

Dec. 4, 1928.

1,693,754

N. B. HENRY

COTTON SEPARATOR

Filed Sept. 27, 1927

3 Sheets-Sheet 1

Fig. 1.

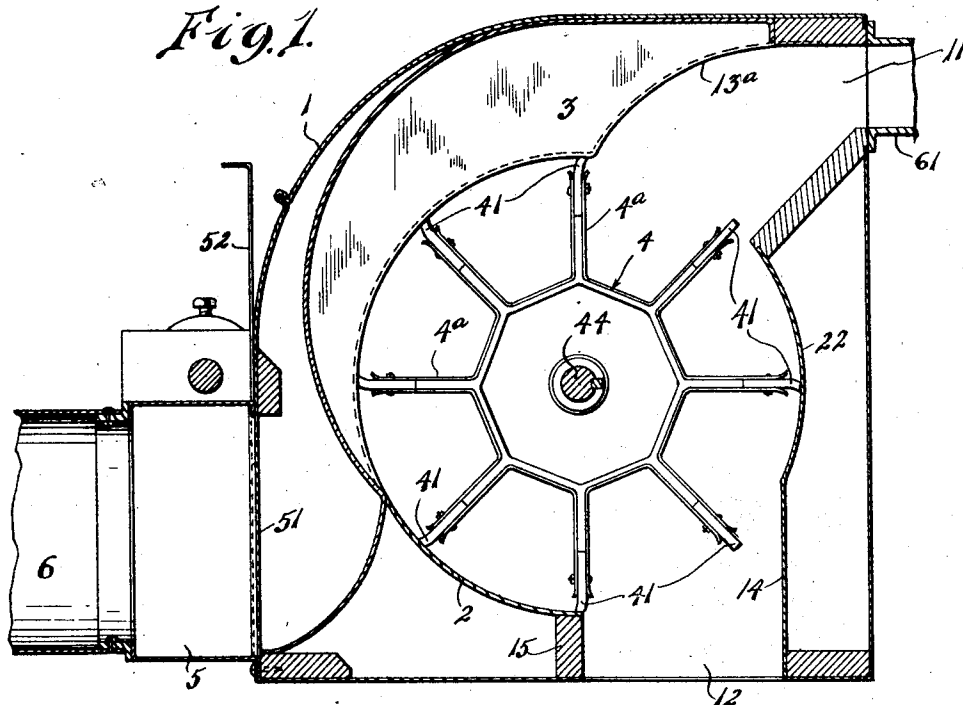
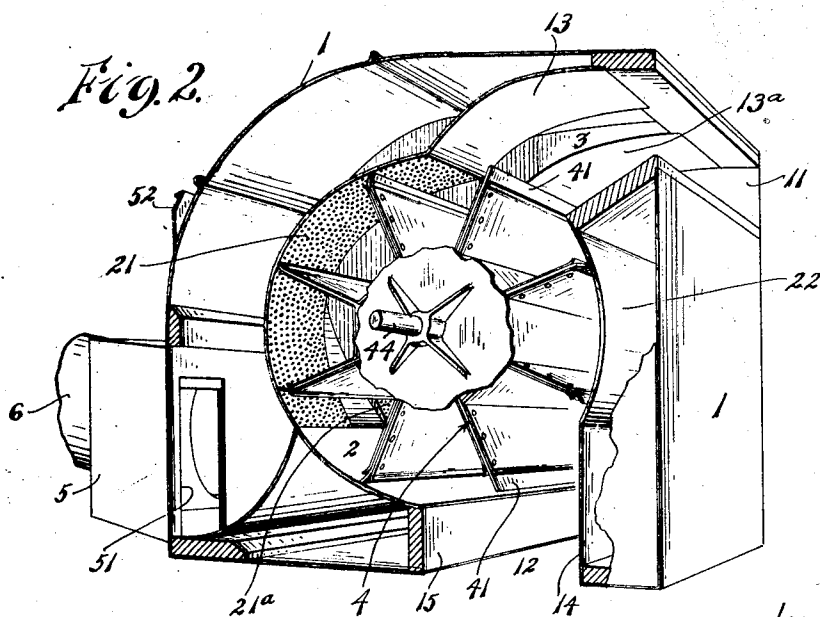


Fig. 2.



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3 Sheets-Sheet 2

Fig. 3.

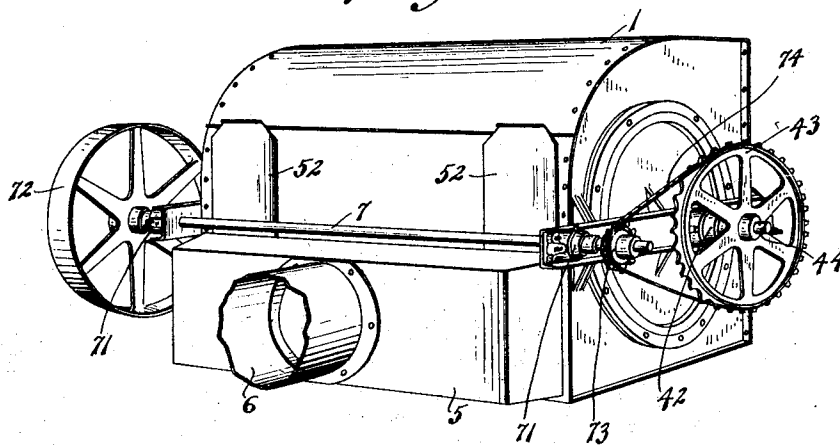
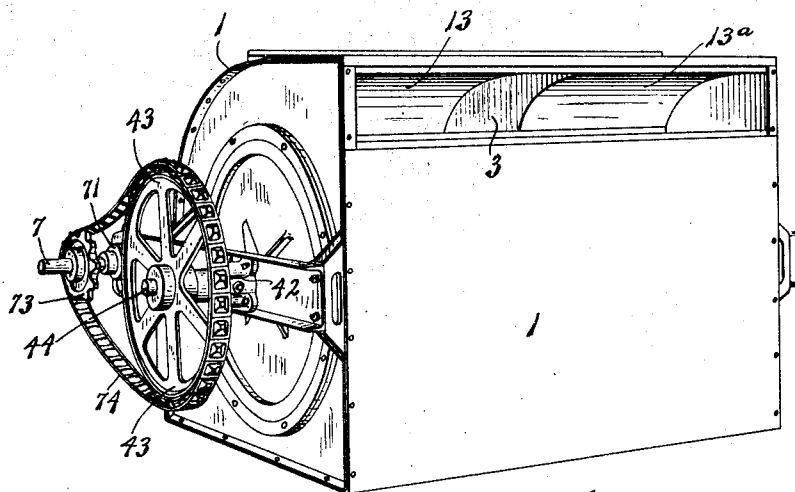


Fig. 4.

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3 Sheets-Sheet 3

Fig. 5.

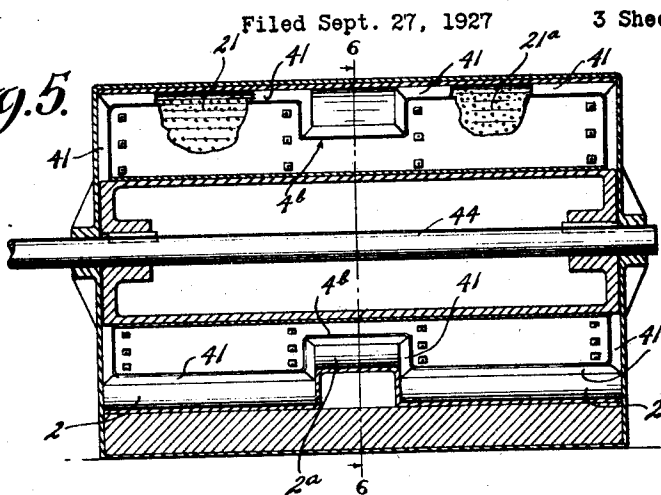


Fig. 6.

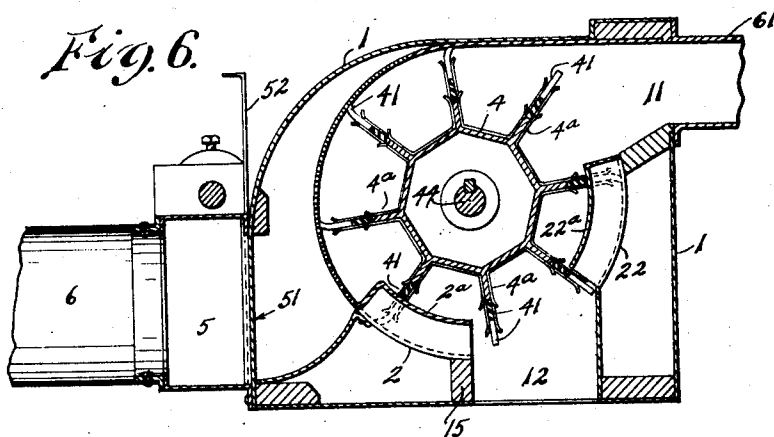
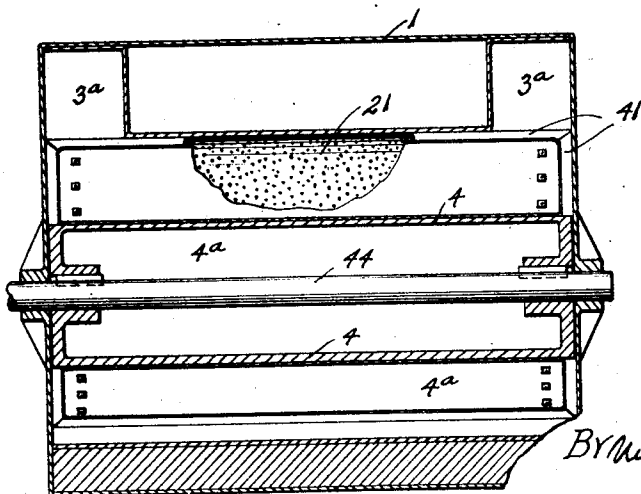


Fig. 7.



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NELSON B. HENRY, OF ATLANTA, GEORGIA.

COTTON SEPARATOR.

Application filed September 27, 1927. Serial No. 222,363.

My invention is a separator designed to remove cotton from an air current in which it is carried. Such mechanisms, of various kinds, are old and well known and belong broadly to two types, one employing a screen either straight, curved, or, in some cases, a screen drum, another, employing a so-called "paddle-wheel" drum, revolving in a partially screened casing, into the buckets or chambers of which drum, between the several paddles, the cotton is deposited by the air current, which passes on through the screened surfaces, leaving the cotton in the chambers. It is to the paddle wheel type of separator that my invention belongs and it consists in providing the inner casing which closely surrounds the paddle wheel, in contact with the ends of the rotating paddles, with a by-pass passage or duct, through which air and cotton may continuously move without regard to the position or movement of the paddles. Another feature of invention is the arrangement of screens in such a fashion that resilient wipers arranged upon the edges of the paddles will continuously sweep the screens, removing any adhering cotton and keeping the screens at all times free and clear of cotton; another feature of invention is a system of valves by which the motion of the air current may be controlled to cause it to deposit cotton evenly throughout the length of the paddle wheel, in the several chambers thereof.

In the drawings:

Figure 1 is a longitudinal, central section of my improved separator;

Figure 2 is an end view, in perspective, one end of the casing being removed to show the interior parts;

Figure 3 is a rear view;

Figure 4 is a front view;

Figure 5 is a vertical central section of my machine, showing a modified form of the invention;

Figure 6 is a vertical central cross section on line 6—6 of Figure 5; and

Figure 7 is a central vertical section of my machine showing another modification.

Referring to the drawings, Figures 1, 2, 3 and 4, the air tight outer casing 1, of the machine may be of any shape desired. Within the casing 1 is an inner casing and certain partitions for guiding the air currents. The inner casing is made up of two curved imperforate metal sheets, 2, 22, and two curved

foraminous sections 21, 21^a extending upward from sheet 2, at the ends thereof. Between the inner edges of sheets 21, 21^a, is located a trough or duct, 3, curving from the inlet opening, 11, to the upper edge of sheet 2, from which spring the perforated sheets 21, 21^a. Between the upper edges of sheets 21, 21^a, and the upper side of inlet 11, are curved inlet guide sheets, 13, 13^a, the duct 3 lying between the opposed inner edges of the foraminous sheets 21, 21^a and the opposed inner edges of the guide sheets 13, 13^a. Depending from the lower side of sector 22 is a guide sheet 14, defining one side of the outlet opening 12, the other side being formed by a support member 15. It will now be seen that within the outer casing is formed a cylindrical inner casing, interrupted longitudinally by an inlet opening 11 and an outlet opening 12, and transversely by a duct 3.

Within the inner casing is mounted in bearings 42 upon the frame of the machine, a "paddle wheel" valve, 4, the edges of the several paddles 4^a being provided with sealing strips 41 of rubberized belting or the like, as is usual, the strips making continuous contact with the inner surfaces of the sectors 2, 22, 21 and 21^a, the sectors 2 and 22 being of such a designed size that a strip 41 is always in contact with the sectors 2 and 22 to prevent the ingress of air through outlet 12.

At the back of the outer casing an air tight box 5 is preferably secured, from which a pipe 6 leads to a suction fan, not shown, the box being connected by openings, 51, to the interior of the outer casing, 1, valves 52 being also provided to vary at will, either or both of the openings 51 from wide open to closed, as may be deemed expedient by the operator. At the front of the outer casing, a pipe 61, from a source of cotton supply, is connected to the inlet 11.

The actuation of the paddle wheel may be accomplished in any way desired. I have shown a counter shaft 7 mounted upon bearings 71 upon the frame of the machine, driven, from a source of power, by a pulley 72, and transmitting by a sprocket gear 73 and chain 74 to a sprocket 43 upon the shaft 44 of the paddle wheel.

Operation: The suction fan being put in operation an air current is induced in pipe 6, box 5, casing 1 and pipe 61, the cotton and air entering at inlet 11, the cotton being deposited in the chambers of the revolving pad-

dle wheel valve and the air passing through the foraminous screens 21, 21^a to box 5, pipe 6 and the fan, air being prevented from entering at the outlet opening 12, by the constant contact of at least two of the sealing strips 41 on the edges of the paddles with the imperforate sectors 2 and 22. In most prior paddle wheel separators, each time that a paddle in its movement across the inlet opening reached the enclosing perforated screen surface, the air current was momentarily completely cut off and had to be re-established as the paddle moved onto the perforated screen surface, giving at first only a limited opening for the passage of air. In some cases this cut-off effect has been sought to be overcome by providing a perforated guide sheet at the point marked 13, 13^a in the drawings, but this was a practical failure owing to the perforations rapidly filling with cotton so that no air could pass this way. In my machine the entering cotton and air stream passes first into the paddle wheel chamber immediately opposite the inlet opening and a considerable part of the cotton is deposited in this chamber, and as this chamber is moved on, the air-cotton current still has access to it, through the duct 3, the air-cotton current dividing and passing toward the ends of the chamber, the air passing through the perforated sectors in the shortest path to the exit openings 51, leaving the cotton in the chambers. The air current continues to pass into all chambers between the inlet opening and the end of the perforated sectors 21, 21^a and owing to the position of the exit openings 51 tends to move toward the ends of the several chambers filling the chambers not only at the middle but at the ends. This even distribution of the cotton along the length of each chamber can be well controlled by means of the valves 52 which can be so adjusted that the air will divide and pass in any desired fashion through the perforated sectors. The perforated sectors are at all times kept clear and open by the wiping action of the strips 41 on the edges of the paddles which serve not only as a seal to prevent ingress of air through outlet 12 but also as a clearing brush for the perforated screen surfaces.

The combination in use of these forces results in a continuous air current, which is, by its continuity, of maximum cotton moving capacity; the air outlet openings in the outer case, out of line with the air duct, give capacity for evenly distributing the load throughout the length of each chamber and thus filling each chamber to capacity, while the wiping action of the paddles upon the perforated surfaces keeps a clear air passage at all times so that the cotton may be moved without obstruction of the air current.

In Figures 5 and 6 I illustrate a modified form of my machine, in which the by-pass

current is provided for by openings 4^b in the several paddles 4^a. In this form the duct 3 is dispensed with, its function as a by-pass being performed by the openings 4^b upon the edges of which openings are fitted sealing strips 41. On the sectors 2, 22, are erected troughs or boxes 2^a and 22^a closed at one or both ends, which troughs or boxes close the openings 4^b in the several paddles 4^a as the paddles severally pass onto the imperforate sectors 21, 21^a, the sealing strips 41 on the edges of the openings 4^b contacting with the troughs or boxes 2^a, 22^a.

In Figure 7 I show a modification in which, instead of one central duct 3, I employ two ducts, 3^a, one at each end of the machine with a screen surface 21 between the ducts.

I claim:

1. A cotton separator, comprising, in combination, an outer casing, having an air-cotton inlet opening, and an air outlet opening and a cotton outlet opening; means to create a continuous suction air current through the casing; an inner casing having perforate and imperforate sectors, the perforate sectors being concentric with a paddle wheel valve, and having an air-cotton inlet opening and a cotton outlet opening; that paddle wheel valve, within the inner casing, the sealing strips of the paddles sweeping the perforate sectors; a by-pass for the air-cotton current leading by several of the paddles; means to actuate the paddle wheel valve positively.

2. A cotton separator, comprising, in combination, an outer casing, having an air-cotton inlet opening, and an air outlet opening and a cotton outlet opening; means to create a continuous suction air current through the casing; an inner casing having perforate and imperforate sectors the perforate sectors being concentric with a paddle wheel valve, and an air-cotton inlet opening and a cotton outlet opening; that paddle wheel valve, within the inner casing, the sealing strips of the paddles sweeping the perforate sectors; a duct forming a section of the inner casing wall, providing a by-pass for the air-cotton current leading by several of the paddles; means to actuate the paddle wheel valve positively.

3. In a cotton separator, in combination, an outer casing, having an air-cotton inlet opening and an air outlet opening and a cotton outlet opening; means to create a suction air current through the casing, comprising a vacuum box secured at the outlet side of the outer casing and connected by apertures adjustably valved, to the interior of the outer casing, at the ends thereof, and connected also to the air inlet side of a suction fan; an inner casing having perforate and imperforate sectors, the perforate sectors being concentric with a paddle wheel valve, and having an air-cotton inlet opening and a cotton outlet opening; that paddle wheel valve, with-

in the inner casing, the sealing strips of the paddles sweeping the perforate sectors; means to actuate the paddle wheel valve positively.

- 5 4. In a cotton separator, in combination, an outer casing, having an air-cotton inlet opening; and an air outlet opening and a cotton outlet opening; means to create a suction air current through the casing; an inner casing having perforate and imperforate sectors, the perforate sectors being concentric

with a paddle wheel valve, and having an air-cotton inlet opening and a cotton outlet opening; that paddle wheel valve, within the inner casing, having sealing strips upon the edges of its paddles sweeping the perforate sectors; means to actuate the paddle wheel valve positively. 15

Signed at Atlanta, Georgia, this twenty fourth day of September, 1927.

NELSON B. HENRY.