(No Model.) 2 Sheets—Sheet 1.

S. B. ALLISON.

FIBER SEPARATING AND CLEANING MACHINE.

No. 568,224. Patented Sept. 22, 1896.

Fig. 1.

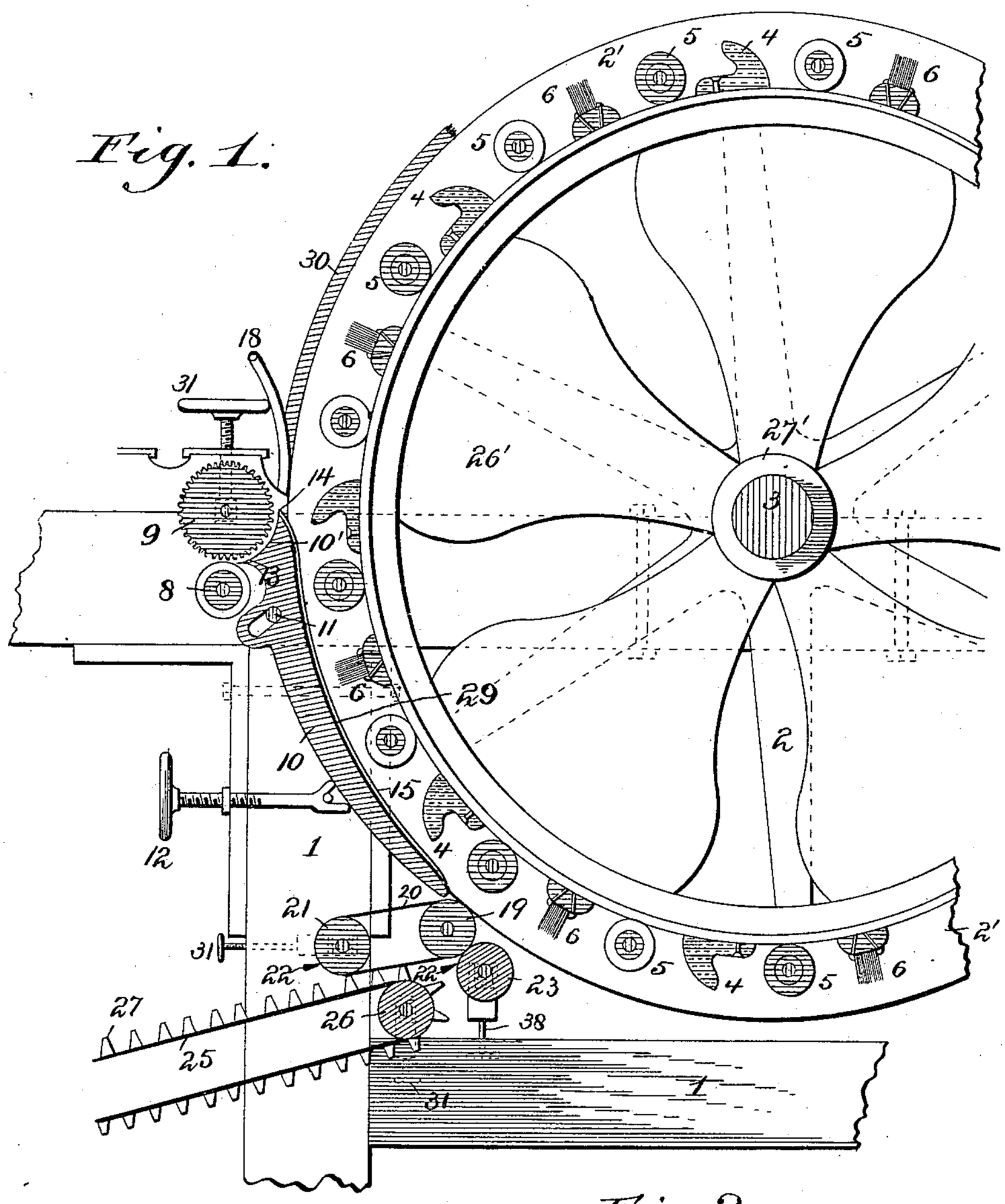
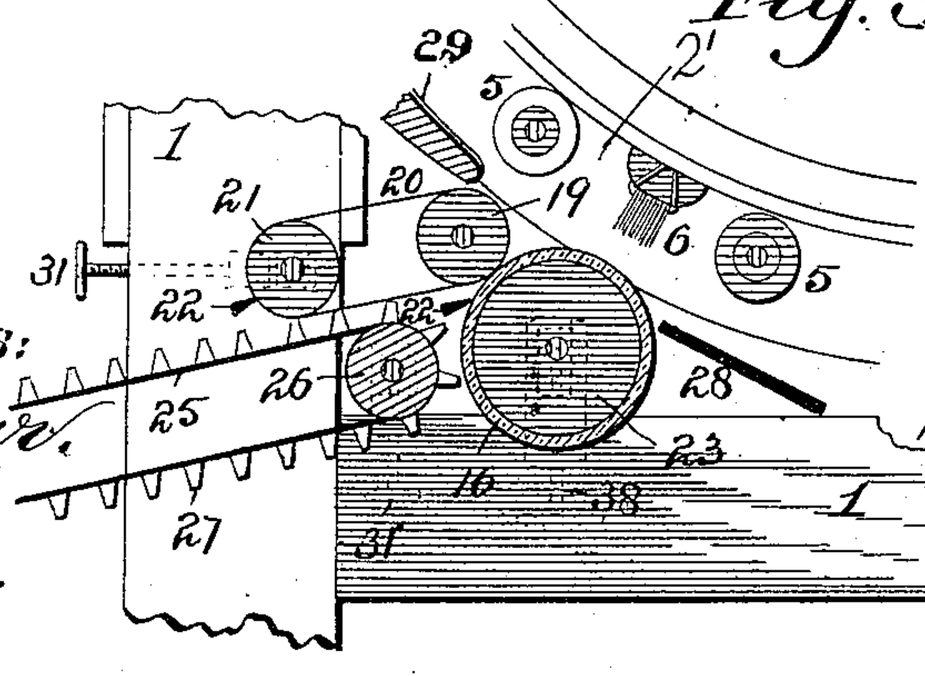


Fig. 3.



Witnesses:
J. B. McGirr.
C. M. Catlin.

Inventor:
Samuel B. Allison.
By Benj. R. Catlin
atty.

(No Model.) 2 Sheets—Sheet 2.

S. B. ALLISON.

FIBER SEPARATING AND CLEANING MACHINE.

No. 568,224. Patented Sept. 22, 1896.

Fig. 2.

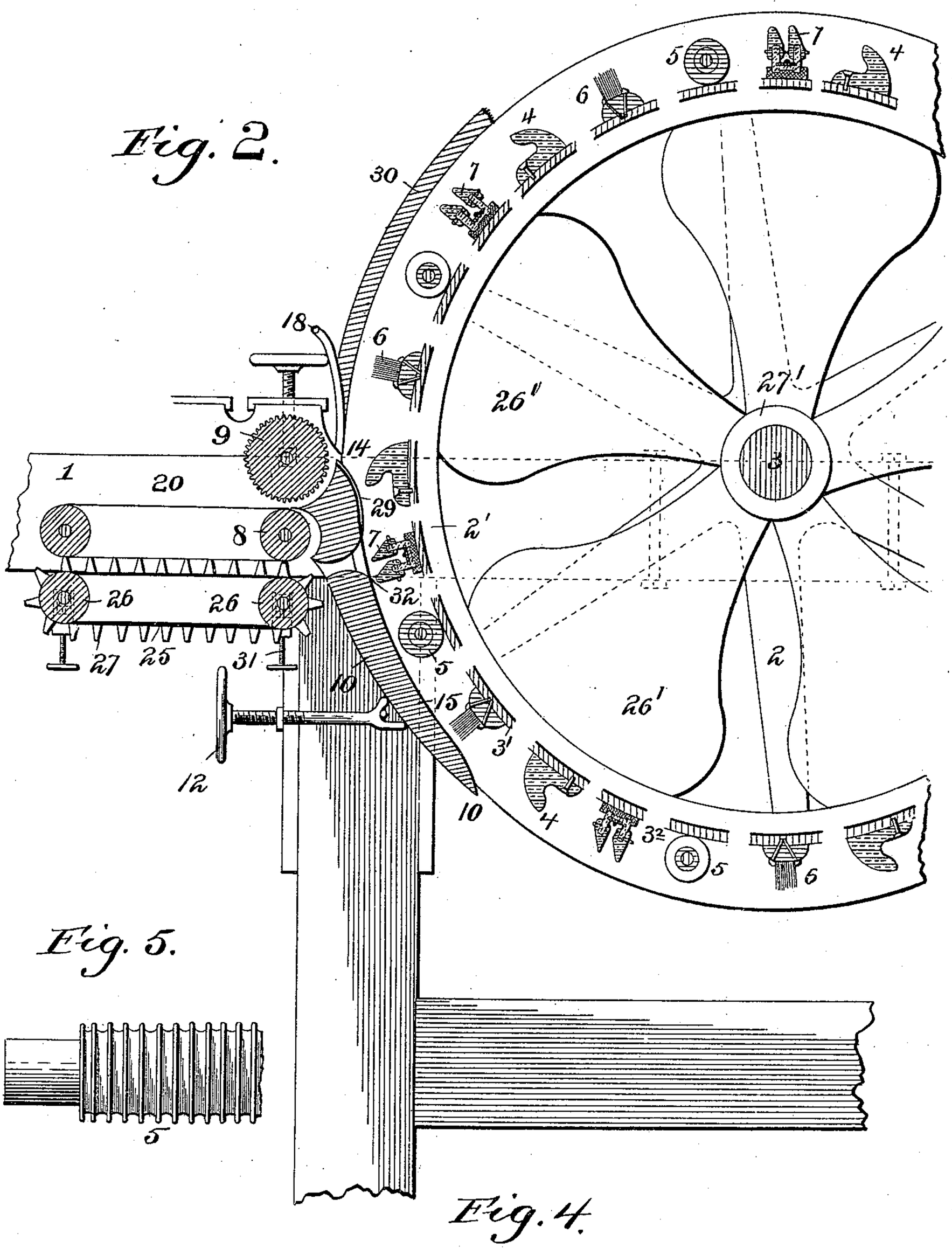
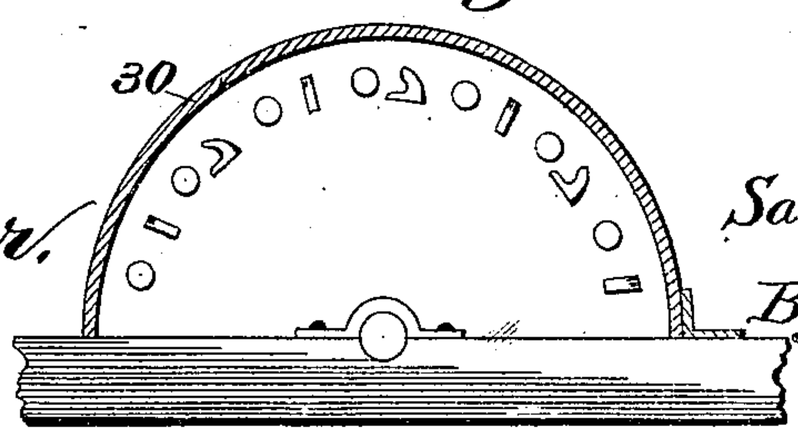


Fig. 5.

Fig. 4.



Witnesses:
J. B. McGirr.
C. M. Catlin.

Inventor:
Samuel B. Allison.
By Benj. R. Catlin
atty.

UNITED STATES PATENT OFFICE.

SAMUEL B. ALLISON, OF NEW ORLEANS, LOUISIANA.

FIBER SEPARATING AND CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 568,224, dated September 22, 1896.

Application filed January 2, 1896. Serial No. 574,093. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL B. ALLISON, a resident of New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Fiber Separating and Cleaning 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 pertains to make and use the same.

The invention relates to a machine for separating the fibrous and woody parts of various leaves and plants, and its object is to effect this in an economical and efficient manner without rehandling the material; and the invention consists in the matters hereinafter described and particularly pointed out.

In the accompanying drawings, Figure 1 is a partial section of the machine. Figs. 2 and 3 are similar views showing modified details. Fig. 4 is a like view on a reduced scale, partly diagrammatic in character. Fig. 5 is a partial elevation of a corrugated fiber-separating roller.

Numeral 1 denotes the main frame, in which is journaled a rotating frame or drum consisting of metal perforated disks or spider-heads 2, secured to a shaft 3 and connected to each other by a tubular shell 3′, (see Fig. 2,) having perforations 3^2, to which shell are suitably fixed detachable and interchangeable fiber-cleaning devices, such as scraping-blades 4, cylindrically-grooved bars 5, wire or bristle brushes 6, and elastic rubbing devices 7. (See Fig. 2.) The use of the perforated cylindrical shell is not essential, and the working devices may be attached directly to the heads of the rotating frame or drum in any usual or suitable manner.

8 denotes a drawing-in or feeding roller, and 9 a longitudinally-grooved breaking and drawing-in roller having a larger diameter than roller 8. This roller 8 is circumferentially grooved and thereby adapted to split stalks.

10 indicates a curved plate having pivots 11 journaled in the main frame of the machine and provided with adjusting screw or screws 12. This plate has a scraping edge 13 adapted to clean the surface of roller 8, and said plate is extended above the level of said roller 8, and has its upper end on the side next to roller 9 made concave, as shown at 10′, to conform to the roller and provide a working bed therefor, whereon the broken stalks are rubbed by the ribs or corrugations of said roller. Said concave portion is situated a short distance from this upper grooved splitting and rubbing roller 9 and extends above the passage between it and the lower feed-roller 8. It holds the material against said roller 9 and guides it up over an upper edge 14 of the bed. The material is drawn down across the said edge by the action of the cleaning devices to be described.

The stalks or leaves are crushed between the rollers 8 and 9 and are immediately thereafter rubbed and the fiber loosened on the concave bed 10′, and are then sharply bent across the upper edge 14 and forced down between the main concave surface 15 of plate 10 and the rotating drum 2 by the action of the bars, rollers, brushes, and like devices attached to said drum.

The screw or screws 12 are adapted to turn the plate 10 on its pivots 11 in manner to adjust the edge 13 with reference to roller 8 and to vary the distance of the upper end of the plate 10 from roller 9, and also the distance of its main part or working bed 15 from the working devices borne by the rotating frame.

18 indicates a pipe to supply water or a chemical solution to the material under treatment. The delivery end of this pipe is over the main concavity 15 of the plate 10, which guides the liquid and the fibrous material downwardly.

19 denotes a fiber-gripping and belt-driving roller situated at the foot of plate 10. 20 is an elastic belt, and 21 a roller coöperating with roller 19 to move the belt.

23 is a roller coöperating with roller 19 to grip the fiber and move it out of the machine. Its bearing can be moved to or from roller 19 by means of an adjusting device 38. Roller-scraping blades or the like are denoted by 22.

25 denotes an endless belt for carrying off the fiber. It is driven, preferably, about one-third faster than belt 20 by its supporting-rollers 26, and is provided with transverse bars 27, which press the fiber against the belt 20 and rub off remnants of the refuse.

In practice the material is subjected to a

wood or pulp breaking and fiber-separating action continuously at every point between the feeding-in and the carrying-out or grip-rollers and until it escapes from under belt 20. The extension of the plate 10, with its bed 10′ above the passage between rollers 8 and 9 and up into the space between the latter roller and the rotating drum 2, insures the continuity of the separating or cleaning action at that point, and the bending of the stalks or leaves across the upper edge of the plate is very favorable to the separation of the hard or partially rigid and broken fragments of waste from the flexible fiber.

The cleaning devices carried by the drum can be varied to suit the character and condition of the material under treatment. The circumferentially-grooved bars 5 will act to separate portions of the fibrous curtain or sliver lengthwise and to maintain the parallelism of the fiber. These bars or rollers are journaled in the rotating frame to permit independent rotation, thereby obviating the breaking, cutting, or excessively-unequal drawing or pulling of parts of the fiber. The bars or blades 4, having the curved or scooped working edges, are well adapted to lift woody or refuse material and separate it from the fiber. The brushes 6 and elastic rubber bars 7 will act to remove the finer waste. These devices thus acting in quick succession to straighten, longitudinally separate, brush, rub, and scrape the material results in a clean unbroken and untangled fiber.

The fibrous material will be carried between the so-called "grip-rollers" 19 and 23 by the conjoint action of gravity, the centrifugal action of the cleaning devices, and the action of the air-blast caused by a fan the blades of which are indicated by 26′. This fan is situated interiorly with respect to the fiber-removing devices and is rotated in the same direction, but at a higher rate of speed.

27 indicates a tubular fan-shaft surrounding the drum-shaft 3. The fan is not, however, essential to the operation of other devices. In some cases the fiber-separating devices create a sufficient air-current.

To confine the air-current and more especially to prevent the material from spreading laterally too far, the plate 10 can be provided with flanges 29 at its ends, and, if desired, these may be overlapped by the exterior part 2′ of the head.

30 indicates a cover so situated as to leave an air-conduit between it and the working devices of the rotating frame. This aids the production of an induced air-current that will carry dust downwardly.

As the fiber is drawn between rollers 19 and 23 loosened refuse will be swept past them by the action of the cleaning devices and by the air-current.

28 denotes an inclined plane to guide refuse to a point of discharge immediately under the drum. This guide 28 may be made of any convenient material, such as paper, cloth, or wood.

The bearing-boxes of the various rollers will be provided with adjusting-screws 31 to vary the action of the several cleaning devices as required by different materials or different conditions of the same material.

The character of the working devices will be varied to suit the particular plants and their various conditions, and the sprinkling device will be used or not, as circumstances require. The shape of the main frame, the proportions of the parts, the number and variety of working devices, and other like details may be varied by mechanical skill without departing from the invention, and the use of the machine is not limited to the treatment of any particular plants or leaves.

In Fig. 2 is illustrated a modification of the improved machine, requiring less power to drive it. 32 is an opening or slot in a plate 10, said opening extending nearly across the plate. The fibrous portion of the material is blown into this opening by the air-current generated by the rotary cleaning devices, such as bars 4, with or without the aid of a fan, while the heavy loosened refuse is swept down upon the lower part of plate and is guided thereby and separately driven out of the machine. The edges of the plate surrounding the slot are rounded to facilitate the fanning of the fiber into the same. The lower portion of plate 10 below its slot 32 is a guide for refuse. The belts 20 and 25 are similar in construction and operation to those shown in Fig. 1. The belt 20 is supported and driven in part by the lower crushing and feeding roller 8, and it and its supporting-rollers cooperate with each other and with the lower belt, provided with slats or scraping-bars 27, in a manner hereinbefore described in connection with similar belts shown in Fig. 1. In the form shown in Fig. 2 the operative part of the working bed does not extend below the slot, and the bed is thereby simply made shorter. Its part below the slot can be used as a guide for refuse, though if it were omitted the upper part would act as a bed, though of less extent than in other modifications, as may be suitable in some cases. The lower belt-roller, through the medium of the slatted belt, coöperates with the roller 8 to grip and draw the material in manner similar to the grip-rollers elsewhere described. In this last-described construction the slot is at the foot of the working bed, the unused part below serving merely as a guide, and the belt-roller, with its slatted belt, coöperates with the upper belt-roller 8 and the two act as so-called "grip-rollers" to draw the fiber around the foot of the bed.

As shown in Fig. 3, the lower grip-roller 23 may in some cases be made larger than the roller 19 and placed near the path of the cleaning devices. It is provided with a leather or rubber cover 16, which serves as a

bed whereon the tail end of the fiber may be cleaned while the main part thereof is being drawn by and between said rollers and away from the path of the brushes, scrapers, and other like devices.

Heretofore grip-rollers equidistant from the path of the cleaning devices have been combined with concave working beds, one of which was adapted for the cleaning of the tail end of the fiber. To insure these functions, one of the rollers is not only made larger than the other, but is placed nearer the path of the cleaning devices, whereby the front end of the fiber may be more certainly arrested and turned between the rollers and its near end subsequently cleaned upon the larger one situated nearer said cleaning devices.

The details of construction may be varied by mechanical skill, provided the substantial principles of construction and operation are preserved. The drum, fan, and rollers can be driven by any suitable motor with gearing of usual form.

The receiving and cleaning rollers, belts, and other devices will have a greater superficial velocity than the devices conveying the material to the said receiving devices, whereby a drawing action is produced to keep the sliver taut and the fiber parallel, and an important purpose of the upper working bed 10′ of plate 10 is to insure continuous action upon the stalks or leaves between the feeding-in rollers and the main cleaning devices.

In some cases, and particularly when the fiber is dry, the upper belt 20, as shown in Fig. 2, may be omitted. The fiber will in such case be blown out onto an endless belt 25, having by preference transverse slats. The cleaning-tools and frame rotating at a high speed will waft the fiber out under the plate 10 or through a slot therein and onto the carrier-belt. An inclined board 28, similar in operation to the mote-board of a cotton-gin, may be used to arrest and guide refuse blown outwardly and forwardly by the rotating devices in lieu of the lower part of plate 10, as before explained.

I am aware that a toothed roller has been combined with a feeding-belt, a frame carrying picking-teeth, and a plate having two curved beds conforming in shape to the paths of the teeth of the roller and frame, respectively, one of said beds extending entirely under the toothed roller. It is characteristic of my improvement that a crushing-roller is placed immediately over a belt-driving roller, which latter is used not only to aid in operating the belt, but also coöperates with said crushing-roller, a curved bed having a cleaning edge for the belt being situated at one side of the proximate surfaces of the crushing-roller and belt.

Having thus described my invention, what I claim is—

1. In combination feeding-rollers comprising a longitudinally-grooved roller and a roller situated in proximity to and coöperating with the said grooved roller to break stalks transversely, a rotating frame provided with fiber-cleaning devices, a concave working bed having an edge adapted to clean the lower roller and an edge situated above, said bed conforming in shape to the upper feed-roller, the ribs of said grooved roller being adapted to first break the stalks by pressure on the lower roller and then to loosen the fragments on said bed whereby they may be beaten and brushed out from the fiber bent over the upper edge of the bed, substantially as described.

2. In combination, the rotating frame, supporting cleaning devices, the inclosing cover, the feeding-rollers, the guiding and working plate having a working bed conforming to the upper feed-roller and also a working bed conforming in shape to the path of the devices carried in said rotating frame, the gripping-rollers, the carrying-off belt and the liquid-supplying pipe, all substantially as set forth, whereby a continuous conduit for air is produced and whereby liquid may be admitted to said conduit.

3. In combination with a rotating frame carrying fiber-cleaning devices, the concave working bed conforming thereto, a fiber-gripping roller carrying an endless belt and situated at the foot of the said bed a second grip-roller situated below the first named, and a belt-carrier having transverse slats adapted to scrape the material against the upper belt adjacent a belt-carrying roller, substantially as described.

4. In combination with a rotating frame carrying fiber-cleaning devices, the concave working bed conforming thereto, a fiber-gripping roller carrying an endless belt and situated at the foot of the said bed and a second grip-roller situated below the first named, a belt-carrier having transverse slats adapted to scrape the material against the upper belt adjacent a belt-carrying roller, and an inclined plane extending downwardly from the grip-rollers, substantially as described.

5. In a fiber-cleaning machine, a rotary frame provided with cleaning devices, a working bed conforming in shape to the path of said cleaning devices, fiber gripping and removing rollers situated immediately at the foot of said bed, an endless belt, a roller coöperating with the upper gripping-roller to support and move said belt, and a separate endless belt adapted to rub the fiber against the belt first named, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SAMUEL B. ALLISON.

Witnesses:
JOS. F. WALTON,
T. G. BRIGHAM.