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A. M. CROOKER.

COTTON GIN AND RENOVATOR.

No. 418,111. Patented Dec. 24, 1889.

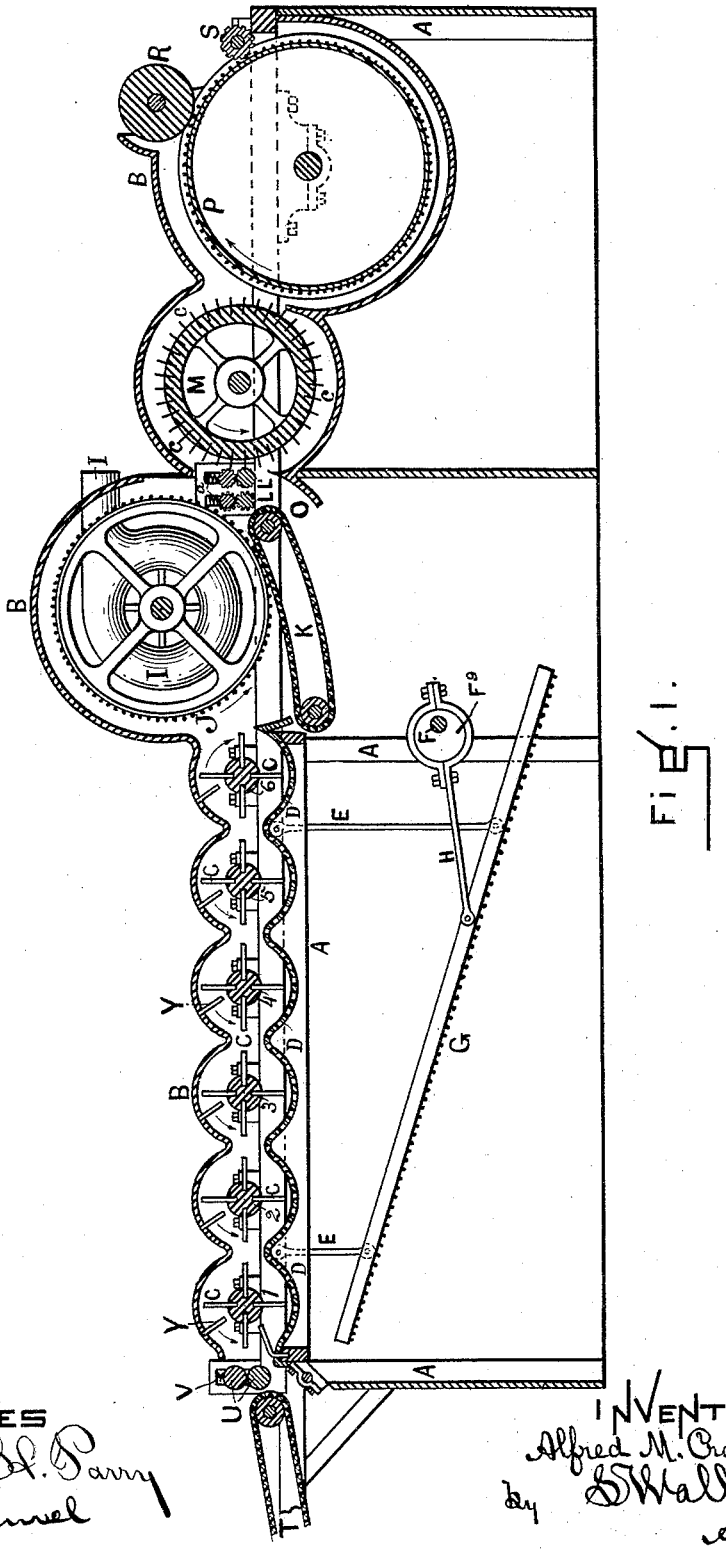

Fig. 1.

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COTTON GIN AND RENOVATOR.

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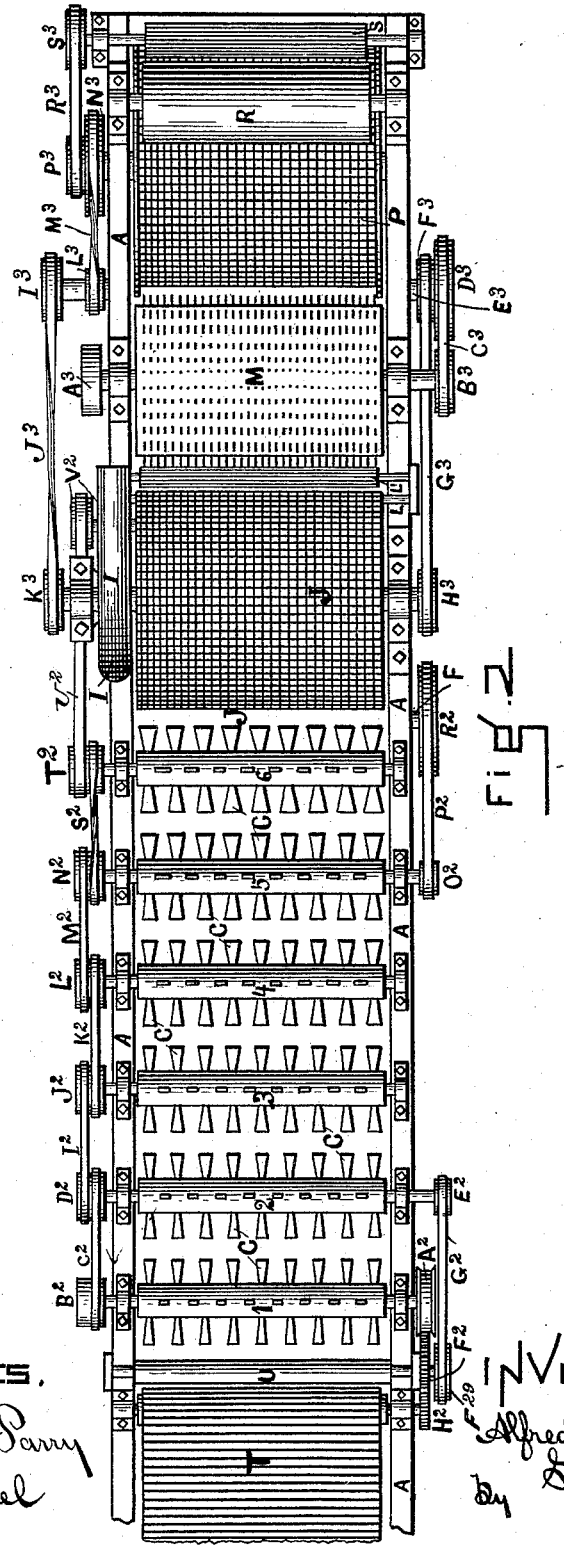

Fig. 2.

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COTTON GIN AND RENOVATOR.

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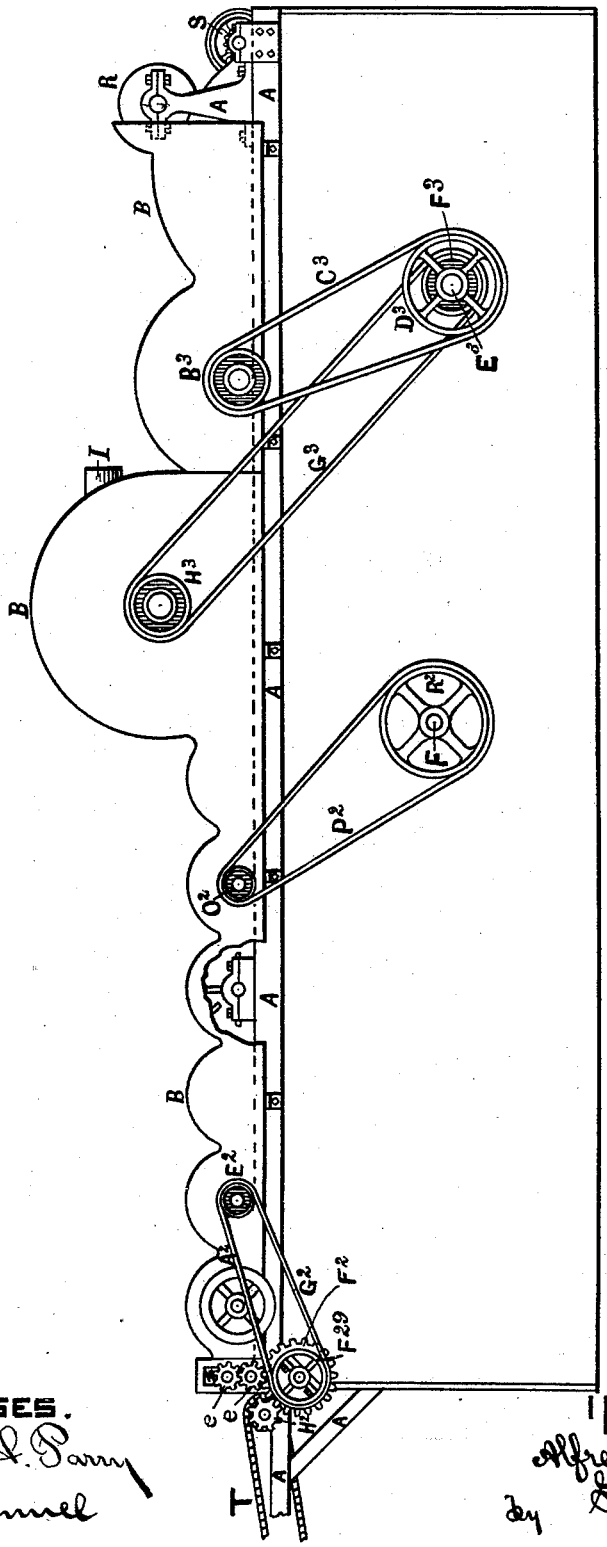

Fig. 5.

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COTTON GIN AND RENOVATOR.

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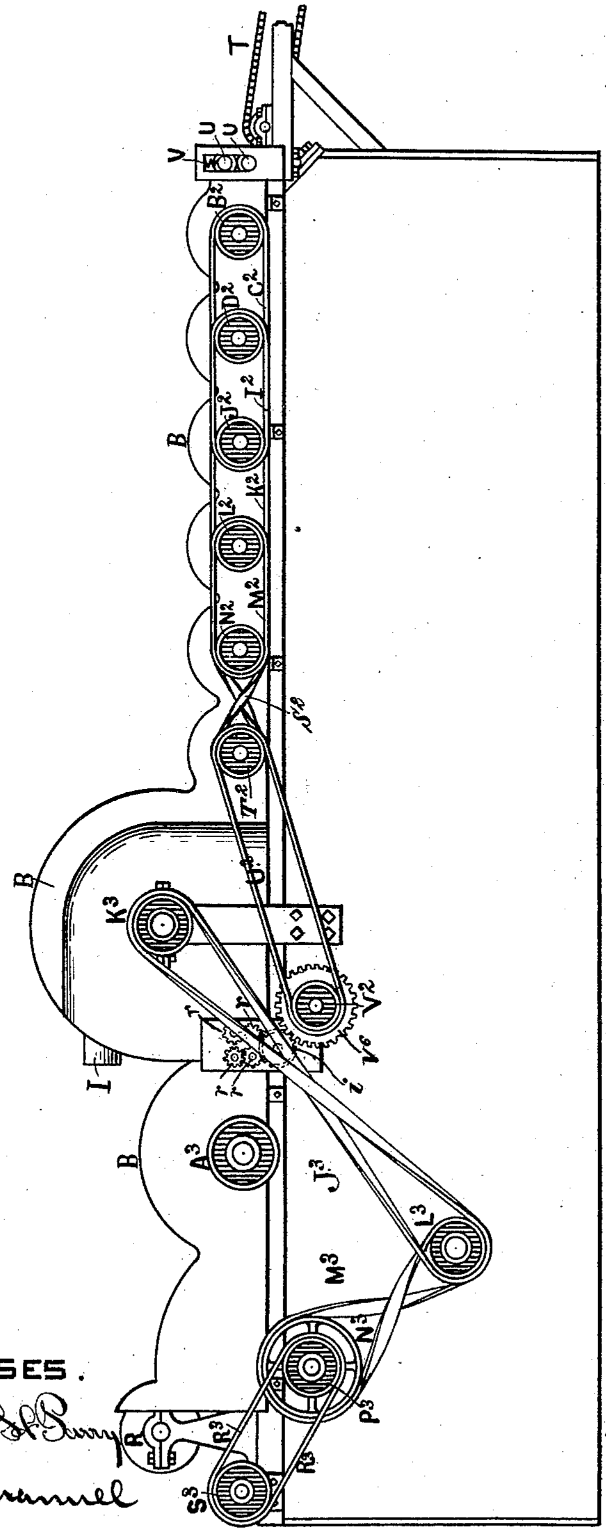

Fig. 4.

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(No Model.) 6 Sheets—Sheet 5.

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COTTON GIN AND RENOVATOR.

No. 418,111. Patented Dec. 24, 1889.

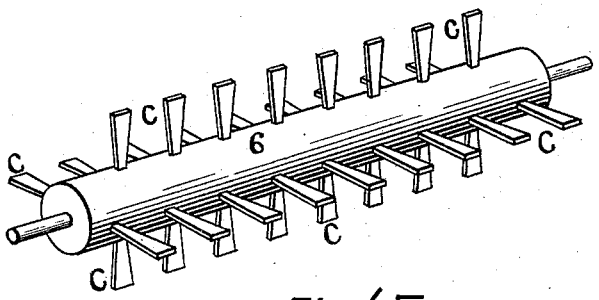

Fig. 5.

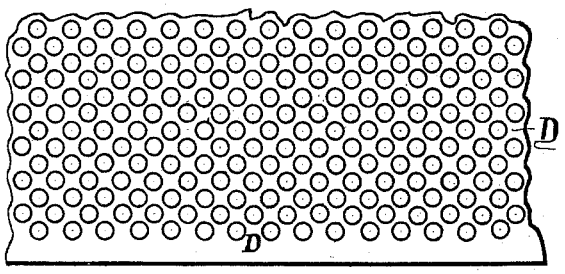

Fig. 6.

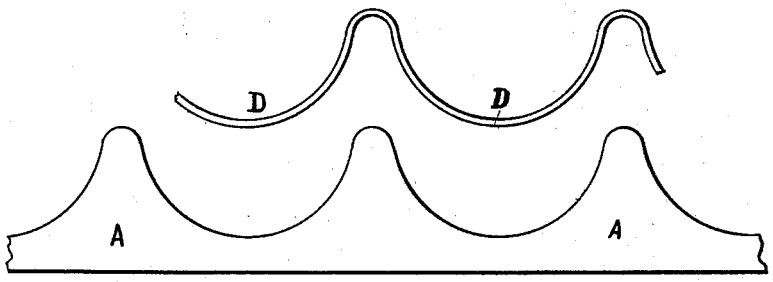

Fig. 7.

WITNESSES

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A. M. CROOKER.

COTTON GIN AND RENOVATOR.

No. 418,111. Patented Dec. 24, 1889.

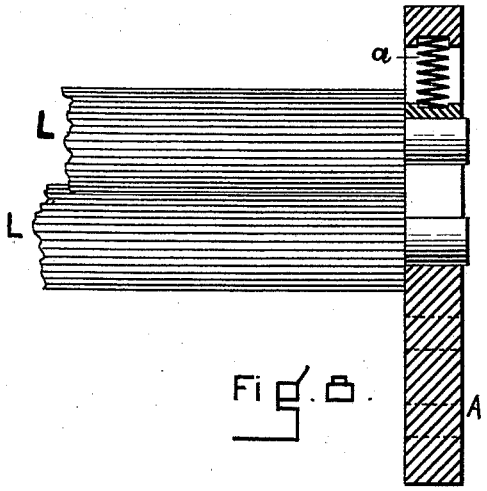

Fig. 8.

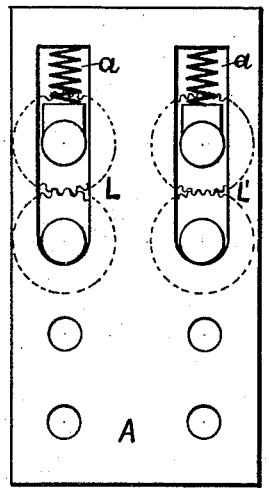

Fig. 9.

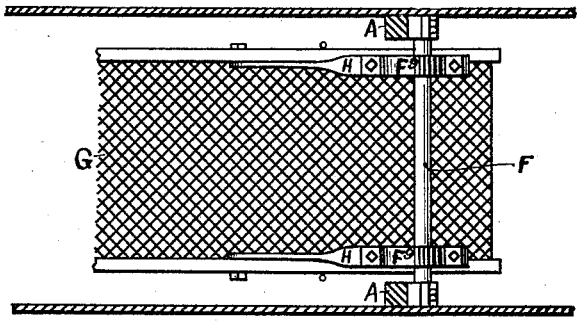

Fig. 10.

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UNITED STATES PATENT OFFICE.

ALFRED M. CROOKER, OF WATERTOWN, MASSACHUSETTS.

COTTON GIN AND RENOVATOR.

SPECIFICATION forming part of Letters Patent No. 418,111, dated December 24, 1889.

Application filed August 13, 1889. Serial No. 320,649. (No model.)

To all whom it may concern:

Be it known that I, ALFRED M. CROOKER, of Watertown, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Cotton Gins and Renovators, of which the following is a specification.

The object of my invention is to provide a machine for ginning, cleaning, and renovating cotton fiber, cotton waste, raw cotton, and other fibrous materials which have heretofore required several separate machines to produce clean stock ready for the manufacture of various kinds of textile fabrics.

To this end my invention relates to a machine comprising a series of beater-rolls having flattened teeth adapted to produce an air-current and act in conjunction with stationary pins placed within a casing surrounding said beater-rolls, so as to separate the cotton fibers from seeds, dirt, and extraneous substances and convey the fibers to a condensing-cylinder, while the seeds and dirt are permitted to fall through a stationary screen forming the bottom of said casing and provided with smooth circular perforations so arranged that fibers will not adhere to or clog the same. The machine also comprises an inclined oscillatory screen suspended beneath the stationary screen for the purpose of separating the cotton-seed from dirt or sand, and a pair of coarse-fluted rolls to which the "bat" is delivered from the condensing-cylinder, and which hold the fibers while combed or carded by a picker-cylinder, from which the cleaned fibers are taken by a wire-gauze-covered cylinder and carried beneath a pressure-roll and over a delivery or wipe roll to the exit end of the machine, the cotton or other fibers being thus ginned, cleaned, or renovated and formed into a bat in one continuous operation.

In the annexed drawings, illustrating the invention, Figure 1 represents a longitudinal vertical central section of a machine constructed in accordance with my invention. Fig. 2 represents a plan view of the machine, the top casing being removed in order to show the mechanism beneath. Fig. 3 represents a side elevation of the same. Fig. 4 represents a similar view of the opposite side of the machine. Fig. 5 represents a perspective view of one of the series of beater-rolls removed and drawn on an enlarged scale. Fig. 6 represents a plan view of a portion of one screen formed of perforated sheet metal. Fig. 7 represents an edge elevation of the same after being bent or corrugated to fit the upper edge of the supporting-frame shown beneath the screen in the same figure. Figs. 8, 9, and 10 represent details of detached portions of the machine drawn on an enlarged scale, as hereinafter more fully described.

A represents the main frame of the machine, and B represents a sheet-metal or other desired cover, capping, or top case bent or corrugated, as shown in Fig. 1, so as to conform somewhat to the series of beater-rolls 1, 2, 3, 4, 5, and 6, the journals of which have suitable bearings upon the said frame A, which frame is inclosed or cased in upon both sides and ends down to the floor or bottom, as shown. Each beater-roll in the series is provided with teeth *c*, which extend radially therefrom in lines extending longitudinally of the roll and at uniform distances apart, and the ends of the teeth are flattened in the direction of the axis of the rolls, so as to serve the double purpose of beater and suction blade or fan to draw or suck the fiber through the machine as it is beaten. Now, as the fiber as it is acted upon by each beater-roll becomes more loose and "fluffy," it is important that the suction of the second beater-roll should be greater than that of the first, and so on throughout the entire series of six beater-rolls, in order that the successive chambers or spaces around the beaters may not become filled and clogged by the cotton; hence the blades of the beater-rolls are successively wider throughout the series, the last or sixth one having the points or flattened ends of its beater-teeth *c* three times as wide as those of the first one, (more or less,) as desired. In practice I have also found it desirable and conducive to the best results to impart to the beaters successively increased speeds, so as to facilitate the forward feed of the cotton.

Below the series of beater-rolls is a screen D. This, preferably, is made of perforated

sheet metal, as shown in Fig. 6, and bent to the shape shown in Fig. 1 and represented in Figs. 1 and 6. The perforations in the sheet-metal screen D, being round and smooth, will not catch the fiber and clog up.

Within the case of the machine is arranged an inclined oscillating screen G, suspended by the vertical pivoted support-rods E and actuated by means of the shaft F, carrying eccentrics F^9, that are connected to the screen-frame by the actuating-rods H or other desired means, so that all heavy dirt and seeds that pass through the upper perforated screen D shall fall upon this inclined oscillating screen G, and thereby separate the dirt from the seeds, which will fall off at the lower end of the screen, while the dirt will pass through the wire-gauze screen, instead of the fiber and dirt going off all together. The fluffy fiber as it leaves beater-roll 6 of the series is, by means of the fan-blower I, sucked or drawn against the outside of the revolving wire-gauze drum or condensing-cylinder J, which carries it downward upon the endless slat belt K beneath the said drum J, which flattens it out into a bat or loose sheet, the latter being delivered to the pair of coarse-fluted rolls L, the upper one of which is made vertically movable by means of suitable boxes or bearings and spiral springs *d*. (See Figs. 8 and 9.) The bat or sheet is then carried between the pair of finer-fluted rolls L′, the upper one of which is vertically movable, and is held down on the lower one by similar or other desired means, in order to hold the fibers firmly between these two sets or pairs of fluted rolls L L′. The fibers passing between the fine-fluted pair of rolls L′ are held firmly therein by the pressure-springs *a*, and as the said fibers pass through slowly they are caught and acted upon or combed out by the needle-pointed teeth *c*, projecting radially from the large rotary picker or drum-card or cylinder M, and any lumps or bunches are thrown downward through the opening O and fall to the bottom of the machine. The cleaned renovated fibers pass beneath the cylinder, picker, or rotary drum-card M, and are caught therefrom by the large wire-gauze-covered cylinder P, and carried upward over the same and beneath the presser-roll R, which forms a bat or batting, and thence out of the machine over the small corrugated delivery or wipe roll S, as shown at the right-hand end of the machine. The fiber to be acted upon, cleaned, and renovated is placed upon the endless slatted-belt carrier T, and passes between the feed-rolls U, the upper one of said rolls having bearings provided with pressure-springs V, as shown at the left hand of Fig. 1. A portion of the belt-carrier T is broken off.

The series of beater-rolls, endless belts, aprons, drums, cylinders, feed-rolls, fluted rolls, eccentrics, and all rotary, moving, and operating parts above described, and illustrated in the drawings, may be driven by means of belts and pulleys or gear-wheels and pinions, as shown, or in any other suitable manner.

The shaft of beater-roll 1 is provided with the main driving-pulley A^2, and is rotated by a belt from a counter-shaft overhead. The opposite end of the shaft of beater-roll 1 is provided with a pulley B^2, which pulley is connected by a belt C^2 with the pulley D^2 on the end of the shaft of beater-roll 2, the opposite end of which is provided with the pulley E^2, which pulley is connected to the pulley F^{29} by the straight belt G^2. F^2 is a gear-wheel, which drives the gear H^2 of the endless feed-apron or slatted-belt carrier T. The gears *e e* on the shafts of the feed-rolls U are also rotated by the said gear F^2, as shown. The pulley D^2 on the shaft of beater-roll 2 has also a belt I^2, which drives the pulley J^2 on the end of the shaft of beater-roll 3, this pulley J^2 carrying also the belt K^2, which passes around the pulley L^2 on the end of the shaft of beater-roll 4, which pulley L^2 also has a belt M^2, which connects with pulley N^2 on the shaft of beater-roll 5, the opposite end of which beater-roll is provided with a small belt-pulley O^2, around which passes belt P^2 down to the large belt-pulley R^2 on the shaft F of the eccentrics F^9, which oscillate the inclined screen G. The pulley N^2 carries a cross-belt S^2, which passes around the pulley T^2 on the end of the shaft of beater-roll 6, the said pulley T^2 carrying also a straight belt U^2, which passes around the pulley V^2. On the same shaft as pulley V^2 is a gear-wheel V^6, which gear V^6 meshes with the gear *i*, the said gear *i* driving gears *r r r r*, provided on the ends of the shafts of the fluted rolls L L′. It will be seen and understood that this arrangement of driving mechanism may be varied.

The shaft of the scratcher or picker cylinder M is provided with a driving-pulley A^3, and is driven by a belt from a counter-shaft overhead, and the opposite end of the shaft of the scratcher or picker cylinder M is provided with a belt-pulley B^3, over which passes downwardly the belt C^3, around the large pulley D^3 on the auxiliary speed-shaft E^3, which is also provided with a small belt-pulley F^3, carrying the belt G^3, which passes upward around the belt-pulley H^3 on the end of the shaft of the large gauze cylinder J. The opposite end of the auxiliary speed-shaft E^3 is provided with a belt-pulley I^3, around which passes the crossed belt J^3, extending upwardly to the belt-pulley K^3 on the shaft of the blower I. This auxiliary speed-shaft E^3 is also provided with a smaller belt-pulley L^3, over which passes the crossed belt M^3 upwardly and around the large pulley N^3 on the end of the shaft of the said large wire-gauze-covered cylinder P. The said shaft of the cylinder P has also a small belt-pulley P^3, over which passes the belt R^3 around the pulley S^3 on the end of the shaft of the corrugated

delivery or wipe roll S at the end of the machine, as shown.

It will be evident that the above-described manner and arrangement of belts and belt-pulleys and gear-wheels, together with eccentrics for actuating the various parts of the machine, as above described, may be changed or varied to suit different kinds of stock or fiber being operated upon.

If desirable, a series of pins Y may be attached to the cover B, and extending within the circle of the movement of the teeth or blades on the beater-rolls.

The opening O is shown some distance forward of the cylinder M; but its location may be varied therefrom as desired, and will be governed somewhat by the quality of stock it is intended to be operated upon by the machine as adapted therefor.

The beater-teeth of the series of cylinders act as fans to impel the fibers through the machine, for which purpose the teeth are broad at their free ends and taper in width toward the axis of each cylinder, as shown.

It will be evident that the current of air caused by the speed of drum M is sufficient to cause the fibers as they leave the same to be carried against the cylinder P with a force requisite to effect their lodgment thereon without the aid of air-suction apparatus being employed for the purpose.

It will be seen and understood by reference to the drawings that the shafts of beaters 1, 2, 3, 4, and 5 revolve downward, so as to carry the stock beneath the same and over the surface of the perforated sheet-metal screen, so as to admit the dirt as it is freed from the fibers to pass through the perforations.

It will be seen and understood in looking at the right-hand side of the machine that the fibers or stock to be operated upon are fed into the same at the left-hand end of the machine, and that the left-hand side of the several beaters and cylinders rotate as follows: The beaters 1, 2, 3, 4, and 5 rotate downward, beater 6 rotates upward, and the next or wire-gauze cylinder rotates downward, and the fan I in the opposite direction, or upward, the toothed or picker cylinder downward, and the wire-gauze cylinder P in the opposite direction, or upward, as is shown, by means of the several belts and gears illustrated in the annexed drawings.

Having thus described my invention, what I claim is—

1. A series of beater-rolls provided with teeth, the ends of which are flattened in the direction of the axes of the rolls and increased in width in each consecutive roll from the first to the last, substantially as described, and for the purposes set forth.

2. The combination of the wire-gauze cylinder J, fan-blower I, endless belt K, and series of beater-rolls, substantially as described.

3. The combination, with a series of beater-rolls, of the stationary screen D, supported beneath said rolls and provided with circular perforations, the inclined screen G, suspended beneath the stationary screen, and means for oscillating the suspended screen, substantially as described.

4. The combination, with a casing having the opening O, of the corrugated rolls L L′, the picker-cylinder M, the wire-gauze receiving-cylinder P, the presser-roll R, the delivery-roll S, and actuating mechanism for said cylinders and rolls, substantially as described.

5. The combination, with a pair of feed-rolls, of two or more beater-rolls provided with teeth having flattened ends, means for rotating said beater-rolls, a casing inclosing said rolls and substantially conforming to the peripheries thereof, the bottom of said casing consisting of a screen formed with circular perforations, a condensing-cylinder, and means for exhausting the air from the interior of said cylinder, substantially as described.

ALFRED M. CROOKER.

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