

No. 652,708.

Patented June 26, 1900.

S. B. ALLISON.
FIBER MACHINE.

(Application filed July 23, 1896.)

(No Model.)

2 Sheets—Sheet 1.

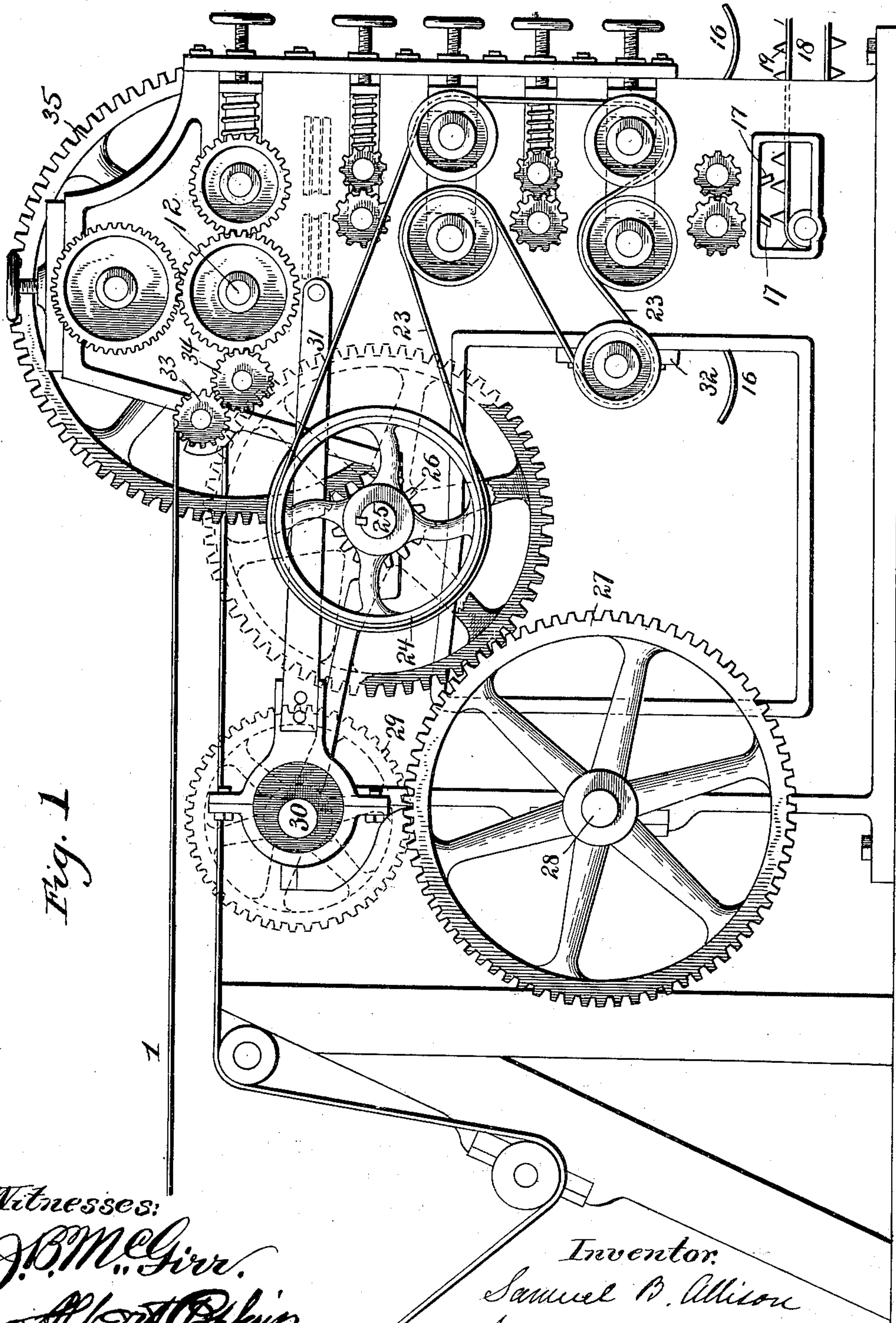


Fig. 1

Witnesses:

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Albert A. Phelps

Inventor.

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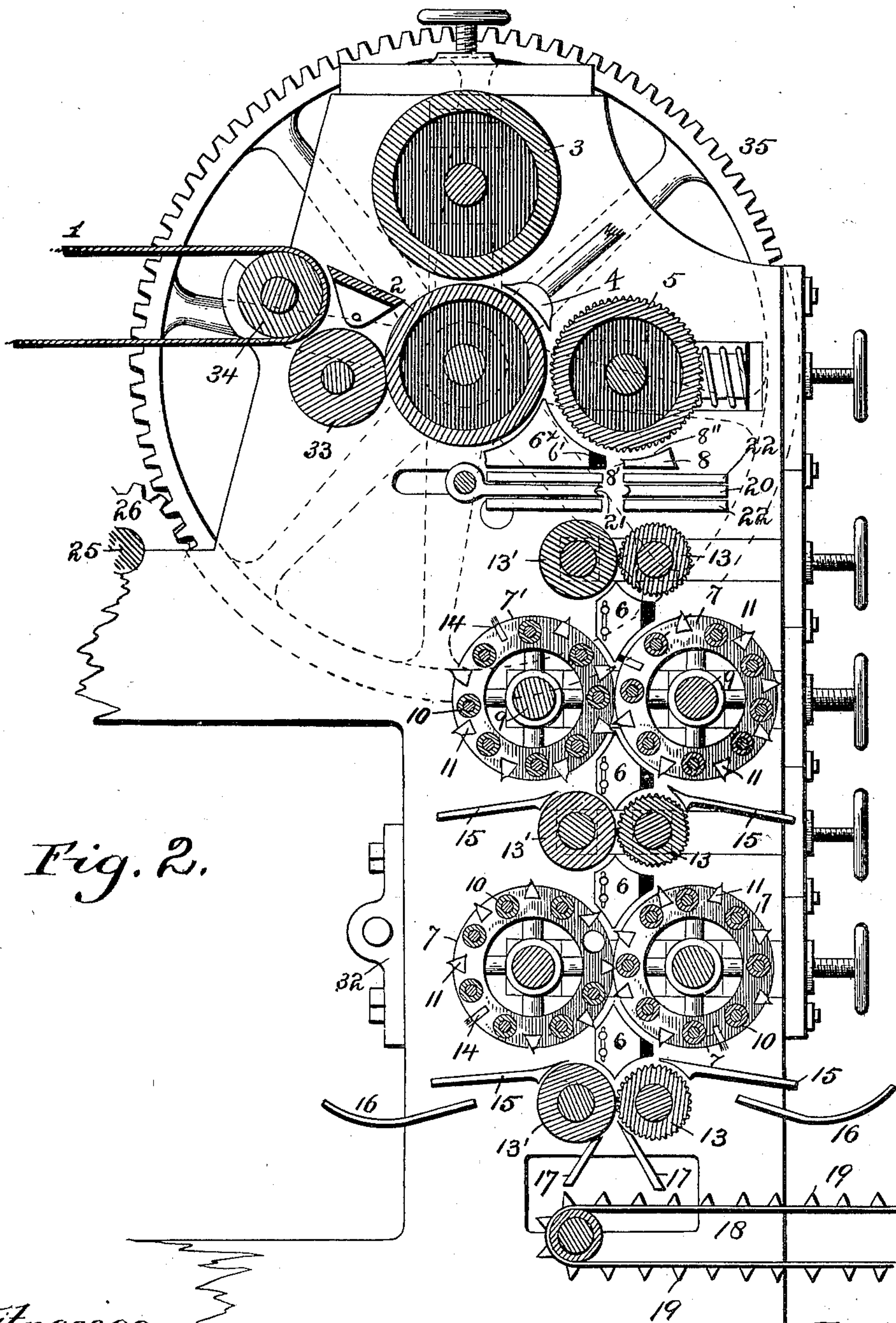


Fig. 2.

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UNITED STATES PATENT OFFICE.

SAMUEL BENJEMAN ALLISON, OF NEW ORLEANS, LOUISIANA.

FIBER-MACHINE.

SPECIFICATION forming part of Letters Patent No. 652,708, dated June 26, 1900.

Application filed July 23, 1896. Serial No. 600,288. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL BENJEMAN ALLISON, a resident of New Orleans, in the parish of Orleans and State of Louisiana, have
5 invented certain new and useful Improvements in Fiber-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 machines for separating fiber from stalks and leaves of plants, such as ramie, flax, sisal, pineapple, and the like. Its object is to simplify the mechanism
15 and increase the efficiency of such machines; and it consists in the construction hereinafter described and particularly pointed out.

In the accompanying drawings, Figure 1 is a side elevation, and Fig. 2 is a partial vertical section on an enlarged scale.

Numerals 1 denotes a feeding-belt:

2 denotes a smooth-surfaced roller five inches in diameter and preferably made of brass or covered with sheet-brass, as also the
25 other rollers may be. 3 indicates a roller having a diameter of six inches and cooperating with roller 3 to crush and split the stalks; but these rollers 2 and 3 are not intended to transversely break and crush the stalks, that being the function of rollers 2 and 5, as hereinafter described.

4 is a sprinkling device adapted by its form and situation to guide the stalks or leaves downwardly.

35 5 is a six-inch roller provided with longitudinal corrugations and geared to run faster than the feeding-roller 2.

6^x denotes a working block or bed adjustably supported in the machine-frame by means of bolts passing through the said block. It has an upper working face or table, curved to correspond to the periphery of the roller 5 and provided at its upper part with an edge adapted to scrape roller 2. This block is of
45 a wedge form and has a sharp edge terminating the two concave faces that conform to the adjacent rollers, whereby the main working face (shown at the right) can be extended up between the rollers in close proximity to a
50 plane passing through the center of both rollers, so that the material is acted upon by roller 5 immediately after it is acted upon by

the two rollers. The object, therefore, of this sharp edge and of the continuation of the working face to said edge is to insure this immediate action and obviate straying of fiber
55 and to insure also a coaction between roller 5 and the bed as extensive as practicable consistent with diverting the path of the fiber from the roller at the opposite edge of the
60 working face, arranged as shown and elsewhere described. The concave face of the block extends, preferably, near the vertical plane passing through the axis of roller 5. At the edge or angle 6' a rubber strip may be
65 secured, if desired.

8 denotes a block or bed having a concave guiding-face 8' and a concave upper face 8'', conforming to roller 5. Rear end portions of stalks or fiber carried over by roller 5 onto
70 the face 8'' would be rubbed on the bed by the corrugations of the roller and the wood loosened from the fiber.

Rollers 7 and 7' consist each of circular skeleton plates or heads secured to a shaft
75 9, said heads being connected near their peripheries by iron tubes or rods 10, one inch in diameter, covered with elastic material, preferably with rubber, having a thickness of three-fourths of an inch. The heads are
80 also connected by scraping-blades 11, brushes 14, and like fiber-cleaning devices, arranged alternately with each other and rubber-covered tubes 10, as shown. The scraping-bars
85 11 are approximately triangular in cross-section and have a concave face, whereby two scraping edges are provided which successively scrape the sliver. This form of bars does not occasion as strong currents of air as flat bars and has double the efficiency.
90 The heads are made in skeleton form or with openings to provide for the escape of air therethrough, and thus aid in obviating too concentrated and violent air-currents in the path of the sliver. The two rollers 7 and 7'
95 are so mounted that when they revolve each scraping edge of the bars 11 will in its revolution be in or near contact with a rubber-covered rod or tube 10.

13 and 13' indicate rollers for gripping and
100 drawing the fiber down and delivering it upon an endless belt 18. The roller 13 is corrugated or fluted lengthwise and adapted to rotate faster than roller 13', whereby it pro-

duces on the sliver a drawing and scraping action.

15 denotes roller-cleaning plates adapted to scrape the gripping-rollers and also to convey refuse to discharge-chutes 16. These refuse-deflecting plates may, if desired, be made convex near their upper ends to conform to the path of the blades and combs carried by the rollers 7 and 7', the said cavities forming beds upon which the rear ends of the fiber carried over onto the said beds are cleaned by the said blades and combs of the scraping and combing bars.

17 denotes plates to scrape the lower rollers 13 and 13', and 18 is an endless belt to carry off the cleaned fiber. Upon this belt, which has a velocity greater than that of the fiber passed between the adjacent rollers 13 and 13', are secured transverse cleaning or scraping bars 19, preferably about one and a half inches apart. The belt and its transverse bars or blades are so situated with respect to the lower edge of a plate 17 that they beat the sliver across said edge and scrape and shake out of it fine particles of refuse, which drop upon the belt between the bars 19 and are carried to the outer return-bend of the belt and dropped below, the cleaned fiber being meantime carried upon the tops of the bars and separately delivered in any usual or convenient manner.

In some cases a sliding breaking-bar 20, having a passage for the sliver and concave edges 21 on each side of said passage and operated by an eccentric or like means, may be employed to advantage. Instead of placing this bar immediately below the rollers 2 and 5 and the passage between them, as heretofore practiced, it is placed at one side of the vertical path between said rollers and beneath the lower edge of the concave bed or block 6^x. By this construction the fiber does not pass by gravity directly down in a straight line from the contact-points of the rollers, but is first rubbed on the bed or block 6^x until it reaches the vicinity of the lowest point of the roller 5, whence it is drawn down through a comparatively-small space to and through the slotted sliding bar. Immediately above and below said bar, respectively, is situated a pair of plates 22, supported in the frame or otherwise, so that they can be moved to or from each other to vary their distance apart, and thereby modify the action of the concave edges of the slot in the sliding bar according to the character and condition of the fiber. The block 8, having on its upper side a concave bed curved to correspond to roller 5, is adapted to receive between it and said roller the tail ends of the stalks or fiber which are thereby subjected to the joint action of the roller and block, which breaks and removes wood from said ends. The slots in the sliding bar will in its narrowest dimensions be from about an inch and a quarter to an inch and a half wide, and the horizontal distance between the plates 22 will be within about

the same limit and adjustable, as stated. The situation of these plates and sliding bar and of the passage therethrough immediately below the outer edge 6' of a bed 6^x and the cooperation of said bed and roller 5, whereby the material is held, rubbed, and deflected to one side, and thereby prevented from descending by gravity, and the action of the machine directly down from between rollers 2 and 5, as in prior machines, is deemed of special importance for the reason that such direct unobstructed vertical descent is necessarily of so great extent—about four inches, if five and six inch rollers 2 and 5 be used—that the fiber or a large part of it is without proper support and guidance in said space and liable to choke the sliding bar or other like devices and also to become tangled and bunched or wrapped about the journal-bearings. To avoid these very serious evils, a working bed 6^x is interposed, as shown and described, and the fiber rubbed thereon and guided down under roller 5, from the bottom of which it is drawn immediately into the passage between the plates 22 and through bar 20 or other wood breaking and loosening devices situated close to the point where the fiber is released by said roller 5 and so that only about from one-half of an inch to an inch of the material is free from the action either of the bed or the sliding bar or other wood-breaking device.

As a further means of guarding against the wrapping of portions of the fiber about the journals the bed 6^x, the beds 6, the plates 22, the scrapers 11, combs 12, brushes 14, and rubber-covered tubes, or a part of them, may be made longer than the feeding and crushing rollers 2, 3, and 5.

In Fig. 1 is shown the main part of the driving-gear.

23 indicates a belt driven by a pulley 24, fixed on the shaft 25, that carries a gear-wheel 26. This wheel meshes with and is driven by the gear 27 on the main driving-shaft 28. The gear-wheel 27 also drives gear 29, fast on a shaft 30, on which is fixed an eccentric to operate the reciprocating slotted blade 20 by means of connecting-rod 31. The belt 23 drives the rollers 7 and 7', as indicated in the drawings. 32 is an adjustable belt-tightening pulley.

33 and 34 indicate pinions by which power is transmitted to the feeding-belt from a pinion on the shaft 12 of a crushing-roller. The latter shaft carries the gear-wheel 35, which is driven by the pinion 26 on the shaft of the main belt-pulley. The other rollers are driven from the main shaft by suitable gear-wheels on pinions on their farther ends, which are of usual construction and not shown. The corrugated rollers are driven at a greater speed than the smooth-surfaced rollers opposed to them in order to produce a rubbing, drawing, or scraping action on the fiber.

The use of the particular cleaning devices 11 and 14 in rollers 7 and 7' is not essential in

all cases, and other devices for acting on the fiber may be substituted when desired.

By the use of the bed 6^x and beds or blocks 66, having the concave working faces, the material is subjected to continuous action instead of being relieved from such action by a considerable fall extending from the horizontal diameters of one pair of rollers to the like diameters of the next pair below, as above stated. One of the most convenient arrangements to effect these purposes has been illustrated; but it is not intended thereby to exclude other arrangements having substantially the same principles of operation and construction, the main objects of which are to insure in a combination substantially such as set forth a practically-continuous action of the rollers and other devices by interposing a working bed, such as 6^x, between two coacting rollers and placing scutching devices or the like adjacent the discharge end of said bed. The fiber is thereby not only acted upon continuously, but is defended from the disturbing action of air-currents generated by the machine, which tend to cause the free ends of the fiber to wrap about rotating parts. Further, the novel shape of the scraping-bars 11 coöperates in this direction by diminishing the currents heretofore caused by the flat blades or bars used in similar situations. By the improved construction the velocity of the machine can be very largely increased without wrapping or unduly disturbing the sliver.

The stalks or leaves are first split and their fibrous and woody portions partially separated by rollers 2, 3, and 5. They are then rapidly beaten on the concave table in the upper part of the block 6^x, and for this purpose the roller 5 is given a surface speed greater than that of the rollers 2 and 3 and greater than that of the material, whereby the split wood bent downwardly by the guide 4 is both beaten and scraped or rubbed against the block 6^x in a manner to loosen it from the fiber. As the material passes to and over the edge 6' of block 6^x it is guided and drawn through the slotted reciprocating plate, in case such is used, and then gripped and drawn down by the adjacent pair of small rollers 13 and 13'. The roller 13 being corrugated lengthwise and rotated faster than roller 13' rubs or scrapes the material as it is passed downwardly. The small size of these rollers reduces to a practical minimum the extent of the fiber left unsupported and unacted upon between them and the cleaning devices immediately above. A further separation and removal of the refuse is effected by the scraping and combing bars of the adjacent pair of rollers 7 and 7' acting alternately on opposite sides of the fiber and against the covered rods or tubes 10, and the rod-covering yielding under the pressure of the blades or teeth insures a smooth and efficient cleaning operation that allows of a high speed. To avoid cutting the rubber cover of the rollers, they

and the oppositely-supported teeth are relatively so arranged that the teeth when they approach the rubber the nearest are one thirty-second of an inch distant therefrom. The blades and the brushes and said opposing rubber-covered rods are preferably so arranged and supported that the blades or brushes will touch the rubber when rollers 7 and 7' are suitably rotated. Refuse is conducted away by the plates and chutes, and a final cleaning operation is effected by the belt, as above explained. Said belt and bars move with sufficient velocity to exert a drawing action on the fiber and scrape or beat the same against an opposing plate or like device. By this means the piling of the material immediately beneath the lower rollers, adjacent the belt, is prevented, and fine refuse is separated and carried away by the belt, which also carries off the fiber.

The construction and arrangement whereby the material is subjected to closely-continuous action and is held throughout its length so as to avoid wrapping and the disarranging effect of air-currents generated by high velocity are deemed important, as thereby a much greater speed can be safely and efficiently used. The support of the various roller-journals in spring-held boxes coöperates with this provision for increased speed, since they are thereby adapted to slightly yield to permit the easy passage of stalks of exceptional size or hardness.

The block 6, having a work bed or face extending up between rollers 2 and 5 in connection with said rollers and with roller 5 and with the scutching or beating devices situated closely adjacent the vertical diameter of said roller 5, continuously holds and acts upon the material, whereby the straying, dropping, or tangling of fiber is avoided. The block 6, with its bed, not only guides and supports the material, but in coöperation with roller 5 it provides that the action of the machine on the material shall be closely continuous that of rollers 2 and 5 and that of the scutching devices.

I am aware that a block with working bed has been used in connection with breaking-rollers and beating devices. My improvement is characterized by the particular devices and constructions hereinafter pointed out, whereby the continuity of the treatment of the material is maintained at the point between the breaking and scutching members of the machine.

Having described my invention, what I claim is—

1. The combination of rollers to crush stalks, scutching devices situated immediately adjacent one of said rollers, and a block situated between the rollers, said block having a working face curved to correspond to one of the rollers and extending from the point of operative contact of the rollers to a point adjacent the scutching devices, whereby the material is continuously acted upon by

one of the rollers from its reception by the rollers to its delivery to the scutching devices.

2. The combination of devices for crushing stalks, rollers acting simultaneously and oppositely on the crushed stalks, a block provided with a working face curved to correspond to one of the rollers and situated partly between them and extending from near a plane passing centrally through both rollers to and terminating near a plane passing through the center of one of the rollers and transverse to the first-named plane, and scutching devices acting on the material immediately adjacent the termination of said face, and a guiding-face 8' situated in close proximity to the termination of the working face the rollers and scutching device.

3. In combination, rollers to crush stalks, scutching devices situated immediately adjacent one of said rollers, and a block situated between the rollers with a sharp edge in proximity to their point of operative contact, said block having a working face curved to correspond to one of the rollers and extending from its sharp edge to a point directly adjacent the scutching devices, substantially as described.

4. The combination of devices for crushing stalks, rollers acting simultaneously and oppositely on the previously-crushed stalks, a working bed block having a sharp edge between the rollers and having a curved working face corresponding to one of the rollers extending from the said edge about a portion of one of the rollers whereby in operation the

material treated is supported and acted upon in a space between the rollers and conducted away from one of them and around the other through an arc of approximately ninety degrees, and scutching devices situated adjacent the end of said bed opposite its sharp edge said end of the bed being adjacent the periphery of one of the rollers, and a guiding-face 8' situated in close proximity to the termination of the working face the roller and scutching devices, substantially as described.

5. In a machine for cleaning fiber, rollers arranged in two coacting pairs, in combination with a block situated between the pairs of rollers and having two curved beds, each respective bed conforming to one roller of a pair, whereby the material is continuously acted on by one roller of a pair until its delivery to the succeeding pair.

6. In a machine for cleaning fiber, rollers arranged in two coacting pairs, in combination with a block situated between the pairs of rollers and having two curved beds each conforming respectively to one roller of a pair, said beds terminating in sharp edges of the block situated in close proximity to the respective coacting parts of each pair of rollers.

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

SAMUEL BENJEMAN ALLISON.

Witnesses:

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W. R. RICHARDSON.