

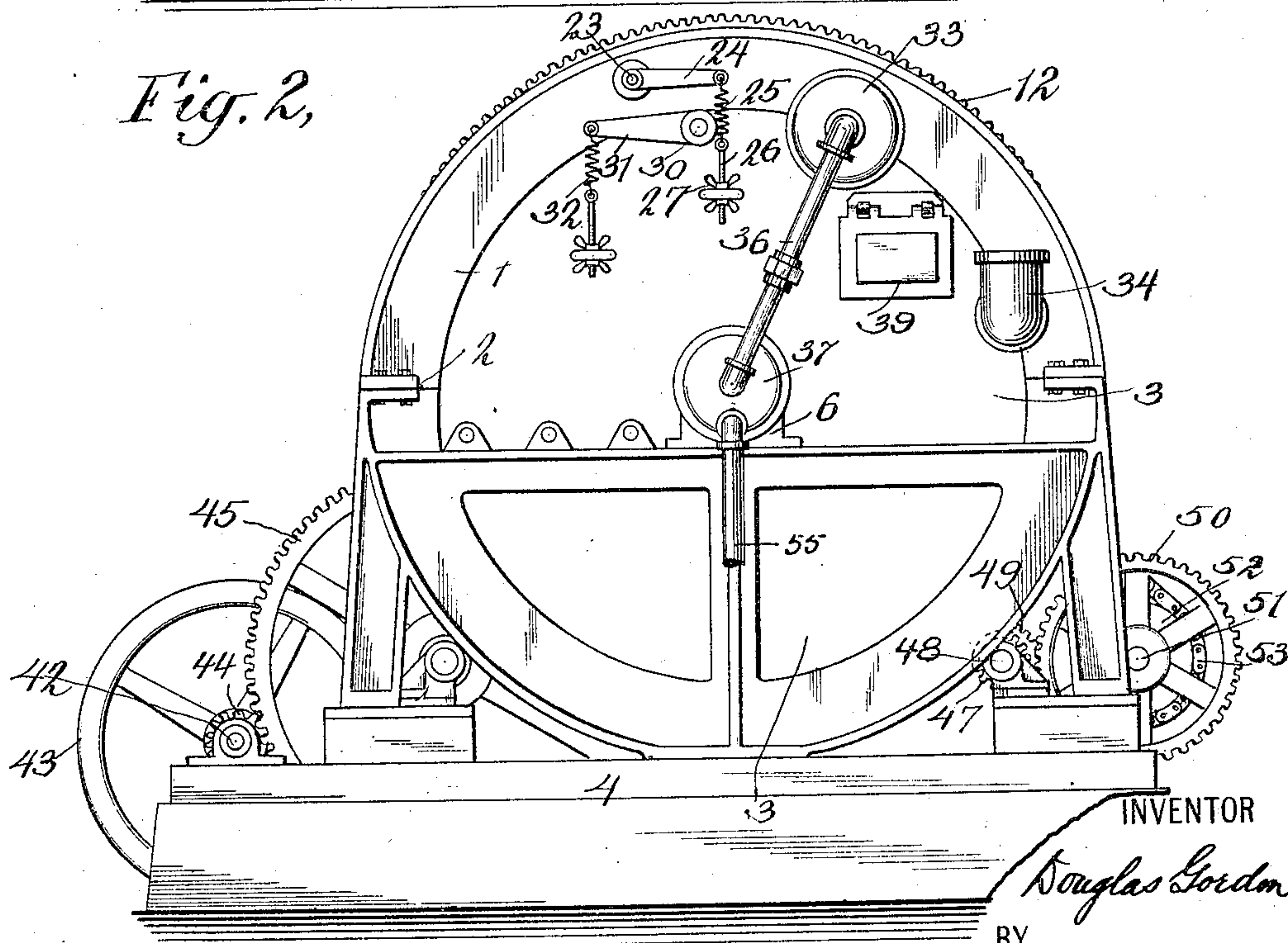
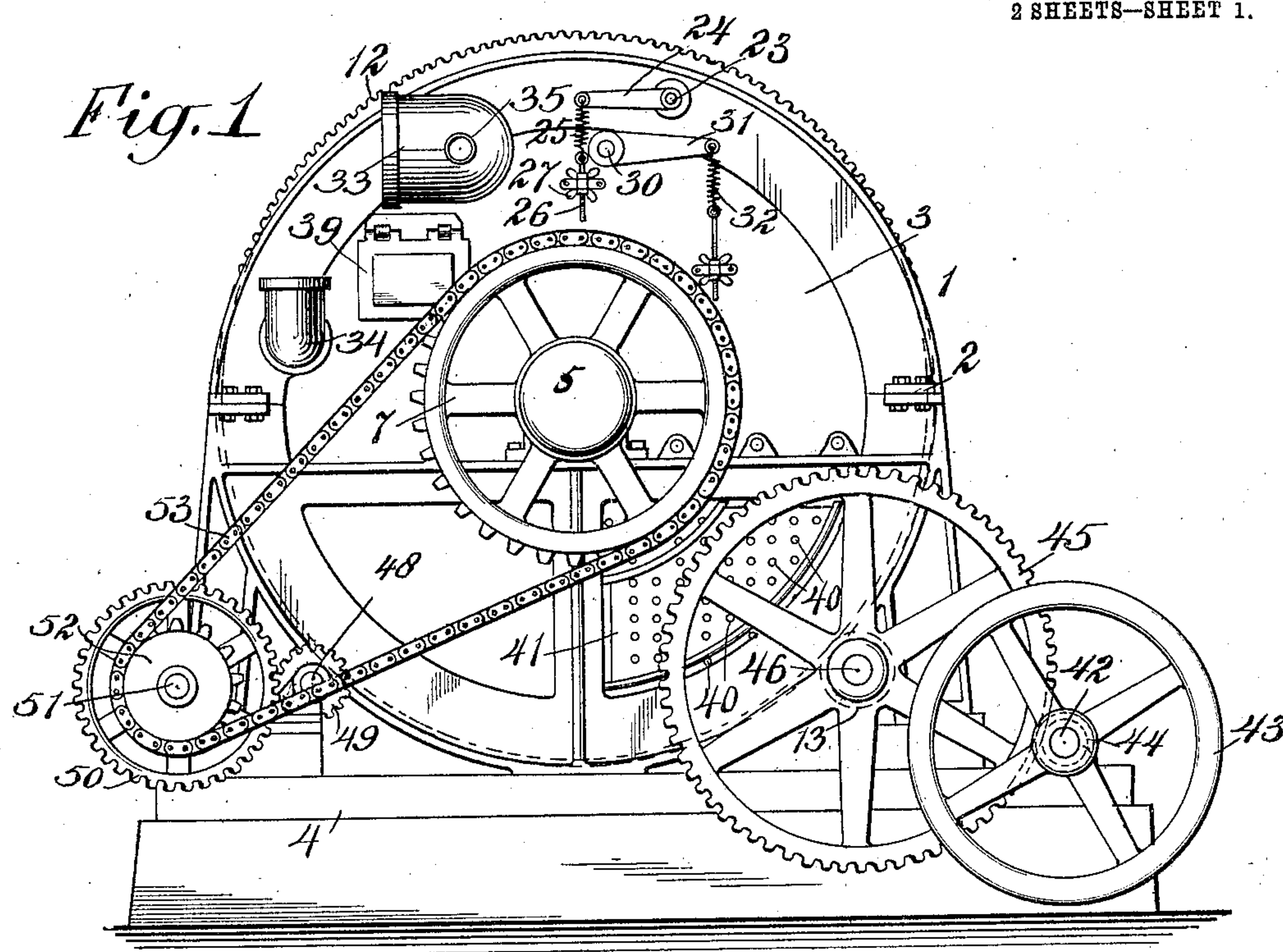
No. 789,151.

PATENTED MAY 9, 1905.

D. GORDON.
COCOA BARB CUTTER AND DRIER.

APPLICATION FILED JULY 26, 1904.

2 SHEETS—SHEET 1.



WITNESSES:

Harry L. Lys
Thomas J. Lang

INVENTOR

Douglas Gordon

BY

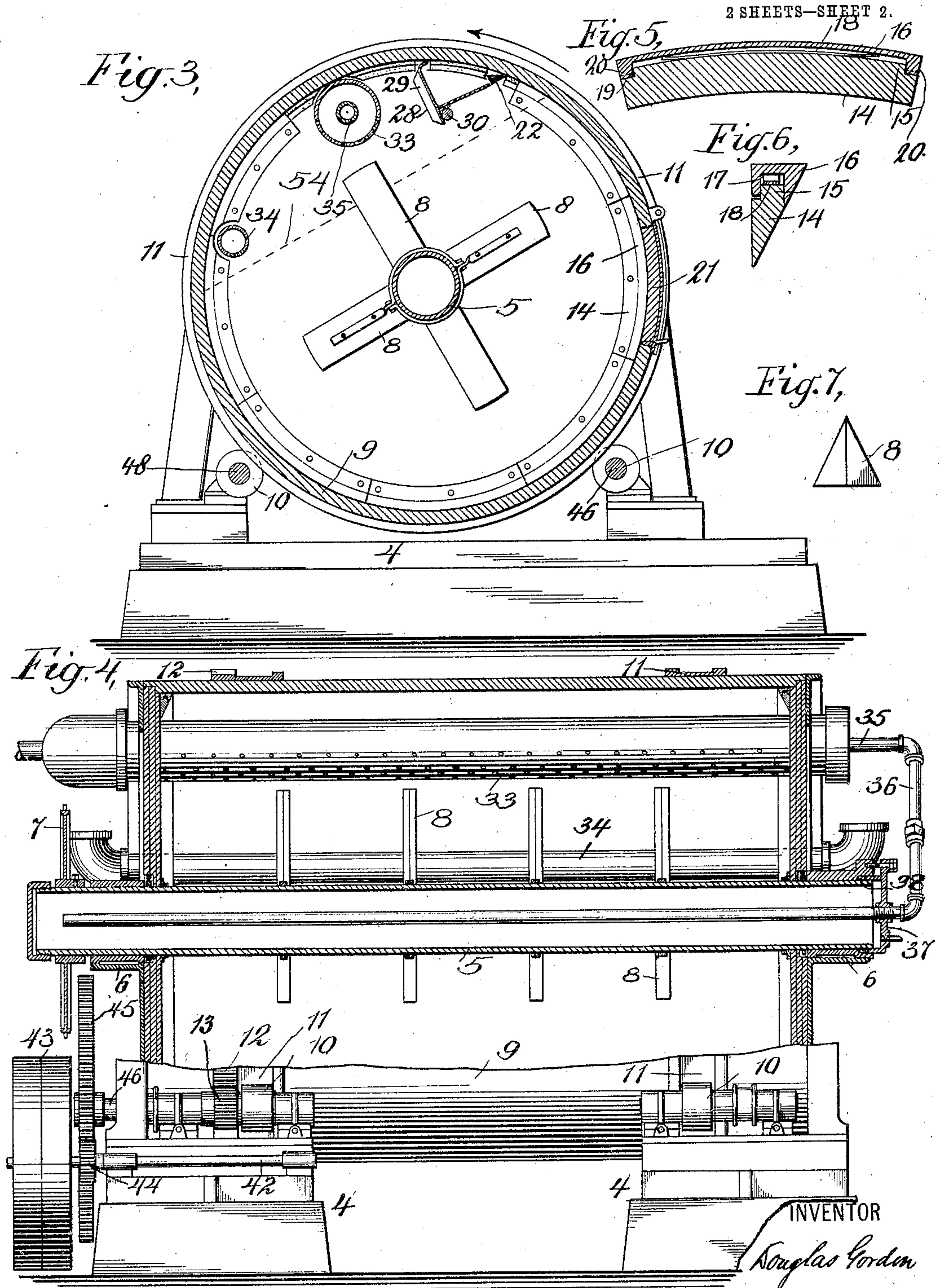
Chapin Raymond Maule
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Chapin Raymond Marble
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UNITED STATES PATENT OFFICE.

DOUGLAS GORDON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO
MARCUS MASON & COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

COCOA-BARB CUTTER AND DRIER.

SPECIFICATION forming part of Letters Patent No. 789,151, dated May 9, 1905.

Application filed July 26, 1904. Serial No. 218,217.

To all whom it may concern:

Be it known that I, DOUGLAS GORDON, a subject of the Crown of Great Britain, and a resident of Worcester, county of Worcester, State of Massachusetts, have invented certain new and useful Improvements in Cocoa-Barb Cutters and Driers, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to certain improved apparatus for treating cocoa, and particularly to apparatus for cleaning and drying the beans and for collecting and drying the barb or gum thereof.

Cocoa-beans before being treated are covered with a gummy substance technically known in the trade as the "barb;" and one of the main objects of this present apparatus is to effectively and cheaply collect and dry this gum. The operation is known in the trade as "cutting the barb."

Other objects of my present invention are to cheaply and efficiently clean, dry, and polish the beans.

To these ends my invention consists in a rotatable drum or holder provided with suitable scrapers and gum-collecting means and with suitable means for passing dry air over and between the beans, and in certain novel details of construction and combination of parts, as will hereinafter be more fully pointed out.

I will now proceed to describe a cocoa-drier and barb-cutter embodying my invention and will then point out the novel features in claims.

In the drawings, Figure 1 is a view in end elevation of a machine embodying my invention. Fig. 2 is a similar view of the opposite end of the machine. Fig. 3 is a view in central transverse vertical section through the machine. Fig. 4 is a view in partial side elevation and partial central vertical longitudinal section of the same. Fig. 5 is a detail view in central longitudinal section of a bearing member and a retaining-ring segment employed. Fig. 6 is a view in transverse section therethrough. Fig. 7 is a view in trans-

verse section through one of the paddle-blades employed.

The machine as a whole comprises a stationary bed and frame, including end plates, and a revolving cylinder or barrel mounted between the said end plates, said end plates forming stationary heads for the said revolving cylinder.

In the present embodiment of my invention the end plates comprise each a cast frame 1, made in two portions bolted together at 2, and a disk-like head or disk 3 secured thereto. These end plates are securely fastened to a stationary bed 4 and form rigid supporting members for the entire machine. A central tube or pipe 5 is rotatably mounted in suitable bearings 6, carried by the end plates, and a sprocket-wheel 7 is secured fast upon the said tube or pipe, as shown, and by which the said tube or pipe may be driven. Radial arms 8 are also carried by said tube or shaft intermediate its ends, there being several sets of the said arms arranged at ninety degrees with respect to each other. There are four sets of these arms shown herein, each set comprising four blades, and it will be noted by reference to Fig. 7 that the said arms are preferably wedge-shaped, being about half as thick as they are wide at their forward edges and tapering to a sharp point at their rear edges.

The revolving cylinder or barrel (here designated as a whole by the reference character 9) is preferably faced on the interior with some material which will resist the acid in the material to be treated. In the present construction I have shown a metal sheathing lined with wood; but the interior may be galvanized iron, aluminium, or other acid-resisting material, or the whole cylinder or barrel may be made of wooden staves secured and bound together by metal hoops. This cylinder has one or more movable hinged portions 21, which constitute doors for charging or discharging same. The cylinder is supported by two pairs of rollers 10, which engage circular tracks 11 upon the cylinder,

as shown. A gear-ring 12 is mounted exteriorly of the said cylinder, said gear-ring engaged by one or more pinions 13 for the purpose of imparting rotary movement to the cylinder. The ends of the cylinder 9 are carefully fitted to the end disks 3 by a running-joint, as follows: Screwed or otherwise attached to the end disks are rings 14, preferably made in a number of sections, such rings having overhanging portions or tongues 15. Loose bearing-pieces 16 are then inserted between each of the rings 14 and the inner face of the revolving cylinder, such bearing-pieces having recesses or grooves 17 for receiving the overhanging portions or tongues 15 of the rings 14, the bearing-pieces 16 forming when placed together end to end ring-like structures surrounding the rings 14. Each bearing-piece 16 carries a flat steel spring 18, which tends to press the bearing-pieces 16 away from the rings 14 and keep them up to the interior face of the revolving cylinder. The sectional portions of the ring 14 and the bearing-pieces 16 have interlocking projections and recesses 19 and 20 for preventing the bearing-pieces 16 from revolving with the cylinder 9. This form of joint forms an effective packing between the revolving cylinder and stationary end disks, while it will give and take sufficiently to prevent binding of the parts or the generation of undue friction.

At about the highest point within the cylinder and in close proximity thereto is arranged a scraper 22, the said scraper being rotatably mounted in the end frames 1, the pivots 23 therefor extending to the exterior of the machine and provided with arms or levers 24, to which springs 25 are attached. Threaded stems 26 and wing-nuts 27 form means for adjusting the tension of said springs 25. Another scraper, 28, is located within the cylinder at a point just in advance of the scraper 22, the edges of the scraper 28 being preferably set in closer proximity to the interior of the cylinder than is the scraper 22, in practice the scraper 28 being set in actual contact therewith, while the scraper 22 is just out of actual contact. The form of the scraper 28 is such as to not only constitute a scraper for the material collected on the inner edge of the cylinder, but also a scraper for the said material. In practice the scraper proper is formed of a piece of bent sheet metal, as shown, which piece of bent sheet metal is secured by rivets or otherwise to an arm or arms 29, having pivot-pins 30 mounted in the end frames 1 and passing through to the exterior thereof. Arms 31 are secured to the said pivot-pins 30, and springs 32, connected thereto and adjusted in like manner as are the springs 25, constitute means for holding the scraper under spring tension up to the interior face of the cylinder.

Located within the cylinder, near the upper end thereof, and supported by the end frames

1 is a perforated inlet-pipe 33, and a perforated discharge-pipe 34 is also provided, the same being located within the cylinder at a point somewhat lower than the perforated inlet-pipe 33, said pipe 34 being also supported and carried by the end frames 1. A steam-pipe 35 passes clear through the inlet air-pipe 33, entering at one end thereof and passing out at the other end, at which latter end said steam-pipe connects with a branch 36, leading down to the interior of the central revolving tube or pipe 5. The end or cap 37 of the tube or pipe 5, through which the branch 36 enters, is stationary, a suitable stuffing-box 38 being provided between the said stationary head or end and the revolving pipe. A drain-pipe 55 is provided for carrying away the exhaust-steam and waters of condensation therefrom.

The end disks 3, which, like the cylinder 9, are preferably of wood or lined with wood or other acid-resisting material, are each provided with windows 39, through which the operation of the machine may be viewed and which are also preferably hinged, so that access may be obtained therethrough to the interior of the cylinder. The end disks are also preferably provided with a perforated portion 40 and with a slide or door 41 for closing the said perforations when desired.

The drive of the machine herein illustrated is as follows: A drive-shaft 42 is journaled in stationary bearings on the bed-plate of the machine and is provided with fast and loose drive-pulleys 43. A pinion 44 upon the said shaft meshes with a spur-gear 45, mounted upon a shaft 46, which carries the drive-pinion 13 for the revolving cylinder or barrel. A similar pinion 47, mounted upon a shaft 48, meshes with the gear-ring 12 upon the opposite side of the machine, said shaft also carrying another pinion, 49, which meshes with a small spur-gear 50, mounted upon a shaft 51, journaled in stationary bearings upon the main frame of the machine. The shaft 51 carries a sprocket-gear 52, and a sprocket-chain 53 connects the sprocket-wheel 52 with the drive-sprocket 7 upon the central tube or pipe 5.

The machine is operated as follows: The cylinder or barrel is charged with a quantity of cocoa-beans or the like to be treated, the same being admitted through a charging-door 21. Steam is admitted to the pipe 35 and hot air to the perforated pipe 33. Power will then be applied to the shaft at 42 to revolve the cylinder or barrel in the direction of the arrow, Fig. 3, and also to revolve the central tube or pipe 5 and paddle-blades carried thereby. The ratio of gearing is preferably such as to cause the pipe and paddle-blades to revolve in the same direction as the cylinder or barrel and at the same rate of speed; but such ratio may be varied as desired. The revolution of the cylinder and paddle-blade will cause the upper surface of the mass within the same to assume a plane

substantially as shown by the dotted line 54 in Fig. 3 and will tumble the beans one upon another, constantly changing their relative positions within the cylinder. The inner face of the revolving cylinder or barrel will collect the barb or gum from the beans, and this barb or gum will be carried along up beyond the surface of the beans and past the scraper 22 to the scraper 28. The scraper 22 is preferably at such a distance from the inner surface of the cylinder as to remove practically no gum therefrom at all; but it will throw down into the mass beneath any beans or portions thereof which may accidentally be carried up with the gum. A thin film of gum only will then pass from the scraper 22 to the scraper 28. The scraper 28 is arranged to remove and collect this barb or gum, which barb or gum may be removed at stated intervals, or the combined scraper and collector may be removed with the gum therein and a new scraper substituted therefor. The operation may be watched through the end windows 39. The interior surface of the cylinder from the point of contact of the scraper 28 to the lower end of the plane 54 will be substantially clean, and this surface will be subjected to a hot blast from the perforated pipe 33. This surface will again enter the mass of cocoa, and the tumbling of the beans causing fresh surfaces to be brought against the inner surface of the cylinder more gum will be collected and finally delivered in a continuous operation. The perforated pipe 34 acts as a discharge for the moist air, vapors, &c., from the interior of the cylinder. The central tube or pipe is steam-heated, and the pipe which admits steam thereto, passing, it as it does, through the perforated air-inlet pipe 33, will serve to still further heat the air therein. Waters of condensation from the steam will be carried away through the drain-pipe 55. Exhausting apparatus may be connected with the pipe 34, if desired, and a blower may be connected with the pipe 33 to force air therein.

The peculiar formation of the wedge-shaped paddles—i. e., with their front faces broad and tapering rearward—tend to assist in the tumbling action of the mass of cocoa, while should the mass, ordinarily held at an incline, tend to fall back this movement backward will be resisted but little, owing the sharp rear edges of the paddle-blades, against which the beans will fall. I have shown and described the paddle-blades as revolving at the same speed with the cylinder; but any desired relationship of movement between the paddle-blades and the cylinder would be within the scope of my invention.

In first starting up the machine it may be found desirable to admit air at a point below the mass of the beans, so that the air will pass through same instead of, or as well as, admitting it through the perforated pipe 33 above

the mass of the beans, and for this purpose I have perforated certain portions of the end disks 3, as at 40, at the lower part thereof and provided doors 41, by which admission of air therethrough may be controlled.

Continued operation of the machine will first clean the beans, cutting the barb thereof and collecting same, will dry the beans, and will finally polish the surface thereof by the tumbling action, giving them a plump, round, and glossy appearance.

It will be obvious that the foregoing is but one embodiment of my invention and that the same is capable of many and varied modifications within the spirit and scope of my invention and, further, that certain parts may be employed in connection with other parts of different construction. Hence I do not desire to be limited only to the precise details of construction and combination of parts herein.

What I claim is—

1. In an apparatus of the class described, the combination with stationary end heads, of a revolving cylinder, revolving paddle-blades arranged to rotate concentrically thereof, and a scraper for the interior surface of the cylinder, substantially as set forth.

2. In an apparatus of the class described, the combination with a stationary end head and a revolving cylinder, of a loose bearing-ring between the said stationary end head and revolving cylinder.

3. In an apparatus of the class described, the combination with a stationary end head and a revolving cylinder, of a loose segmental bearing-ring between the said stationary end head and revolving cylinder.

4. In an apparatus of the class described, the combination with a stationary end head and a revolving cylinder, of a loose bearing-ring mounted between the said end head and the revolving cylinder, said bearing-ring held against relative rotary movement with one of the said parts, and spring-pressed against the other said part.

5. In an apparatus of the class described, the combination with a stationary end head and a revolving cylinder, of a loose segmental bearing-ring mounted between the said end head and the revolving cylinder, said bearing-ring held against relative rotary movement with one of the said parts, and spring-pressed against the other said part.

6. In an apparatus of the class described, the combination with a stationary end head and a revolving cylinder, of a retaining-ring secured to said end head, and a loose bearing-ring engaged by said retaining-ring and held against rotation thereby, said bearing-ring spring-pressed against the interior surface of said cylinder.

7. In an apparatus of the class described, the combination with a stationary end head and a revolving cylinder, of a retaining-ring

secured to said end head, a segmental bearing-ring engaged by said retaining-ring, said retaining-ring and segmental bearing-ring having interlocking shoulders for preventing
 5 relative rotation thereof, each of the segments of said segmental bearing-ring provided with a spring tending to press the same outward.

8. In an apparatus of the class described,
 10 the combination with stationary end heads and a revolving cylinder, of revolving paddle-blades mounted within the cylinder, said paddle-blades comprising radial arms wedge-shaped in cross-section, and arranged with
 15 their bases facing the direction of rotation of the cylinder.

9. In an apparatus of the class described, the combination with stationary end heads and a revolving cylinder, of a shaft rotatably mounted in said stationary end heads, radial paddle-blades carried by said shaft within said cylinder, said radial blades wedge-shaped in cross-section, and means for revolving said shaft in the same direction as said cylinder, the wedge-shaped paddle-blades being arranged with
 25 their bases facing in the direction of rotation thereof.

10. In an apparatus of the class described, the combination with stationary end heads, of
 30 a cylinder fitted to said end heads and provided with running-joints including radially-free, spring-pressed bearing-rings between them, said cylinder provided with circular tracks and a peripheral gear-ring, rollers engaging said circular tracks and supporting said cylinder, and a gear-wheel engaging said peripheral gear-ring, by which said cylinder may be revolved.

11. In an apparatus of the class described,
 40 the combination with stationary end heads and a revolving cylinder, of two scrapers supported by said heads within said cylinder, one of said scrapers set in proximity to but out of contact with the interior surface of the cylinder, and the other of said scrapers arranged to engage the inner face of said cylinder and constituting a collector for the material scraped from the interior surface of the cylinder, substantially as shown and described.

50 12. In an apparatus of the class described, the combination with stationary end heads and

a revolving cylinder, of a scraper set in close proximity to the interior of the cylinder, but out of actual contact therewith, a barb cutter and scraper engaging the inner periphery of
 55 the cylinder, and adjustable springs therefor, substantially as set forth.

13. In an apparatus of the class described, the combination with a revolving cylinder, and revolving paddle-blades concentrically arranged therein, of a scraper for the interior surface of the cylinder, a perforated inlet-pipe for introducing heated air, and a perforated discharge-pipe, substantially as set forth.

14. In an apparatus of the class described,
 65 the combination with a stationary end head and a revolving cylinder, of a hollow revoluble shaft mounted therein, paddle-blades carried by said shaft, a perforated inlet-pipe at the upper end of said cylinder, a perforated
 70 discharge-pipe discharging from said cylinder, and a steam-pipe passing through said perforated inlet-pipe and connecting with said revoluble hollow shaft.

15. In an apparatus of the class described,
 75 the combination with stationary end heads and a revoluble cylinder, of a hollow shaft mounted concentrically in said end heads, radial paddle-blades carried by said hollow shaft within said cylinder, a combined scraper and barb-
 80 collector supported by the end heads within the cylinder and arranged to engage the interior face thereof, a perforated inlet-pipe supported by the end heads within the cylinder near the said scraper and barb-collector, and
 85 a perforated discharge-pipe, also supported by the end heads and located within the cylinder beneath the said perforated inlet-pipe.

16. In an apparatus of the class described, the combination with stationary end heads and
 90 a revolving cylinder, of an air-inlet arranged near the lower end of the said end heads, means for controlling admission of air therethrough, means for carrying air away from the upper end of the cylinder, and a scraper for the interior of the cylinder, substantially as set forth.

In witness whereof I have hereunto set my hand this 14th day of July, 1904.

DOUGLAS GORDON.

Witnesses:

D. HOWARD HAYWOOD,
 C. L. HALL.