

No. 657,206.

Patented Sept. 4, 1900.

C. M. & O. C. TERRELL.

FIBER FORMING MACHINE.

(Application filed Nov. 15, 1899.)

(No Model.)

2 Sheets—Sheet 1.

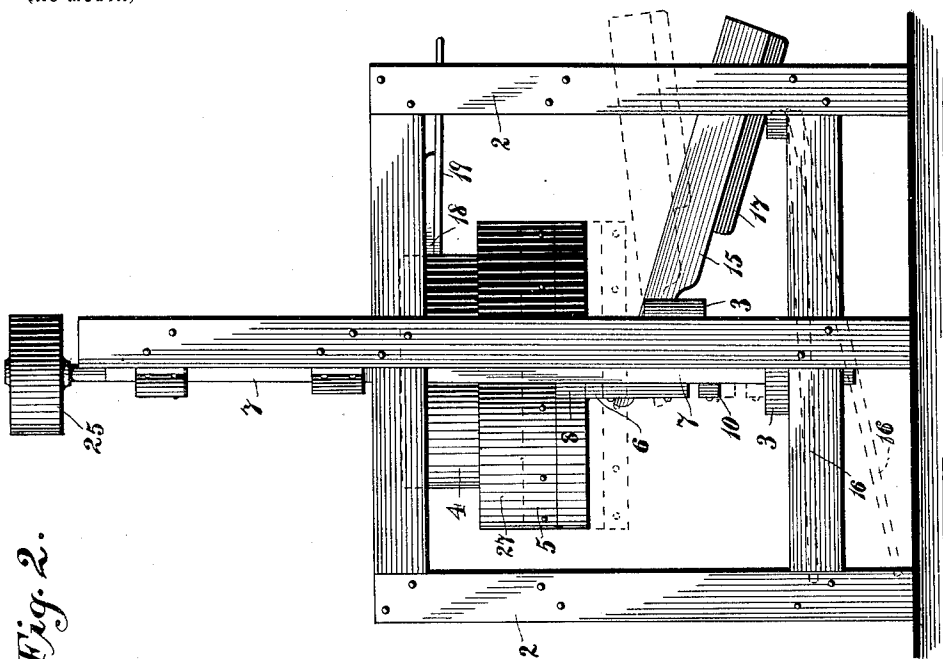


Fig. 2.

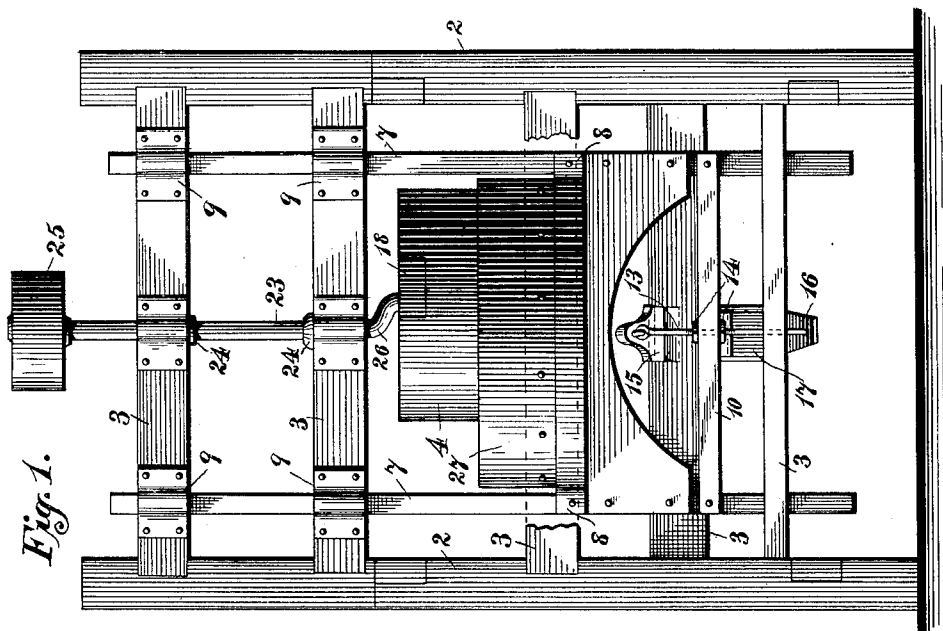


Fig. 1.

Witnesses
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 By *E. J. Signa* Attorney

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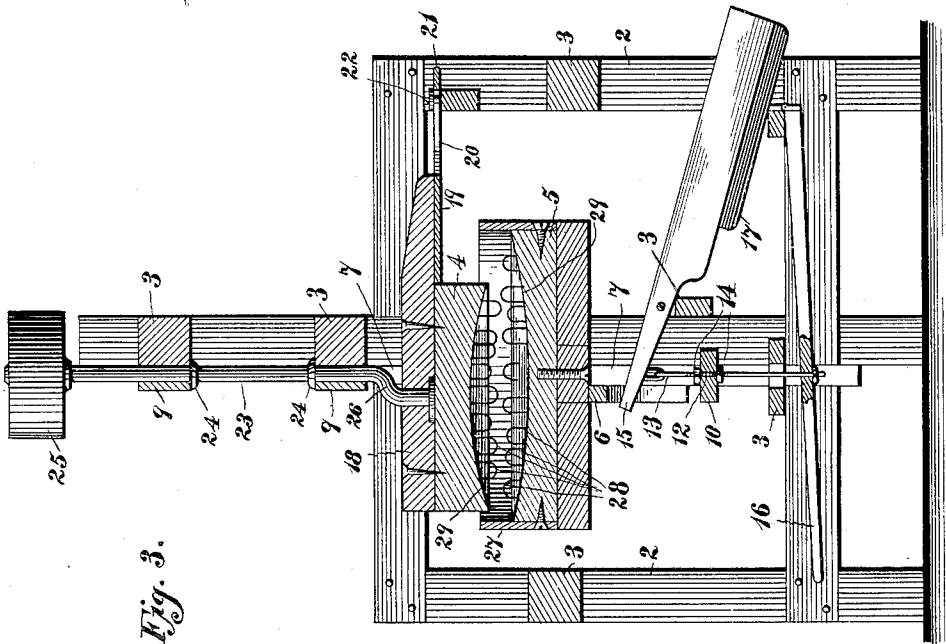
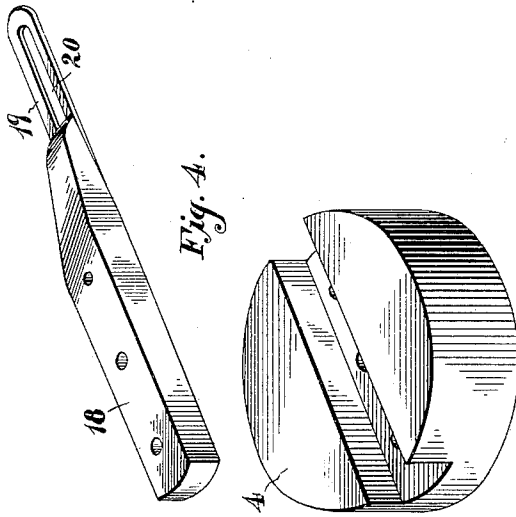
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UNITED STATES PATENT OFFICE.

CLARK M. TERRELL AND OLIVER C. TERRELL, OF GRANTS PASS, OREGON.

FIBER-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 657,206, dated September 4, 1900.

Application filed November 15, 1899. Serial No. 737,125. (No model.)

To all whom it may concern:

Be it known that we, CLARK M. TERRELL and OLIVER C. TERRELL, citizens of the United States, residing at Grants Pass, in the county of Josephine and State of Oregon, have invented a new and useful Fiber-Forming Machine, of which the following is a specification.

This invention relates to machines for forming fiber from various kinds of material and for use in different arts, and it is intended primarily for the reduction of pine needles and like natural products to a finely-fibrous condition; and the object of the invention is to provide a simple and effective machine capable of carrying out with rapidity the functions just specified.

The machine includes in its organization and in combination with two grinding members means for imparting a gyratory or whirling motion to one of said grinding members, and the latter may be of any suitable construction; but we have found in practice that two cooperating disks produce very excellent results. As a means for introducing material between the working surfaces of the grinding members we prefer to mount one of them for movement toward and from its companion, and it will be apparent that when said movable member is shifted away from the cooperating member material can be placed upon the same, after which said shiftable member can be returned to its primary position for the purpose of carrying out the grinding operation. As a means for adding to the effectiveness of the grinding mechanism we prefer to arm or provide the adjacent or working faces of the two grinding members or disks with teeth or suitably-spaced projections, the ends of the teeth on one grinding device being adjacent to those upon the other grinding device.

The invention is not limited to any particular means for imparting a gyratory movement to the driven member of the grinding mechanism, and it is distinctly stated that for this purpose any means may be employed. The gyratory motion applied causes the fiber between the two disks to form into rolls or balls, which tend to constantly change their position and which turn in all directions, and the continuous combined twisting and rolling ac-

tion given to the fiber, together with the pressure brought to bear upon the same by the disks, produces a finely-divided and excellent fiber, as demonstrated in practice.

With the ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, the preferred embodiment thereof is illustrated in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a front elevation of a fiber-forming machine constructed in accordance with our invention. Fig. 2 is a side elevation of the machine as seen from the right in Fig. 1 and showing the vertically-reciprocative member of the grinding mechanism in its elevated and depressed positions by full and dotted lines, respectively. Fig. 3 is a vertical central section. Fig. 4 is a detail perspective view of the upper grinding-disk and the arm whereby the gyratory movement is imparted thereto.

Like characters denote like and corresponding parts in each of the several figures of the drawings.

Any suitable framework constructed of any convenient material may be provided for sustaining the different parts of the machine, and the framework is represented as consisting of two side pieces or uprights 2, connected at suitable intervals by the cross bars or braces 3.

The grinding mechanism is represented as including in its construction an upper disk 4 and a lower disk 5, and we prefer to impart to the upper disk the gyratory motion to which reference has hereinbefore been made and to mount the lower disk for vertical reciprocation, said lower disk being lowered by the manipulation of suitable instrumentalities to provide for the introduction of the stock between the two disks for action thereby.

The disk 5 rests upon the cross-bar 6, which is secured at its ends to the two vertically-reciprocative rods 7, and said disk is provided with oppositely-disposed arms 8, notched at their outer ends to receive the said rods 7, which are supported against the two upper cross-braces 3 and are held in place there-against by the bearing-boxes 9, and said rods

also extend through apertures in the lowermost cross-brace 3, from which it will be evident that the rods, which are disposed in parallelism, are properly guided in their vertical reciprocation. The cross-bar 10 is secured to the rods 7 near their lower ends and is provided near its middle with an opening 12 to receive the connecting rod or bolt 13, to which the check-nuts 14 are threaded and which bear against the upper and lower faces of the cross-bar 10. The upper end of the connecting rod or bolt 13 is attached to the lever 15, while the lower end is attached to the lever 16, which latter is adapted to be operated by the foot of an attendant. The foot-lever 16 is fulcrumed at its rear end to the framework, and the rod 13 is connected thereto at its middle, and it will be apparent that by pressing down upon the free end of the said lever the inside auxiliary frame, consisting of the vertically-reciprocative rods 7 and their transverse connections, can be lowered, thereby to depress the lower disk 5, so that material can be placed upon the same. As a means for returning said disk to its primary position we prefer to provide the lever 15 with a weight 17, which exerts sufficient stress to instantly return the lower disk to its initial position when the foot-lever 16 is released and which also serves to maintain said lower disk in proper operative relation to the upper gyratory disk 4. The weighted lever 15 is fulcrumed between its ends to one of the cross-bars 3, constituting a part of the framework of the machine.

The upper disk 4 is mortised to receive the arm 18, the upper face of which is flush with the upper surface of said disk, and said arm extends diametrically from the disk and has secured thereto the plate 19, having a longitudinal slot 20 to receive the stud or pin 22 upon the framework and which is headed to hold the plate in place.

As hereinbefore set forth, any convenient means may be employed for imparting the necessary gyratory motion to the upper disk 4; but in practice we employ a crank-shaft 23, supported for rotation about a vertical axis and by suitable bearing-blocks upon the upper or topmost cross-bars 3 of the framework, and said shaft is provided at suitable places with stop-collars 24, which serve to hold it against endwise movement, and it is provided with a suitable driving device, as the pulley 25, by which it can be rotated.

Said shaft has at its lower end the crank 26, which is connected to the diametrical arm 18 of the upper grinding-disk, and it will be evident that by rotating the pulley 25 a gyratory or whirling motion will be imparted to the upper disk for the purpose of carrying out the grinding motion.

The lower disk is provided with a circumferential guard wall or fender 27, extending entirely around the same and which extends above the lower surface of the upper disk and acts to prevent the escape and consequent waste of the substance under action between

the two disks, and said disks are armed upon their adjacent faces with teeth, as 28, the edges of which are adjacent and which cooperate to reduce the material between the disks to a fibrous condition, and these teeth are arranged in circular series and consist of staples or U-shaped members suitably fitted in the disks.

We prefer to concave the working faces of the disks, as at 29, and these concavities serve to prevent the fiber from spreading out between the disks when one or both of them are in motion.

By means of the gyratory motion the fiber is thrown together and has a tendency to remain in the center of the disks. It is not allowed to form into a rope, but into balls or spheres, and each of these is thrust from side to side and rolled over and over in such a manner as to bring all parts of the same into direct contact with the teeth of the disk, which works the fiber uniformly, and the peculiar motion brings certain actions into play—viz., a rubbing action—for when the substance is caught between the disks the pressure is brought to bear directly upon the same, and at the same time a lateral or rubbing action is applied, and this compound action gathers the substance into balls and gives to them a twisting and crimping action and at the same time a crushing action, so that all portions of the balls are reduced to a fibrous condition. In practice the balls are placed in a screen for cleaning.

Changes in the form, proportion, size, and the minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what we claim is—

1. In a machine of the class specified, the combination of two grinding members provided with the opposing concave working surfaces and having teeth arranged to clear each other, and means for imparting a gyratory movement to one of said grinding members, substantially as described.

2. In a machine of the class specified, the combination of two grinding members, means for imparting a gyratory movement to one of said grinding members, and means for effecting a positive movement of one member vertically and to an inoperative position with respect to the other member, substantially as described.

3. In a machine of the class specified, the combination of two grinding-disks having the concave working surfaces in opposing relation, and means for imparting a gyratory movement to one of said disks, substantially as described.

4. In a machine of the class specified, the combination of two grinding members, one of which is movable with a gyratory motion in a horizontal plane, means connected opera-

tively with the other grinding member for positively moving the same vertically with respect to the first-named member, and means tending normally to maintain the laterally-moving grinding member in operative opposing relation to the gyratory movable member, as and for the purposes set forth.

5. In a machine of the class specified, the combination with two grinding members, of means for imparting a gyratory movement to one of said members, and a reciprocative device for supporting the other grinding member, substantially as described.

6. In a machine of the class specified, the combination with two grinding members, of means for imparting a gyratory movement to one of said members, a reciprocative device for supporting the other grinding member, and an operating-lever connected to said reciprocative device for lowering the same, substantially as described.

7. In a machine of the class specified, the combination with two grinding members, of means for imparting a gyratory movement to one of said members, a reciprocative device for supporting the other grinding member, an operating-lever connected to said reciprocative device for lowering the same, and means acting in opposition to said lever for elevating said reciprocative device thereby to hold the grinding member carried thereby in working relation with its mate, substantially as described.

8. In a machine of the class specified, the combination with two grinding members, of means for imparting a gyratory movement to one of said members, a reciprocative device for supporting the other grinding member, a weighted lever, a foot-lever, and means connecting both levers with said reciprocative device, substantially as described.

9. In a machine of the class specified, the combination with upper and lower grinding members, of means for imparting gyratory movement to the upper grinding member, an auxiliary reciprocative frame including two rods connected by cross-bars and said rods

being supported by the main frame, and one of the cross-bars being adapted to support the lower grinding member, two levers fulcrumed upon the framework and one of them being weighted, and means connecting both of said levers to said auxiliary frame, substantially as described.

10. In a machine of the class specified, the combination of two grinding-disks having concave working surfaces in opposing relation, U-shaped teeth fitted into the working faces of said grinding-disks, and said teeth arranged in different planes on the respective disks to clear each other, and means for imparting a gyratory movement to one of said disks, substantially as described.

11. In a machine of the class specified, the combination with two grinding members both of which are concave, and both of which are provided with teeth upon their working surfaces, of means for imparting a gyratory motion to one of said grinding members, substantially as described.

12. In a machine of the class specified, a grinding mechanism comprising disks provided with concave working surfaces in opposing relation, one of said disks being smaller than the other, teeth projecting from the concave working surfaces of said disks and arranged to clear each other, and a boundary wall circumscribing one member and extending therefrom in overlapping relation to the other member, in combination with means for imparting gyratory motion to the smaller grinding member, and means for adjusting the larger grinding member laterally with respect to the other grinding member to which the gyratory motion is applied, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

CLARK M. TERRELL.
OLIVER C. TERRELL.

Witnesses:

SAM AXTELL,
WM. ALFRED.