

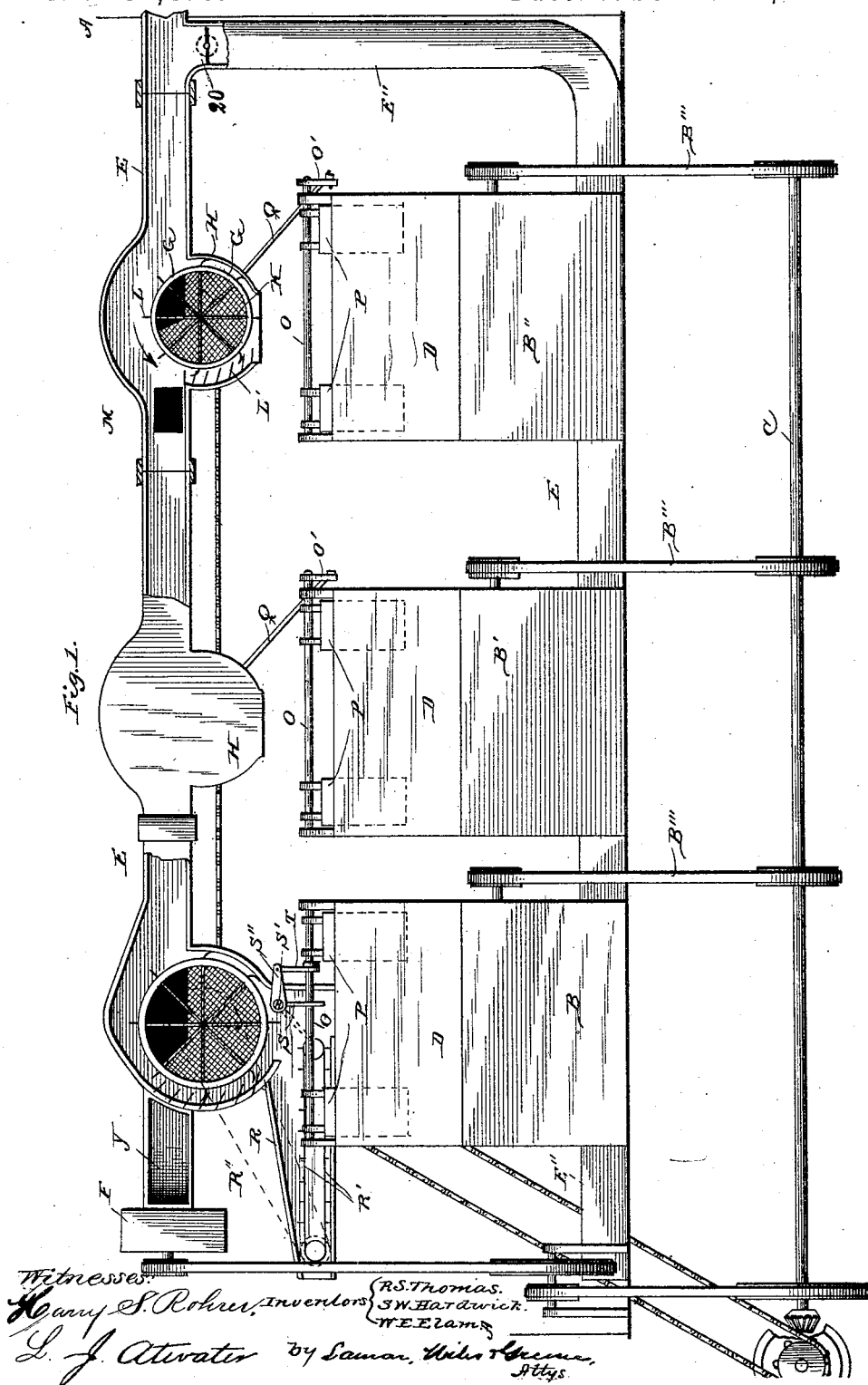
(No Model.)

4 Sheets—Sheet 1.

R. S. THOMAS, S. W. HARDWICK & W. E. ELAM.
APPARATUS FOR HANDLING AND CLEANING SEED COTTON.

No. 454,146.

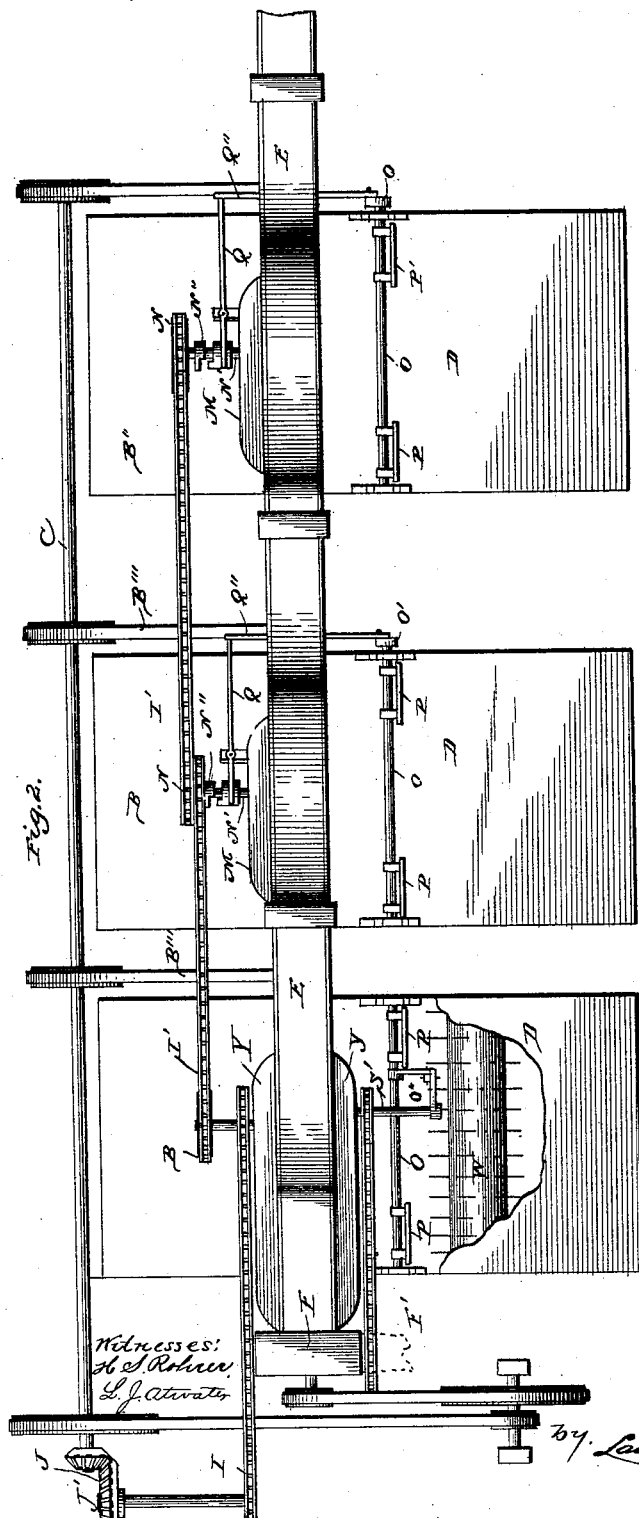
Patented June 16, 1891.



4 Sheets—Sheet 2.

No. 454,146.

Patented June 16, 1891.



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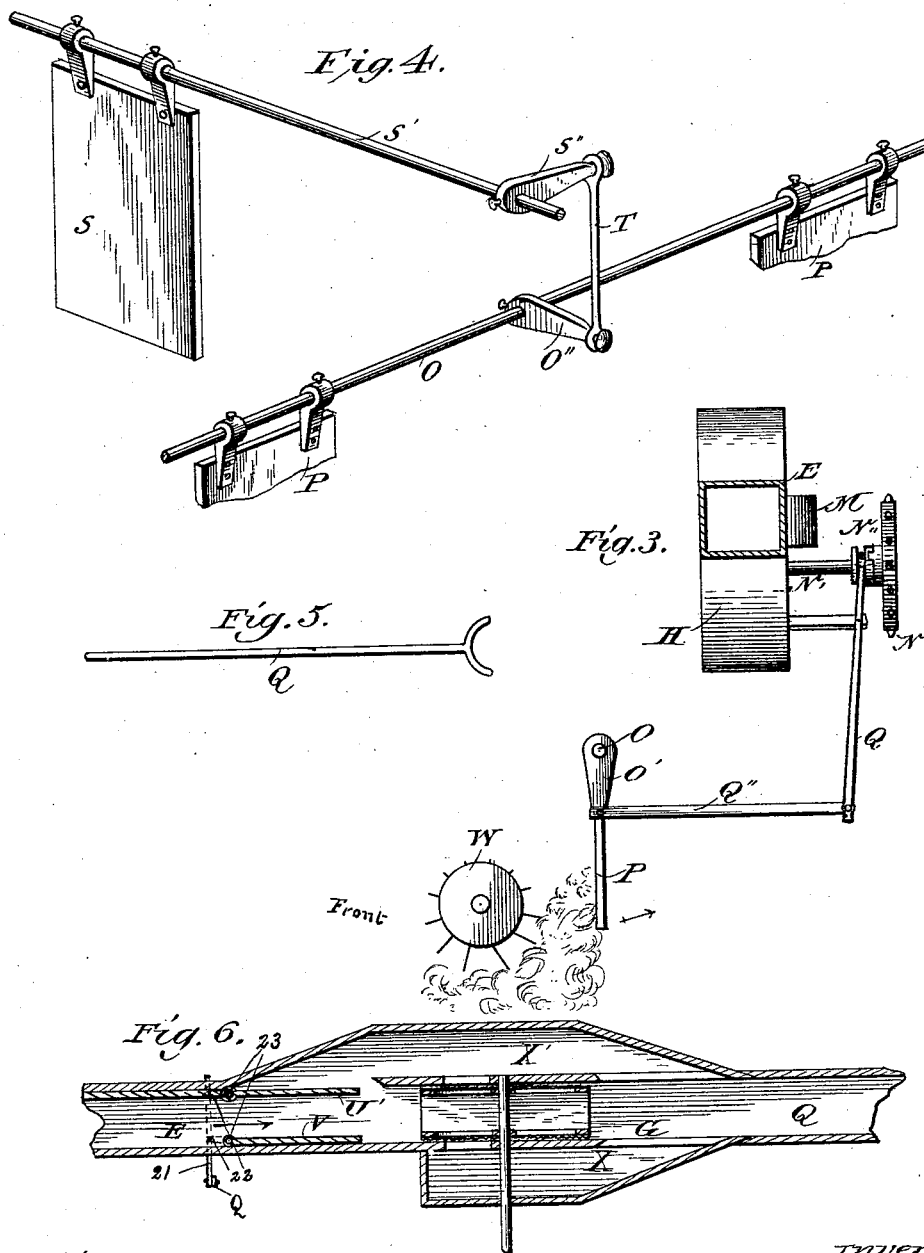
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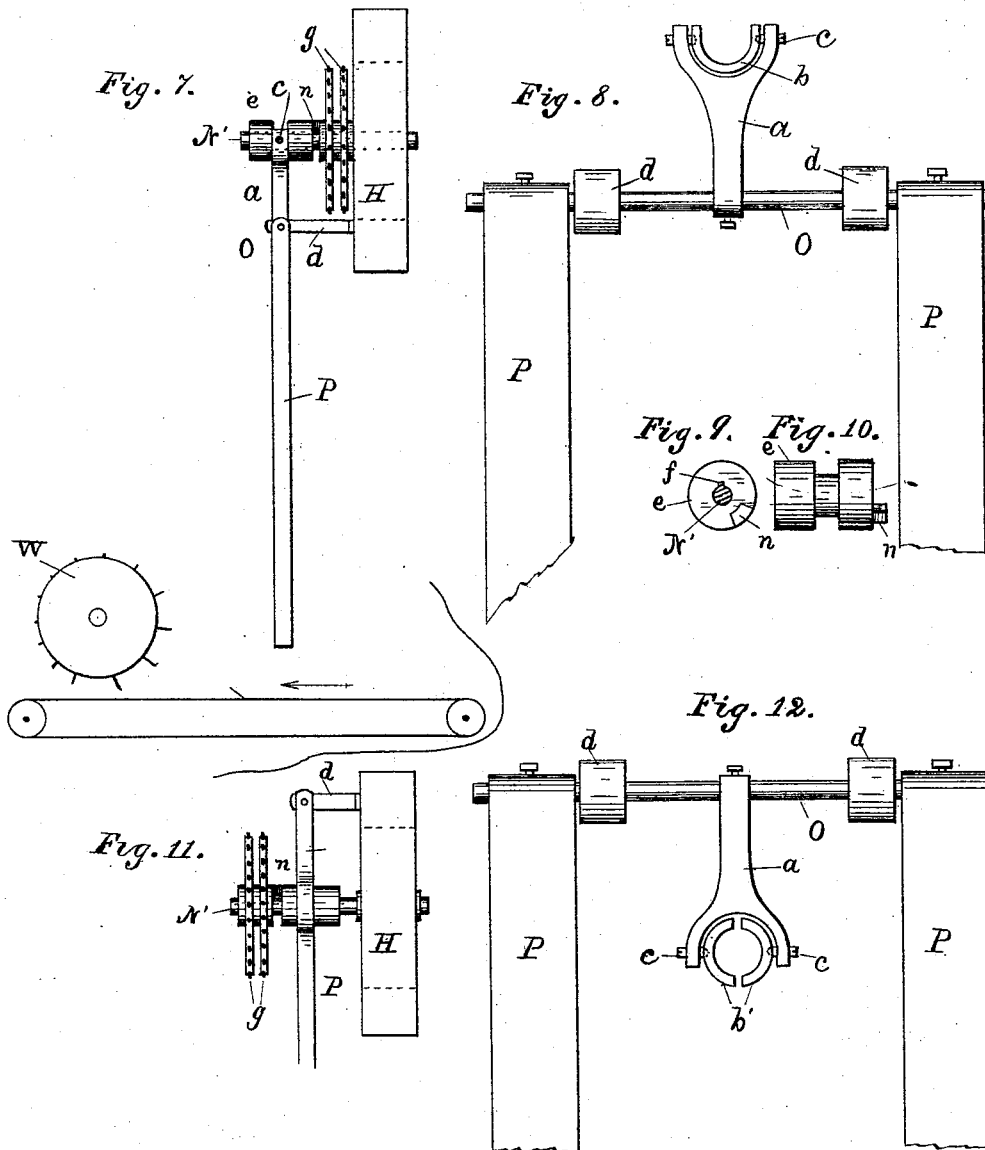
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UNITED STATES PATENT OFFICE.

ROBERT S. THOMAS, SAUNIE W. HARDWICK, AND WILLIAM E. ELAM, OF
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APPARATUS FOR HANDLING AND CLEANING SEED-COTTON.

SPECIFICATION forming part of Letters Patent No. 454,146, dated June 16, 1891.

Application filed August 12, 1890. Serial No. 361,813. (No model.)

To all whom it may concern:

Be it known that we, ROBERT S. THOMAS, SAUNIE W. HARDWICK, and WILLIAM E. ELAM, citizens of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Apparatus for Handling and Cleaning Seed-Cotton; and we do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention involves the use of a pneumatic tube, through which cotton is drawn by an exhaust-current, for convenience of illustration shown as induced by a fan.

It further involves means for screening and removing from the tube at one or more points any desired fraction of the passing cotton without interrupting the flow of the remainder, and also means whereby the amount of cotton so subtracted from the tube at each point may automatically vary with the needs of the gin to which the cotton from that point is taken, and, further, means whereby cotton passing in the tube and not required by any of the gins may be screened and automatically returned to the tube near its origin to be again offered to the gins at such time as the supply of fresh cotton may permit.

It still further involves various details and combinations, as will hereinafter appear.

In the drawings, Figure 1 is a side elevation of the apparatus, certain parts being removed to show internal construction. Fig. 2 is a plan of the same devices. Figs. 3, 4, and 5 are detail views. Fig. 6 shows a slight modification in construction. Figs. 7, 8, 9, 10, 11, and 12 are detail views hereinafter described.

In the drawings, A A represent the floor and walls of a gin-house, and B B' B'' are gins therein driven by belts B'''. (Shown beneath the floor.)

Upon the gins rest feeders D D, and at some

distance above these is a suitably-supported cotton-conveying tube E, in which an air-current is produced by an exhaust-fan F. The fan is driven from the power-shaft C through ordinary speed-increasing devices, and from it leads a discharge-pipe F', preferably passing out of the building. The opposite end of the tube passes out through the wall A to take cotton from a wagon or other source of supply.

For convenience the tube is made in sections that are joined by any suitable detachable union, and that are each provided with an opening in the lower side and preferably curved upward over the opening. Revolvable cotton-intercepting screen-wheels G project from below into these openings, respectively, where they fill the space between the tube's lateral walls, but obstruct only its lower part, this construction being preferred with the last wheel, because the cotton projecting from the pockets in rapid feeding meets less frictional resistance.

A casing H, forming a continuation of the tube-walls, extends downward, supporting the wheel-shaft and inclosing the wheel. It is open at the bottom, however, so that cotton may pass freely from the wheel to the feeder below. The wheels are slowly rotated by chain belts I I', actuated from the main shaft C through speed-reducing gearing J J', and are provided with peripheral pockets formed by the plane walls of the wheels and radial partitions K between those walls. In each wheel the partitions and one of the walls are solid or imperforate, but the other wall is of wire-cloth or otherwise of screen-like construction.

The peripheral edges of the partitions are provided with elastic flaps L, that press the curved wall of the casing upon one side of the wheel as they pass over it, and that upon the other side coact with like flaps L', fixed to the here more distant curved surface to exclude air that might otherwise pass around the wheel and enter the tube. The length of the curved surface upon each side is greater than the distance between successive partitions, and hence whether or not the wheel be in

motion the air is at all times excluded. From the construction it is evident that if the wheel rotates in the direction of the arrow such cotton as enters the pockets from the tube will
 5 be carried around with the wheel and will fall out when it reaches the opening in the lower side of the casing.

From a point alongside the screen portion of the wheel a pipe M passes laterally outward and returning enters the tube at a point beyond the casing and between it and the fan. The current through this pipe insures the prompt and certain filling of the pockets and removes dust that may enter with the cotton.
 15 Without this pipe the air-cushions and eddies in the pockets and the filling are consequently slow and irregular.

The chain belts I run upon sprocket-wheels N, loosely mounted upon the shafts N' of the screen-wheels and engaging them only by the clutches N'', which are without novelty. Each clutch is connected with the corresponding feeder below by devices whereby the accumulation of cotton on that feeder causes
 20 disengagement of the clutch, thus stopping the rotation of the cotton-delivering screen-wheel. Each feeder bears a rock-shaft O, upon which are rigidly fixed one or more boards P. These hang suspended in the
 25 feeder in position to be forced backward by the accumulation of cotton when the feeder receives it from the wheel above faster than the gin removes it.

From the shaft O projects a crank-arm O', and upon the side of the screen-wheel casing is centrally pivoted a lever Q, whose upper end engages and operates the clutch. The free end of the crank-arm is connected by a link Q'' to the lower end of the lever. Through
 30 these devices the swinging of the board P by the pressure of cotton in the feeder disengages the clutch and the wheel stops. All the cotton in the tube E then passes on above the wheel to the next gin until by the continued action of the gin the cotton in the feeder
 35 is so far diminished that the board swings back to its normal position, and thus re-engages the clutch. The operation is therefore at all times automatic, the feeder taking
 40 from the tube so much, and so much only, of the passing cotton as it is intended it shall receive.

Evidently any number of gins can take cotton from the same tube, the apparatus described being duplicated; but as it is desirable that no cotton should pass to the fan the construction for the last gin in the series must be modified. Here, then, we use a similar
 45 wheel, but make both sides of screen-cloth and carry the lateral pipes out upon each side instead of upon one only, as before. Upon that side of the wheel next the fan the top of the tube and the casing are made continuous, completely cutting off the direct passage of
 50 the current and forcing it through the wheel

and the lateral tubes Y, whence it, with the dust, passes to the fan, as before. The entire amount of cotton that has not been removed by the preceding wheels is, however, arrested by the screens, and as the wheel rotates is
 55 dropped as in the former case. It may happen that this cotton is too great in amount to be taken by this last gin. The casing is therefore extended to form a support or trough R for an endless-belt conveyer R', which is
 60 driven by a belt R'' from the screen-wheel shaft. One end of this conveyer lies alongside the path of the cotton falling from the wheel to the feeder, and the other extends beyond the gin to a point above the end of an
 65 overflow-pipe E'', which leads to a valved opening 20 into the tube E, near the opposite end of the apparatus, and through which the surplus cotton may be returned to the tube to be again offered to the gins. The conveyer
 70 runs continuously, but carries nothing ordinarily. Upon the opposite side of the path of the falling cotton is board S, fixed by its upper edge to a rock-shaft S', mounted on or in the side walls of the conveyer-trough, which
 75 projects horizontally from this shaft, and its free end is connected by a rod T with the corresponding end of an arm O'' upon a rock-shaft O, mounted upon the feeder in the
 80 same manner and provided with dependent boards, as in the gin first described. Now when the pressure of the cotton in the feeder rocks the shaft O in the manner already described the depression of the arm O'' draws
 85 down the rod T and with it the arm S''. This swings the board S obliquely across the path of the falling cotton and deflects the latter to the carrier, which deposits it at the mouth
 90 of the tube E''. When by the continued action of the gin the cotton in the feeder is so far reduced in amount as to permit the board P to swing back to place, the board S also
 95 swings back to its vertical position and the cotton falls as at first directly into the feeder, while the conveyer again runs idly.

Considering the apparatus as a whole it may be said that cotton is passed continuously through a pneumatic tube, that each of a series of gins takes from the tube so much
 100 as it needs and no more without interrupting the flow of the remainder, and that the surplus, if there be any after all the gins have been supplied, is placed in position to be returned to the tube when desired. The dust
 105 is thoroughly removed before the cotton reaches the gins, and the whole operation is entirely automatic.

It has been common to use a pneumatic tube and to remove the screened cotton therefrom to a different conveyer by which it was distributed to a series of gins. This apparatus dispenses with such second conveyer.

It is evident that any mechanic can readily vary the detail of our construction in many
 110

ways without passing the proper limits of the invention, and we do not therefore wish to be confined to the precise forms shown and described. As an example of such variations

we have added to the illustrations Fig. 6, which is a horizontal section of the tube and wheel with a modified arrangement of pipes. Both faces of the wheel are of wire-cloth, and opposite them the sides of the tube are cut away. One of the openings so formed leads into a tube X, which lies alongside the main tube and opens into it again at a point between the wheel and the fan. The other X' opens into a tube that has besides this opening two others, one leading to the main tube between the wheel and the fan and the other upon the opposite side of the wheel. Through this latter tube a part of the current and cotton conveyed thereby passes at all times, and when the wheel is not in operation it may allow the passage of the entire current. Two hinged boards V V' regulate the proportion of the current sent to the wheel and sent around it, and these boards may be varied in position by automatic devices connecting them with the feeder in a manner analogous to that already described in connection with the principal construction. The upper end of the lever Q, instead of engaging the clutch, as in Fig. 3, engages the end of a sliding bar 21, pivotally attached to arms 22, secured to the pivots 23 of the boards V V', Fig. 6. So, too, the construction connecting the swinging boards with the clutch may be varied, and for use in certain situations may be simplified. In Figs. 7, 8, 9, 10, 11, and 12 some such changes are illustrated, the boards P being supported from the tube instead of from the feeder. The first four of these figures pertain to mounting the shaft O upon which the boards P are suspended upon the casing H below the shaft N'. As shown, the shaft is mounted in bearings d, and from the shaft O extends a forked arm a, which engages the clutch upon the shaft N'. The movable member e of the clutch slides upon the shaft, but is prevented from rotating thereon by a spline f. At one end it is provided with a tooth n to engage a similar tooth upon the fixed portion, and it has a circumferential groove to receive a half-ring b, supported by pivots c in the fork a.

The boards P and the forked arm together form a shipping-lever, of which the shaft O is the pivot. In Fig. 11 the boards and arm are shown as united in one and the fulcrum-pivot is placed above the shaft N'. Fig. 12 is a view similar to Fig. 8, but with the shaft O above the shaft N', where it is supported in the same manner as in that figure. In this case the forked arm is dependent, and, as illustrated, it is provided with two pivotally-suspended half-rings b' to engage the clutch.

What we claim is—

1. The combination, with a cotton-conveying pneumatic tube, of a transversely-moving

screen bearing devices obstructing a part only of the tube and adapted to remove laterally out of the tube the cotton intercepted by them.

2. The combination, with a cotton-conveying pneumatic tube, of a transversely-moving screen bearing devices obstructing a part only of the tube and adapted to remove laterally from the tube the cotton that they intercept, and a second transversely-moving screen bearing devices upon that side of the first toward which the current passes, obstructing the whole path of the air-current, and adapted to remove laterally from the tube all cotton that may pass the first screen.

3. The combination, with a cotton-conveying pneumatic tube, of transverse rotary wheels, each obstructing a part only of the tube and having peripheral pockets with a screen-wall upon one plane side of the wheel, a pipe leading from the tube at said screen side and returning to the tube at a point beyond the wheel, substantially as set forth, whereby a part of the passing cotton may be drawn into the pockets of the wheel and be removed from the tube by the wheel's rotation.

4. The combination, with a gin and a feeder thereon, of a cotton-conveying pneumatic tube provided with a cotton-removing screen-wheel projecting into the tube and obstructing a part of it and adapted to remove laterally out of the tube and drop to the feeder the cotton intercepted, and devices whereby the pressure of the cotton accumulating in the feeder may temporarily arrest the motion of the wheel.

5. The combination, with a cotton-conveying pneumatic tube and a gin with a feeder thereon below the tube, of a screen-wheel adapted to transfer a part of the passing cotton from the tube to the feeder, means whereby the pressure of cotton in said feeder may govern the amount so transferred, a second gin and feeder thereon below said tube, a second screen-wheel arranged to intercept and drop to the feeder last mentioned all cotton passing the first wheel, a conveyer adjacent to the path of the falling cotton, and mechanism whereby undue pressure in the feeder may divert the falling cotton to said conveyer, substantially as set forth.

6. The combination, with two gins, feeders thereon, and a cotton-conveying pneumatic tube above the feeders, of corresponding screen-wheels adapted to discharge cotton from the tube to the feeders, respectively, the first wheel being arranged to intercept part only of the passing cotton and the second to discharge all that passes the first, and mechanism whereby undue pressure in the first feeder may govern the discharge from the corresponding wheel.

7. The combination, with a gin, a feeder thereon, the rock-shaft upon the feeder and the boards depending from the rock-shaft

into the feeder, of a cotton-conveying tube
above the feeder, the rotary wheel working
in the tube to remove cotton therefrom and
drop it into said feeder, a clutch connecting
5 said wheel with the motive power, and the
centrally-pivoted lever having one end con-
nected to an arm upon the rock-shaft and the
other engaging said clutch, substantially as
set forth.

In testimony whereof we affix our signatures, to
in presence of two witnesses.

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S. W. HARDWICK.
W. E. ELAM.

Witnesses:

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