

J. R. FORDYCE.
VACUUM COTTON GIN.
APPLICATION FILED OCT. 8, 1908.

1,031,701.

Patented July 9, 1912.

2 SHEETS—SHEET 1.

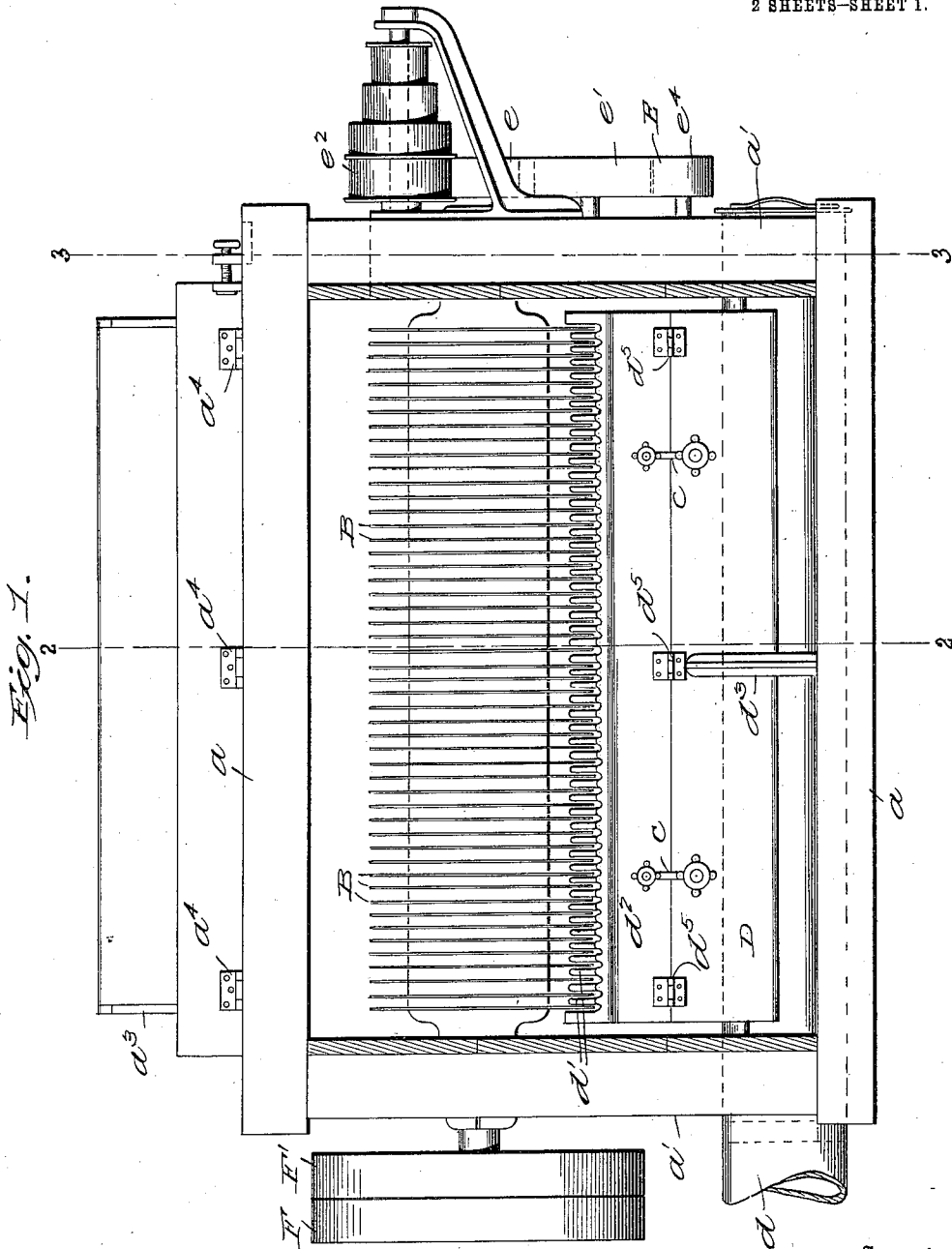


Fig. 1.

Witnesses
T. A. Moorman
Chas E. Riordan

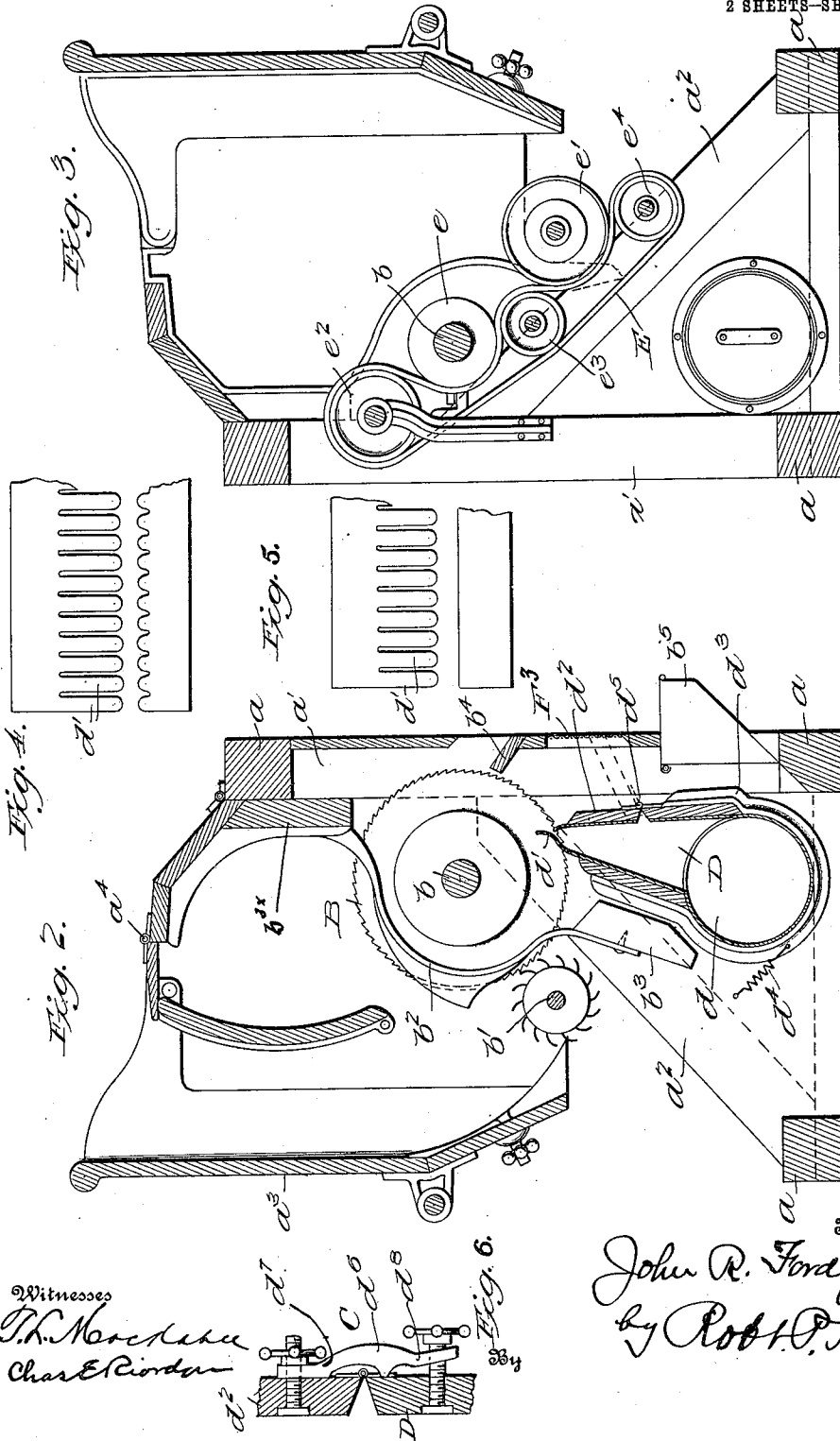
Inventor
John R. Fordyce
By Robt. P. Harris.
Attorney

J. R. FORDYCE.
VACUUM COTTON GIN.
APPLICATION FILED OCT. 8, 1908.

1,031,701.

Patented July 9, 1912.

2 SHEETS—SHEET 2.



Witnesses
P. H. Mordike
Charles R. Jordan

Inventor
John R. Fordyce
by Robt. P. Harris.
Attorney

UNITED STATES PATENT OFFICE.

JOHN R. FORDYCE, OF LITTLE ROCK, ARKANSAS.

VACUUM COTTON-GIN.

1,031,701.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed October 8, 1908. Serial No. 456,689.

To all whom it may concern:

Be it known that I, JOHN R. FORDYCE, a citizen of the United States, residing at Little Rock, in the county of Pulaski and State of Arkansas, have invented an Improvement in Vacuum Cotton-Gins, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention to be hereinafter described relates to cotton gins, and more particularly to that type wherein the cotton is stripped from the seed by means of saws, although, as will be clear to those skilled in the art, many of its features are adapted for use in other relations.

The aims and objects of the invention will best be understood from the following description taken in connection with the accompanying drawings which illustrate one form or embodiment of the invention; it being understood, however, that changes may readily be made in the structural features and in the form and relation of the parts within the true province of the invention as definitely pointed out in the claims.

In the drawings: Figure 1 is a longitudinal sectional view looking from the back of the gin, said view showing the relation of the saws and nozzle parts, as will later appear; Fig. 2 is a transverse sectional view on the line 2—2 of Fig. 1; Fig. 3 is a side view of the gin looking in the direction of the arrow, Fig. 1, the framing being shown in section; and Figs. 4, 5 and 6 are detached detail views showing features of the nozzle construction.

Referring to the drawing the supporting frame is of improved form and of simplified construction comprising the longitudinal beams *a*, uprights *a'*, and the inclined braces *a''*, said parts constituting a compact and rigid structure sufficient to support the working parts and the sides and end coverings.

Mounted on the supporting frame is the gin breast *a³*, preferably connected thereto by hinge or pivotal devices *a⁴*, Fig. 2; and connected to the shaft *b* are the gin saws *B* which may be of any preferred construction. Said saws *B* project into the usual roll box and between the ribs *b²* supported in any usual manner, as by the rib rails *b³*

and *b^{3x}* carried by the gin breast. Suitably supported on the shaft *b'* is the picker roll which delivers the seed cotton as usual to the saws.

As well understood by those skilled in the art, the saws *B* not only engage the lint and draw it between the ribs *b²* for subsequent delivery free of the seed, but they also carry motes or small broken seed, leaf trash, sand, and other waste. The lint is held in the throat of the saw teeth as the saws revolve, while the said waste material is thrown off by centrifugal action. To properly collect such waste an incline *b⁴* is provided at a point between the ribs *b²* where the saws act to detach the lint from the seed and the nozzle *D* to be described, and serves to direct such waste material into a hopper *b⁵*, which may be connected to a proper waste discharge or to the same receptacle that receives the denuded seed, as will be clear to those familiar with such devices.

The lint, which, as stated, is held in the throat of the saw teeth, is then carried by the saws to the lint detaching means or nozzle *D* at which point the teeth extend in a downward direction. The nozzle *D* is preferably provided with a series of curved fingers *d'*, Figs. 1, 2, 4 and 6, which project between the saws *B*, the end portions of said fingers preferably extending in a general direction from the front toward the back of the gin, as indicated in Fig. 2; and a back lip *d²*, which may be plain, as indicated in Fig. 5, or provided with a series of notches, as in Fig. 4, the lower parts of the notched or serrated edge being preferably disposed opposite the saws, as indicated in Fig. 1, and the lip *d²* being preferably inclined toward the fingers *d'* constituting the opposite wall of the nozzle. It will thus be noted that the nozzle provides an opening closely adjacent the edge of the saws and that inflowing air, due to suction in the nozzle, travels principally in the direction of the saw teeth, the effect of such action being that the lint, held in the throat of the saw teeth, is readily lifted and detached by the faster traveling currents of air as they move down the sides of the saw and in the direction of saw teeth movement, as will further appear hereinafter.

The nozzle *D* is connected to an exhaust pipe *d* through which an exhaust may be maintained by any suitable means, as will

be readily understood, and in order that the said nozzle may be readily drawn from its operative position for cleaning or repair, it is preferably rotatably mounted on the exhaust pipe d , by suitable means such as the yoke d^3 which may surround the exhaust pipe and form a turning support for the nozzle with respect to said pipe, said yoke having portions extending up the side of the nozzle for a purpose hereinafter described, as indicated in Fig. 2; thus it will be seen that even while the saws are operating, the nozzle may be swung about the pipe d to present the fingers d' or the nozzle opening in position for inspection, cleaning, or repair without danger to the attendant. The nozzle is normally held in operative relation with the saws by suitable means, such, for instance, as the spring d^4 , the tension of which is so gaged that in case of a choke in the nozzle opening, the whole nozzle will swing around the exhaust pipe d as an axis, and coming in contact with the rib rail b^3 or other part of the gin breast, will raise the said gin breast and stop the machine in a manner to be presently described, thus making the gin automatic in its stopping action in case of a choke. To turn the nozzle for inspection or repair it is only necessary to grasp the nozzle by the hand, or, if desired, a suitable handle may be employed.

Owing to the pressure of the air on the outside of the nozzle due to the interior vacuum or partial vacuum it is found desirable to add to the nozzle sides a stiffening yoke d^3 , as indicated in Fig. 2, and when used the spring d^4 may have one end connected thereto and its other end connected to a part of the main frame, as shown. Also in the movement of the nozzle D due to a choke this yoke may serve to contact with a part, as b^3 , of the gin breast and raise the same in the manner described. The back lip d^2 is hinged at d^5 and provided with means indicated as a whole at C for adjusting the lip with relation to the fingers d' , whereby it can be made to approach the fingers d' when dry cotton is being ginned and not much air is required, or it can be pulled back away from the front lip when wet cotton is being ginned and more air is necessary. The adjusting device C may be of any desired construction, but that illustrated comprises a bar d^6 having one arm d^7 engaged by a bolt and an offset arm d^8 engaged by a second bolt, the play of the back lip d^2 being regulated by adjusting the offset finger d^8 with relation to the body of nozzle D , as will be readily understood by those skilled in the art.

A small pulley e is placed on the gin saw shaft b and a pulley e' on the shaft of the roller J , and staggered with relation to these are three other small pulleys, e^2, e^3, e^4 , placed

as shown and mounted on the main frame, and from these run a leather belt E . When the breast a^3 is dropped down into working position, the pulley e' engages the belt and tightens it up against the roller e . This starts the belt to moving and causes the rotation of the picker roller b' which also causes the roller e^2 to revolve, from which roller it is designed to run the belt that runs the feed device (not shown); this feeding device will obviously stop feeding when the breast is raised, and the operation of ginning be discontinued.

In order to stop and start the gin it is contemplated using a tight and loose pulley shown at F and F' respectively. As this gin only requires half the power at the belt that a brush gin requires, the width of the belt is consequently only half of the width required on a brush gin, and therefore, the tight and loose pulley combined only need the same face that was formerly required for the brush gin.

On the back of the frame, below the inclined board b^4 is located a screen F^3 ; the purpose of this screen is to allow air to enter from the back and to obstruct the entrance of motes and other flying particles which may be showering down from the saws from which they have been thrown by centrifugal force, as hereinbefore explained.

From the foregoing, it will be noted that air is admitted around the incoming teeth of the saws substantially from all directions, but mainly in the direction of the moving saw teeth, and at a greater velocity than the speed at which they are traveling. The air suction in the pipe d and nozzle D , as distinguished from a driving blast, causes the cotton to leave the teeth and remain suspended in the current of air not only from the saws but also in the nozzle and exhaust pipe d so that the suction serves to deliver the cotton by one operation from the saws to the condenser or other cotton collector. The nozzle on the gin is placed below the saws to enable the motes, leaf trash, sand, sticks, etc., to be thrown off of the saws by centrifugal force before the lint-bearing teeth reach the vacuum, thus without any mechanism at all this arrangement accomplishes perfect moting which other devices have done but indifferently, when at all, by the addition of various complicated mechanism.

In practice, cotton leaves the teeth about two inches before it reaches the back lip d^2 , the opposite lip acting as a dam and jumps to the opening of the nozzle, the same bunch frequently getting into two openings between the fingers at the same time. This would cause a choke if the notches in the back plate came in actual contact with the underside of the fingers, but there is an opening between the tips of these notches

and the fingers which allows the cotton to clear and enter the nozzle freely and without causing a choke. The fingers in the front lip d' and the notches in the back lip d^2 and the saws B themselves, especially when full of cotton, obstruct the inlet of the nozzle and hinder the entrance of air into the vacuum, at the same time causing the air which is enabled to enter to assume a high velocity; thus my improved gin is very efficient and economical in the use of air, as all the air that goes into the fan has gained access through the opening of the nozzle and has accomplished the useful work of stripping the saw teeth of their lint. In the blast gin, air at high pressure is directed at the saws and loosens the cotton from the teeth and only a small part of the air gets into the flue to carry the lint along to its destination.

In the blast gin also there must be a system of piping to bring the blast to the gin and then another system of piping to take the cotton and lint away from the gin, whereas my improved vacuum gin requires only one system of piping, *i. e.*, that which takes the cotton and air from the nozzle, conducts it to the discharge; it will thus be seen that the air has a shorter distance to travel, and necessarily, has to pass fewer joints with consequent less leakage and loss. After the lint has entered the nozzle D it follows the air currents through the pipe d either to a condenser which allows the air to go on to the fan and retains the lint, which is subsequently wiped off by the doffer rollers, or the air and cotton are taken into the fan and together blown against the condenser drum, or the air and cotton are blown into a cyclone device for collecting cotton and allowing the air to escape, all as will be evident to those skilled in the art.

From the foregoing description it will be noted that an important characteristic of the invention is the removal of lint from the saw teeth by suction current of air entering the contracted opening of a suction nozzle disposed at a peripheral portion of the saws, and that such suction currents carry with them the lint or cotton fiber which also enters the opening of the suction nozzle. Obviously the suction nozzle may be variously formed, and while a good practical character of suction nozzle is shown by the drawings and has been described as one embodiment of the invention, it is to be understood that the invention is not necessarily restricted thereto, as I believe I am the first to provide a saw gin with a suction nozzle having a small or contracted opening adjacent the saw teeth for producing suction currents that detach the lint or cotton from the saws and carry it into the opening of the nozzle. Another important characteristic of the invention in connection with the suction nozzle

acting as stated is the removal of motes, trash, etc. by centrifugal action before they reach the suction nozzle and carrying them away from the suction currents to the rear or bottom of the gin by a mote board disposed above the suction nozzle and back of the saws. It is of advantage, though not in all cases necessary, to locate the suction nozzle at the lower part of the saws because the saw teeth are there pointed downward, and gravity assists the action of the suction currents and centrifugal force in detaching the fiber from the saws and carrying it into the mouth of the suction nozzle.

The construction illustrated shows a good practical embodiment of the essentials of the present invention, which, however, may take other forms without departing from the distinguishing characteristic thereof as defined by the claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, means co-acting therewith for removing fiber from the seed, a suction nozzle having a contracted opening adjacent the periphery of the saws and extending transversely of the series of saws, and a device for catching motes thrown from the saws between said means and the nozzle opening.

2. A cotton gin comprising a supporting frame, ginning saws mounted therein, and a suction nozzle having its opening directed in opposition to the saw movement and provided with separated fingers extended between said saws and affording a suction opening into the nozzle in the direction of saw movement.

3. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, a suction nozzle having its opening disposed below the axis of the saws and adjacent the teeth thereof, and a suction chamber in communication with the suction nozzle.

4. A cotton gin comprising a supporting frame, ginning saws mounted therein, and a suction nozzle having its opening disposed in a direction opposed to the saw movement to induce suction currents into said nozzle in the direction of saw movement and provided with a back lip having notches arranged in juxtaposition with said saws.

5. A cotton gin comprising a supporting frame, ginning saws mounted therein, and a suction nozzle having its opening directed in opposition to the saw movement to induce currents in the direction of saw movement and provided with an adjustable back lip provided with notches arranged in the planes of and opposite said saws.

6. A cotton gin comprising a supporting

frame, ginning saws mounted therein, and a suction nozzle provided with fingers extended between said saws and also provided with an adjustable back lip opposed to said fingers and forming an opening for the nozzle to induce currents into said nozzle in the direction of saw movement.

7. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, a suction nozzle having a contracted opening disposed adjacent the saw teeth for directing suction currents along the saws and carrying the cotton into the contracted opening of the nozzle, and a suction chamber connected with said nozzle.

8. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, a suction nozzle having a contracted opening disposed adjacent the saw teeth for directing suction currents along the saws and carrying the cotton into the contracted opening of the nozzle, and a mote board disposed above the nozzle and back of the saws to catch motes and trash thrown from the saws.

9. A cotton gin comprising a supporting frame, ginning saws mounted therein, and a suction nozzle having its inlet opposed to the direction of movement of the saws to induce suction currents into the nozzle in the direction of saw movement and provided with fingers extending between said saws, said nozzle being also provided with an adjustable back lip and means for adjusting said back lip to vary the suction opening into the nozzle.

10. A cotton gin comprising a supporting frame, ginning saws mounted therein, and a pivotally supported suction nozzle having its inlet adjacent said saws and directed to induce suction currents into said nozzle in the direction of saw movement.

11. A cotton gin comprising a supporting frame, ginning saws mounted therein, a suction pipe also supported in said frame, and a suction nozzle, having its inlet opening directed in opposition to the movement of the saws to induce suction currents into the nozzle in the direction of saw movement, pivotally mounted on said pipe and communicating therewith.

12. A cotton gin comprising a supporting frame, ginning saws mounted therein, a pivotally supported suction nozzle, and means for yieldingly holding said nozzle in operative position.

13. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, means for operating the saws, a suction nozzle having a contracted opening disposed below the axis of the saws and in close relation with the saw teeth for directing suction currents over the saws and the cotton into

the suction nozzle, and a mote board disposed back of the saws to direct motes away from the suction nozzle.

14. A cotton gin comprising a supporting frame, ginning saws mounted therein, a suction pipe also supported in said frame, a suction nozzle pivotally mounted on said pipe and communicating therewith and a stiffening yoke surrounding said pipe and secured to said nozzle.

15. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, a suction nozzle having a contracted opening disposed in close proximity to the saw teeth for directing suction air currents along the face of the saws to remove cotton therefrom and direct it into the suction nozzle, and a mote receptacle for catching motes and trash thrown from the saws by centrifugal action.

16. A cotton gin comprising a frame, ginning saws mounted therein, a suction nozzle having its opening extending transversely of the saws and inducing currents therein into the direction of saw movement, and a chute arranged back of said nozzle, a screened air inlet opening being arranged below said chute.

17. In a cotton gin, the combination of gin saws, a movable suction nozzle, a gin breast mounted to swing, means for yieldingly holding the nozzle in operative relation with the saws, said nozzle being adapted to move and swing the breast when the nozzle becomes choked.

18. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a suction nozzle having a contracted opening disposed in close proximity to the saw teeth for producing suction currents over the saws to remove cotton therefrom and direct it into the mouth of the nozzle, a vacuum chamber communicating with said nozzle, and a mote catcher disposed back of the saws and above the nozzle to direct motes out of the influence of currents of air entering said nozzle.

19. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, a suction nozzle having its opening disposed below the saws and in close proximity thereto for removing cotton from the saws and directing it into the suction nozzle, and an inclined mote board having its upper end in close proximity to the saws and its lower end directing the motes to the rear of the suction nozzle and out of the influence of the suction currents.

20. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, means co-acting therewith for removing fiber from the seed, said saws acting to throw

5 notes therefrom by centrifugal action, a suction nozzle having its opening disposed adjacent the saw teeth and separated from said means a distance greater than the radius of the saws to permit notes to be
10 thrown from the saws between said means and nozzle opening, and a device between said means and nozzle opening to direct the notes thrown from the saws by centrifugal
15 action away from said nozzle opening.

21. In a saw gin employing suction currents of air for removing cotton from the saws, the combination of a series of saws, a suction nozzle having its opening disposed
15 below the axis of the saws and adjacent the teeth thereof, fingers extending between the saws and over the nozzle opening, and a suction chamber in communication with the suction nozzle.

20 22. In a cotton gin, the combination of a series of saws, a suction nozzle having its opening disposed adjacent the saws and in

close proximity thereto for removing cotton from the saws, a series of fingers extending over the nozzle opening between the saws, 25 and a vacuum chamber in communication with said nozzle.

23. In a cotton gin, the combination of a series of saws, a suction nozzle having its opening disposed below the saws to remove 30 cotton therefrom when the saw teeth are directed downward, one wall of said nozzle forming a dam for the saw induced currents, a series of fingers extending over the nozzle opening between the saws, and a vacuum 35 chamber communicating with said nozzle.

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

JOHN R. FORDYCE.

Witnesses:

R. E. BISHOP,
HASS MCCARTHY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
