

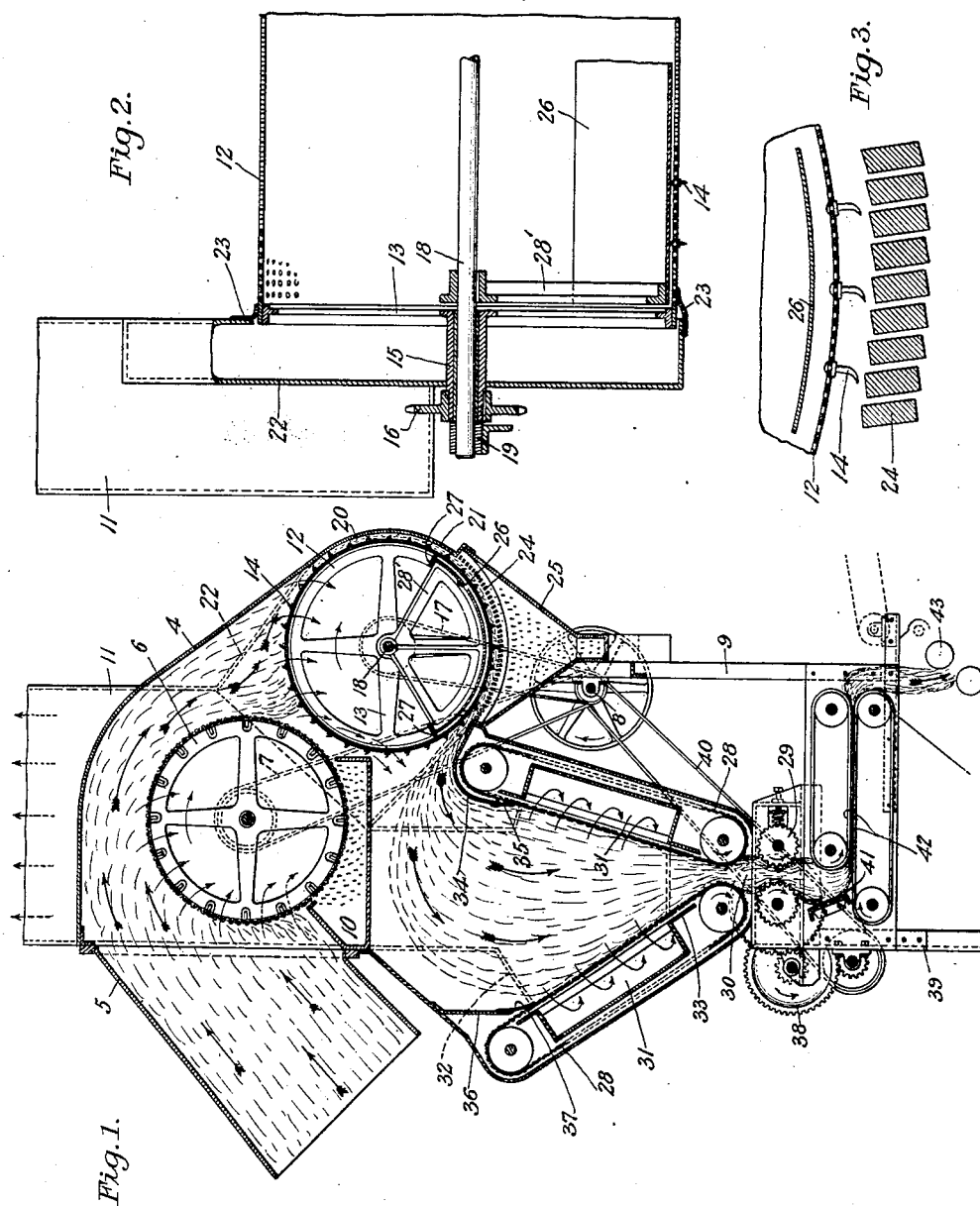
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COTTON CONDENSER

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COTTON CONDENSER

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This invention relates to new and useful improvements in cotton condensers and the method of removing dust, dirt, motes, and other extraneous matter from cotton lint.

5 An important object of this invention is to provide method and means of removing such extraneous matter from cotton lint without the loss of valuable fibres while it is being subjected to the usual condenser action. In
10 all ginning machines the lint is removed from the saws by a current of air, whether it be created by a gin brush, blast fan, or suction fan. It is well known that a condenser is primarily designed to extract the air and
15 dirt from the lint coming from the gin without the loss of cotton fibres, and secondly to compress this cotton lint into a bat. In all condensers, whether suction or blast, the current of cotton laden air is projected against
20 a screen or screens which must be of fine enough mesh to prevent the passage of small fibres with the result that the air is extracted from the lint, but not the particles of leaf trash, motes, and other large foreign sub-
25 stances. Consequently, in ordinary condensers trash and the larger extraneous matter are left in the cotton lint and go into the bat produced by the condenser.

My invention, therefore, has for its primary
30 object, the provision of means within a condenser for temporarily taking the cotton out of the air current passing through the condenser while it is passed over a coarse screen to remove the trash and motes without
35 loss of valuable fibre, and then returning the cotton to the air current.

Another important object of the invention is to provide means within the usual con-
40 denser mechanism for removing trash and the like from the cotton lint; the arrangement being such that after the cotton is cleaned, a part of the current of air passing through the condenser operates to remove cotton lint
45 from the trash removing means and this remaining air is then removed from the cotton as it is being formed into a bat.

Another object of the invention is to provide improved bat forming mechanism for
50 the condenser which functions to gradually

compress the cotton while extracting practically all air remaining in the cotton.

Other objects and advantages of the invention will become apparent during the course of the following description. 55

In the accompanying drawing forming a part of the description and wherein like numerals are employed to designate like parts throughout the several views:

Figure 1 is a vertical section through my improved condenser, 60

Figure 2 is an enlarged fragmentary longitudinal section through one end of the trash removing means, and

Figure 3 is an enlarged transverse fragmentary section through a portion of the same, illustrating in detail the trash removing mechanism. 65

Referring now more particularly to the drawing, the numeral 4 designates an improved condenser casing, in its entirety, having an inlet duct 5 communicating with the upper end thereof at one side of the casing for directing the blast of cotton laden air current from the ginning mechanism to the condenser in the usual manner. Within the upper end of the condenser casing and rotatably mounted on an axis extending transversely across the inlet portion of the condenser, is a usual condenser screen drum 6
70 rotated in a clockwise direction by a belt chain 7 or other suitable gearing deriving its power from a main power shaft 8 journaled in bearings outside of the condenser casing upon suitable uprights 9. The arrows with tails
75 in the drawing represent the direction of travel of the cotton lint, while the arrows without such tails indicate the various courses taken by the air which carries the cotton lint up from the ginning mechanism and through
80 the condenser. 85

Beneath the screen drum 6 is located a receptacle 10 adapted to receive dust and the heavier particles of extraneous matter which pass through the drum 6 due to the lint being
85 blown or sucked through the screened drum by the air current and which are not exhausted from the interior of this drum by means of the air current employed. In the present instance, an air outlet duct 11 in which
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a siphoning action is set up by the blast of air being expelled therethrough, communicates with the interior of the screen drum 6 at opposite ends thereof and serves to exhaust air and dust passing through the drum 6 from the condenser casing.

In ordinary condenser construction, the mesh of the screen around the drum 6 is naturally fine enough to prevent the passage of cotton lint and valuable fibre, and consequently leaf trash and other extraneous matter is not removed by means of such a screen.

In order that trash may be effectively removed from the cotton in the condenser without the loss of lint, I provide a cleaning drum which consists of a plurality of spiders 13, about which is secured a screen 12. A plurality of radially extending spikes or teeth 14 are secured to the exterior surface of the screen in any suitable manner. The spider 13 at one end of the drum is provided with a drive sleeve 15 having a sprocket 16 keyed thereto and is driven by a sprocket chain 17 deriving its power from the shaft 8. The sleeve 15 is loosely and rotatably mounted upon a non-rotatable stationary shaft 18 extending axially through the cleaning drum and the shaft is held against rotation in stationary bearings 19 for a purpose which will be presently described. It is to be particularly noted that the cleaning drum is rotated in a clockwise direction faster than the screen drum 6 in order to drag the cotton through a confined space 20 formed between an arcuate part 21 of the condenser casing and one side of the cleaning drum as fast as the cotton lint is conveyed to the condenser from the ginning mechanism. This is possible by reason of the sprocket 16 being smaller than the sprocket of the drum 6. It will be noted that this cleaning drum is mounted below and to one side of the drum 6 so that the cotton lint discharged therefrom by the action of gravity and the air current, will fall upon the cleaning drum.

In order to remove air and entrained particles of dust and dirt which pass into the cleaning drum 12, branch conduits 22 communicate with the ends of this drum and with the main outlet duct 11; flexible sealing strips 23 being secured to the branch conduit and overlapping the ends of the drum to provide an air seal as clearly shown in Figure 2.

Beneath the cleaning drum 12 is arranged an arcuate series of bars 24 extending parallel to the axis of the drum and forming a continuation of the curved portion 21 of the condenser casing to provide a confined space through which cotton is dragged by the toothed drum 12 for the purpose of removing leaf trash and other extraneous matter from the cotton which is too large to pass through the screens of the drums 6 and 12.

These bars 24 are set at an angle with one edge projecting above an edge of the bar next

to it and are spaced apart as clearly shown in Figure 3 to form a screen or sieve having openings larger than those of the screen drums 6 and 12. Below these bars 24 is arranged a hopper shaped receptacle 25 into which the trash falls by gravity and is conveyed away by a chute or any other suitable means.

In order that the lint or cotton fibres will not be forced between the bars 24 and lost, I provide means whereby the current of air passing through the condenser will not force the cotton lint between the bars as well as to prevent suction through the drum 12 from drawing the lint up close against the drum whereby the cotton can be effectively combed and scrubbed over the bars 24 so as to release the trash therefrom. In other words, the cotton at this point in the condenser is taken out of the current of air temporarily and later returned thereto so that this final scrubbing action may be effectively accomplished without the loss of valuable fibre. The means I provide for this purpose consists of an imperforate segmental plate 26 mounted in the drum 12 in close proximity to the interior surface thereof by means of arms 28' rigidly secured to the stationary shaft 18. This shield plate 26 remains stationary inside of the lower portion of the cleaning drum 12 and is of an area slightly in excess of the combined area of the bars 24 so as to effectively shield the bars from the action of the air current in the condenser. At each side edge, this segmental plate 26 is provided with flexible sealing strips 27 engaging the interior surface of the drum to effectively prevent air currents from acting through the portion of the drum covered by the shield plate 26.

The cotton after coming from the trash removing instrumentality passes to a final air removing and bat forming device. This device consists of a pair of endless aprons 28 arranged within the condenser casing to one side of the drum 12 and below the same in downwardly inclined converging relation to form a substantially V-shaped hopper. These two endless aprons are rotated by any suitable means, not shown, so that their inner reaches or runs move downwardly in the same direction to feed the cotton while compressing it, to a pair of oppositely rotating corrugated condenser rolls 29 mounted directly below the discharge mouth 30 of the hopper. The endless aprons 28 are constructed of foraminous material to permit the passage of air and to exhaust the air from the hopper. Each endless apron is provided with an air outlet box 31 located between its runs and communicating by way of branch ducts 32 with the main outlet duct 11. The ends of these outlet boxes are provided with oppositely directed flanges 33 to form a footing for the inner run of the apron and to

permit its outward movement so that the cotton will be compressed between these two aprons as it passes therebetween.

In order to guide the cotton coming from the trash removing instrumentality and to prevent it from falling in between the endless aprons and the condenser casing, an arcuate shield plate 34 is mounted within the condenser casing above the upper sprocket of the right hand apron and is provided with a flexible sealing strip 35 which bears upon the inner run of the apron to cause the air passing through the apron to be more or less centralized over the outlet boxes. A somewhat similar but flat shield plate 36 is mounted in the opposite side of the condenser casing to overlap the upper sprocket of the left hand apron and is also provided with a flexible strip 37 lapping the inner run of the apron for the same purpose as the sealing strip 35.

Suitable gearing 38 is mounted upon a frame 39 below the discharge mouth of the hopper for rotating the condenser rolls 29, this gearing being driven by means of a sprocket chain 40 deriving its power from the main shaft 8. One of the condenser rolls 29 is adjustably mounted in a yielding manner so that the condenser rolls may pass lumps of cotton and be adjusted relatively to regulate the thickness of the bat. The cotton after passing the condenser rolls is deflected by a baffle 41 to pass between the inner runs of a pair of parallel horizontal endless aprons 42 which discharge the cotton into a baling instrumentality, a portion of which is designated generally by the numeral 43.

In operation, cotton laden air passes in an upwardly direction into the upper portion of the condenser casing 4 through the inlet duct 5 where it strikes the rotating screen drum 6 which screens out dust and fine dirt and allows a certain portion of the air to pass into the drum and out through the duct 11. The siphonic action created in the duct 11 facilitates this action of air withdrawal. The cotton lint is carried over by the drum 6 and dropped upon the trash cleaning drum 12; a certain portion of the air current going over with this cotton passing into the drum 12 to be taken out of the condenser casing through the branch duct 22. The lint is then carried into the restricted passage 20 between the drum 12 and condenser casing, the entrained air being blown through the drum 12 until the plate 26 is reached, at which time air current through the portion of the drum underlying this plate is cut off so that the cotton is free from the action of any air currents and therefore will neither be held in close contact with the drum 12 nor will it be forced between the bars 24 and lost. In this state, the cotton being carried around by the teeth of the drum 12 is combed and scrubbed over the series of bars 24 so that all trash, motes

and other extraneous matter are caused to sift between the bars 24 and drop by gravity into the hopper 25 from whence such extraneous matter may be conveniently removed. It will thus be seen, that during the time the cotton is passed beneath the shield plate 26 and over the bars 24, it is effectively removed from the air currents in the condenser in order that a thorough cleaning of the cotton may be effected to discharge even large particles of trash without the loss of any of the lint.

As the cotton is moved by the teeth 14 of the drum 12 beyond the shield 26, it will be blown from the drum 12 by a portion of the current of air which passes into one portion of the drum and out through another portion thereof and discharged into the space between the converging aprons 28 to be formed into a bat. This air, however, is extracted from the cotton lint before it is formed into a condensed bat by being removed through the two aprons 28 and into the boxes 31 by the siphoning effect produced in these boxes by their being connected with the main outlet duct 11. Practically all of the air having now been withdrawn from the cotton, it is possible to condense the lint into a dense bat which passes out of the hopper through the mouth 30 and is then guided between the condenser rolls 29 and thence between the final compression aprons 42 to be discharged into a baling instrumentality in condition to be readily baled into a compact mass.

It is to be understood that various changes in the arrangement and construction of the component parts of the device may be made without departing from the spirit of the invention or scope of the appended claims.

What I claim is:

1. The method of treating cotton consisting in subjecting the same to ordinary gin air current, removing the cotton from the gin air current while removing the trash, and then returning said cotton to the gin air current.
2. The method of treating cotton consisting in subjecting the same to ordinary gin air current, removing the cotton from the gin air current while removing the trash, then returning said cotton to the gin air current, and then subjecting the cotton to bat forming treatment.
3. The method of treating cotton consisting in subjecting the same to ordinary gin air current, removing said cotton from the gin air current while removing the trash, then returning said cotton to the gin air current, and then subjecting the cotton to bat forming treatment in the presence of gin air current.
4. The method of treating cotton consisting in subjecting the same to ordinary gin air current, removing said cotton from the gin air current while scrubbing the same to remove trash without loss of lint, and then returning said cotton to the gin air current.

5. The method of treating cotton consisting in subjecting the same to primary air extraction and then to secondary air extraction, removing said cotton from the secondary air extraction while scrubbing the same to remove trash without loss of lint, and then subjecting the cotton to a final air extraction while forming the same into a bat.

6. The combination with a condenser comprising a casing adapted to receive a current of cotton laden air; of means within the condenser for cleaning cotton, and means within said condenser for removing cotton from substantially all air current while it is subjected to said cleaning means whereby trash is removed from the cotton without the loss of lint.

7. A condenser comprising a casing adapted to receive a current of cotton laden air and having dust removing means and bat forming means, cotton disintegrating and scrubbing means arranged between said dust removing means and bat forming means and means for removing said cotton from the air current while it is subjected to said scrubbing means whereby trash is removed from the cotton without loss of lint.

8. A condenser comprising a casing adapted to receive a current of cotton laden air and having dust removing means and bat forming means, means for passing the cotton from said dust removing means to said bat forming means including a perforated drum, means for rendering a portion of said drum non-subject to such current of air, and a screen adjacent said portion of said drum of sufficient gauge to pass trash from the cotton.

9. A condenser comprising a casing adapted to receive a current of cotton laden air and having dust removing means and bat forming means, means for passing the cotton from said dust removing means to said bat forming means including a perforated drum, means for rendering a portion of said drum non-subject to such current of air, and a screen spaced from such portion of said drum and defining a space through which cotton is passed to said bat forming means, such screen being of sufficient gauge to pass trash from the cotton.

10. A condenser comprising a casing adapted to receive a current of cotton laden air and having dust removing means and bat forming means, means for passing the cotton from said dust removing means to said bat forming means including a perforated drum, means for rendering a portion of said drum non-subject to such current of air, and a plurality of bars set at an angle with one edge arranged above an edge of an adjacent bar to form a sieve of sufficient gauge to pass trash from the cotton.

11. A condenser comprising a casing adapted to receive a current of cotton laden air and having dust removing means and bat

forming means, means for passing the cotton from said dust removing means to said bat forming means including a perforated drum, a segmental plate covering a portion of said drum to cut off the current of air at this point, and a screen spaced from said portion of said drum defining a space through which the cotton is passed to said bat forming means, said screen being of sufficient gauge to pass trash from the cotton.

12. A condenser comprising a casing adapted to receive a current of cotton laden air and having dust removing means and bat forming means, means for passing the cotton from said dust removing means to said bat forming means including a toothed foraminous drum subjected to the action of said current of air, means for rendering a portion of said drum non-subject to such current of air, a plurality of bars set at an angle with one edge arranged above an edge of an adjacent bar to form a sieve of sufficient gauge to pass trash, said sieve being spaced from said portion of said drum and defining a space through which the cotton is combed and scrubbed by the toothed drum dragging the cotton over said bars.

13. A condenser comprising a casing having an inlet and outlet, a dust removing drum located adjacent said inlet, means below said drum for removing trash from the cotton, a pair of substantially vertical downwardly converging inclined endless bat forming aprons below said means adjacent said outlet, air outlet boxes located between the runs of each apron, and a duct having individual branches communicating with said dust removing drum and said outlet boxes.

14. A condenser comprising a casing adapted to receive a current of cotton laden air and having a dust removing drum, a toothed trash removing drum receiving cotton from said dust removing drum, means for rendering a portion of said toothed drum non-subject to said current of air, a screen spaced from said portion of said drum and defining a space through which cotton is moved by said toothed drum, and said drums being arranged so that a portion of the air current carrying said cotton to the condenser passes into one side of the toothed drum and out through the other side to strip cotton from the toothed drum after passing said screen.

15. A condenser comprising a casing adapted to receive a current of cotton laden air and having a dust removing drum, a toothed trash removing drum receiving cotton from the dust removing drum, means for rendering a portion of said toothed drum non-subject to such current of air, a screen spaced from such portion of said drum and defining a space through which the cotton is moved by said toothed drum, a bat former

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located to one side of and below said toothed drum and being subject to said air current, and said drums being arranged so that a portion of the air current carrying the cotton to the condenser passes through the toothed drum and out through a side thereof adjacent such bat former to strip the cotton from said toothed drum after passing said screen.

16. In a mechanism for treating cotton, a casing having a passage for the transit of a current of cotton laden air, cleaning means in said passage, cotton conveying means for screening said cotton and conveying it over said cleaning means, means for removing said cotton from air current during subjection to said cleaning means, and said conveying means screening said passage and allowing the passage of air through the conveying means to remove cotton therefrom while preventing the passage of cotton which has not been subjected to said cleaning means.

17. In a mechanism for treating cotton, a casing having a passage for the transit of a current of cotton laden air, scrubbing means in said passage, a toothed foraminous rotary drum in said passage for intercepting the passage of cotton while permitting the passage of air, said drum serving to comb cotton over said scrubbing means, means for preventing the action of the air current upon said cotton while subjected to said scrubbing means, the passage of air through said drum serving to remove cotton therefrom which has been subjected to said scrubbing means.

18. In a mechanism for cleaning cotton, a casing having a passage for the transit of a current of cotton laden air, a dust removing drum in said passage, a toothed foraminous rotary drum arranged between said dust drum and a wall of said casing to define a relatively narrow passage therebetween for the conveyance of cotton, a trash sieve cooperating with said toothed drum for removing trash from the cotton, means for rendering the portion of said drum above said sieve non-subject to the current of air, and said drums being arranged to screen the outlet of said passage and to cause the current of air to pass into one portion of the toothed drum and out through the other side thereof to strip cotton therefrom after said cotton has been scrubbed over said trash sieve.

19. In a mechanism for treating cotton, a casing having a passage for the transit of a current of cotton laden air, an upwardly inclined inlet, a dust sifting drum arranged in said casing to intercept said current of air, a dust receptacle positioned beneath said drum, a toothed foraminous rotary disintegrating drum arranged between said dust drum and a wall of said casing to define a relatively narrow passage therebetween for the conveyance of cotton, a sieve cooperating with said toothed drum for removing foreign

matter from the cotton, means for rendering the portion of said drum above said sieve non-subject to the current of air, said disintegrating drum being arranged to intercept the air current through said casing, and to cause the current of air to pass into one portion of the drum and out through another portion thereof to strip cotton therefrom delivered from said sieve, an outlet for the casing below said drums, and means arranged between said outlet and said disintegrating drum for compressing the cotton lint into a bat.

In testimony whereof I have hereunto set my hand.

ALEXANDER S. MACKENZIE.

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