

No. 849,141.

PATENTED APR. 2. 1907.

S. B. LADD.
COTTON GIN.

APPLICATION FILED JUNE 10, 1903.

Fig. 1.

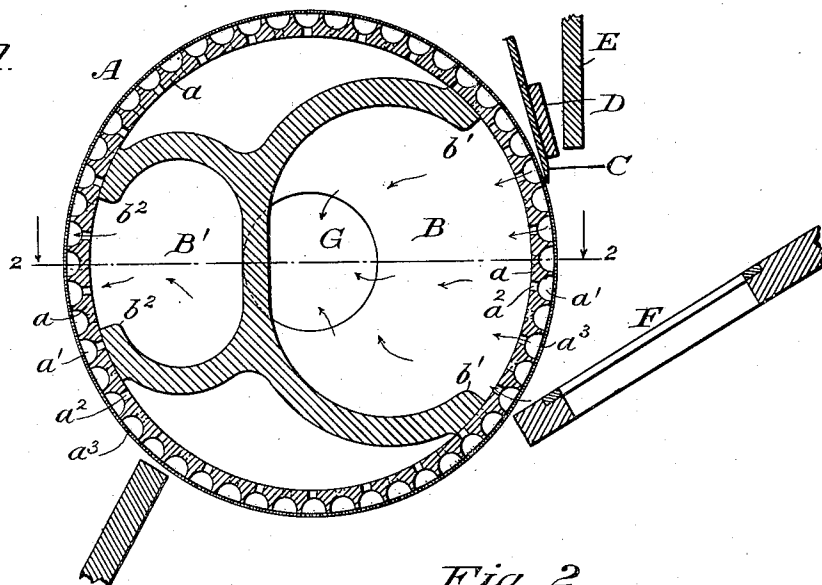


Fig. 2.

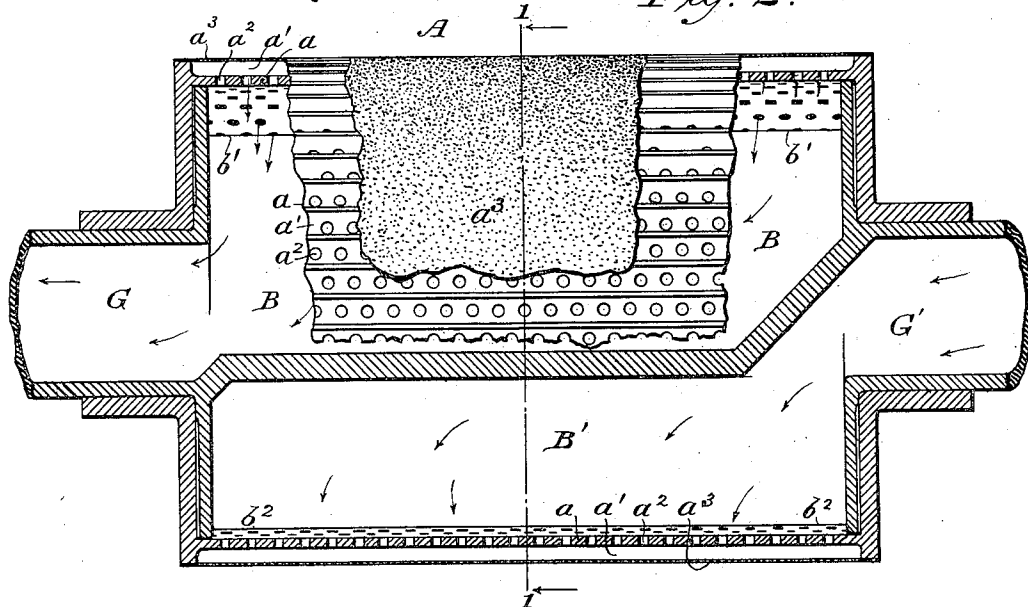
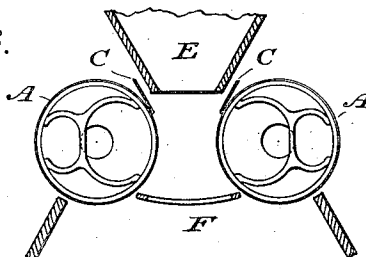


Fig. 3.



WITNESSES:

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COTTON-GIN.

No. 849,141.

Specification of Letters Patent.

Patented April 2, 1907.

Application filed June 10, 1903. Serial No. 160,847.

To all whom it may concern:

Be it known that I, STORY B. LADD, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a new and useful Improvement in Cotton-Gins, of which the following is a specification.

This invention relates to that class of cotton-gins in which the fibers are caught by or held to a moving surface to effect separation from a mass of fiber or from the seed—as, for example, in the roller cotton-gin.

The invention is specially applicable to gins for ginning seed-cotton; but it is to be distinctly understood that its application to the treatment of cotton, wool, or other fibrous material in the process of picking, carding, or otherwise manipulating the same is within the scope of this invention. With this understanding it will be described in the embodiment of a cotton-gin of the roller type.

The cotton-gins in general use are of two types—the saw-gin and the roller-gin. The former has large capacity, but it breaks the cotton and does not give full length of fiber. The roller-gin, on the other hand, gives full length of fiber, but its present capacity is small, and it can only be used on long-fiber cotton, such as sea-island cotton.

Considerable invention has been exercised in the construction of a gin-roller which will have an increased hold on the fiber, and thus increase the capacity of the gin and permit also of short-fiber cotton being handled—as, per example, by the use of walrus-hide for a covering for the roller, rings of rubber packing, or a surface so constructed as to present the ends of wires or bristles projecting slightly from a surface of leather or plastic composition. In all cases, however, the aim has been to provide a moving surface which shall have a friction hold on the cotton, or the hold due to the minute projecting points or hooks or a rough surface. It will readily be seen that in all these cases the hold of the roller can only reach to the fibers in contact with its surface, to those in engagement with its rough or studded periphery, either directly or by being intermeshed with such fibers.

The present invention employs a radically different principle. It employs suction created and maintained through the roller periphery to draw the cotton to and hold it on the roller. A suction process is capable of

control and regulation, and the grip can be gaged to meet the requirements of the case. The ginned cotton is blown from the roller by an air-blast outward through the roller periphery, the suction on one side of the roller to hold the fiber thereto during the period of the plucking of the fiber from its seed or from the mass of fiber and the blast on the other side of the roller outward through its surface to clear it of the ginned fiber being functions of one and the same roller.

The invention, which consists of the application of the suction principle to a cotton-gin, will be described in the details of its embodiment in a roller cotton-gin and then pointed out in the claims.

The gin-roller is made of a cylinder having a finely-perforated surface revolving around a stationary compartment suction and blast box, one compartment being for the air-suction, with proper end connections with a vacuum-pump or exhaust mechanism, and the other compartment being for the air-blast, with end connections to an air-blast pipe. This produces a suction through the roller periphery on one side, the side toward the cotton-seed hoppers, and an outward blast through the roller periphery on the opposite side to detach and throw off the ginned fiber, with intermediate portions of the roller-surface neutral.

It will be seen that the suction draws the cotton in the hopper to the roller, and thus assists the feed, becomes, in fact, a self-feeder, and, moreover, the suction holds to the roller a mat of cotton instead of the few fibers immediately in contact therewith. The hold is a firm grip by reason of the fact that fibers even of short upland cotton span across several of the fine perforations in the roller and sag a short distance into the apertures, thus giving the apertures as the roller revolves a positive hold on the fibers.

In the accompanying drawings, Figure 1 is a cross-section of so much of a roller-gin as is necessary to illustrate the pneumatic roller. Fig. 2 is a broken side view thereof; and Fig. 3 illustrates a double-roller gin.

A is a perforated cylinder-roller revolving around a stationary double-compartment suction and blast box B B'. The cylinder-roller is preferably formed of a cylinder a , having the longitudinal grooves a' and the radial holes a'' . Surrounding this cylinder is the finely-perforated covering a^3 , of sheet metal, the perforations of which are small

enough to prevent the fibers from being drawn therethrough. This construction is designed to properly support the perforated covering and yet permit free access of the suction and blast to all parts therefor with as little obstruction to the perforations as possible.

The suction and blast box has its suction-compartment toward the hopper, with its open side b' b' spanning whatever arc of the roller periphery is necessary for efficient work and with its blast side presenting a narrow contracted open face b^2 b^2 to the perforated roller on the opposite side for the blowing off of the mat of fiber.

C shows the knife-blade, and D the reciprocating stripper of a common type of roller-gin. Any suitable form of knife and stripper or other device for holding back the seed and seed-cotton may be used.

E is the hopper, and F the grating through which the seed drops when cleared of fiber.

The arc of the roller-surface subjected to the action of the suction should begin at the point where the seed-cotton first comes against the roller and extend at least the length of the longest fibers and above and below the edge of the knife-blade, thereby making an equal suction or pressure of air into the roller above and below the coacting point of the stripper and the roller. The suction-compartment of the roller is open to a suction-pipe G at one end of the roller. At each end of the suction and blast box there is a pipe G G', one opening into the suction side and the other into the blast side thereof, the former leading to a vacuum-pump or mechanism for producing a suction and the other to blast mechanism. These pipes support the suction and blast box, and the outer cylinder revolves on them. The roller-cylinder is driven by a driving-pulley attached thereto. (Not shown.)

In operation the hopper being filled with seed-cotton and the machine started the cotton fibers are drawn to the roller and held thereon by the suction and carried up under the knife-blade, between which and the roller the seeds and motes cannot pass, and on passing around to the outer face of the roller they are blown off and the roller left clean. The knife-blade is set with respect to the roller to conform to the conditions of suction-pressure and size of motes and other matter to be caught, so as to give a maximum thickness of fiber mat consistent with clean product. The air-suction through the mass of seed-cotton in the hopper to the roller has the effect of steadily drawing the cotton toward the roller and makes it self-feeding, and this renders it possible to use a pair of rollers, rights and lefts, as illustrated by Fig. 3; taking cotton from a common central hopper. The combined suction of the two rollers outward from the hopper results in a steady

and uniform downward drawing force to the seed-cotton in the hopper and effects a steady feed without the necessity of using auxiliary devices therefor.

I do not claim as my invention means for disturbing the equilibrium of air-pressure at the point of coaction of the stripper with the roller.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A cotton-gin roller having peripheral perforations, and means upon which the roller is revolved for conducting air into and out of the roller through its perforations.

2. In a cotton-gin, the combination, with a perforated roller, and a stripper adapted to cooperate with the periphery of the roller in a ginning operation, of means for drawing an equal pressure of air into the roller above and below the coacting point of the stripper and the roller.

3. In a cotton-gin a roller having a perforated surface in combination with a pneumatic cylinder upon which the perforated roller revolves, said pneumatic cylinder having separate chambers for suction and blast respectively.

4. The combination, with a hollow cotton-gin roller having circumferential apertures, and a perforated roller-covering, of a pneumatic cylinder divided lengthwise into separate air-chambers and upon which the roller is revolved.

5. The combination, with a cotton-gin roller, having circumferential apertures, and a sheet of perforated material covering the roller, of a pneumatic cylinder upon which the roller is revolvably mounted, the cylinder being divided lengthwise into separate air-chambers having an opening at one end, one of said chambers having an air-suction mouth in communication with the apertures, and the other of said chambers having an air-blast mouth in communication with the apertures.

6. The combination, with a cotton-gin roller having apertures, and a perforated sheet covering the roller, of a chambered air-cylinder upon which the roller is revolvably mounted, a partition separating the chambers with an axial opening and a mouth in each chamber communicating with said apertures.

7. The combination, with the pneumatic cylinder having separate air-chambers, the pneumatic roller having apertures in communication with the chambers, and the perforated roller-covering, of the knife bar located adjacent to the roller to separate the cotton-seed from the fiber and permit the latter to be drawn to and held on the roller.

8. The combination, with the roller having apertures and journal-bearing ends, and a perforated surface, of a pneumatic cylinder upon which the roller is mounted and having

air-stems forming journals for said roller ends, a partition reaching from one stem to the other and dividing the cylinder into separate chambers which communicate with said
5 apertures through openings in the chambers, and a knife-bar located adjacent to the roller for separating the cotton-seed from the fiber and permitting the latter to be sucked into the said perforations.

1. 9. In a cotton-gin, the combination, with a roller, and a stripper adapted to coöperate with the periphery of the roller in a ginning

operation, of means upon which the roller is revolved for permitting an equal air-pressure above and below the coacting place of the
15 stripper with the roller.

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

STORY B. LADD.

Witnesses:

ALFRED H. COWLES,
NELLIE J. WILLS.