travel of said cleaned fibers for separating them into groups, and means cooperating to feed and twist said groups of fibers
55 into a loose strand while the remainder of the plant is being denuded of waste material, substantially as described.

11. In a machine for defibrating fibrous plants, the combination with a knife for denuding the fibers of waste
60 vegetable matter, a comb for separating the clean fibers into groups, and an auxiliary fine comb disposed between said first comb and knife, substantially as described.

12. The combination in a machine for defibrating fibrous plants, of means for denuding the fibers of the plant of
65 waste vegetable matter, a fine comb engaging said denuded fibers, and means for twisting the denuded and combed fibers into strands, substantially as described.

13. The combination in a machine for defibrating fibrous plants, of means for denuding the fibers of the plant of
70 waste vegetable matter, means for separating the clean fibers into groups, means cooperating to feed and twist said groups of fibers into a loose strand while the remainder of the plant is being denuded, comprising spring-controlled axially movable twister heads, and means for
75 rotating said twister heads, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

JOHN S. GILLIES.

Witnesses:

D. R. WILLIAMS,
A. W. BEAM.