PROCESS AND APPARATUS FOR REMOVING LINT FROM A CONDENSER

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This invention relates to a process and apparatus for removing lint from a condenser and has for its object the provision of improved means for removing loose lint from the condenser in a continuous and uniform manner, whereby the lint thus removed, after passing through an auxiliary condenser, is in the form of a uniform bat.

Another object of my invention is to provide a process and apparatus for removing lint cotton from a condenser by the use of a suction pick-up manifold, whereby the lint is removed in a continuous, loose condition.

A more specific object of my invention is to provide a process and apparatus of the character designated which shall produce a uniform bat which may be fed directly into a lint cleaner without choking the feed works of the lint cleaner, thus permitting the lint cleaner to operate at its maximum cleaning and combing efficiency.

Another object of my invention is to provide a process and apparatus for removing lint cotton from a condenser by the use of a suction pick-up manifold in which there is a negative pressure differential within the manifold relative to the inside of the condenser housing, thus removing the lint while it is in a loose condition and well ahead of the usual location of the doffing rolls.

Hereinafter in the art to which my invention relates, various forms of apparatus have been devised for delivering lint to a lint cleaner or lint comber. For example, lint cotton has been processed by allowing the lint of lint to pass through the usual doffing rollers of the battery condenser and then passing it directly to the lint cleaner or through a bat separator or disintegrator in order to get it into condition to properly bat on the screen of the condenser over the lint comber. As is well known, many of the battery condensers deliver a bat which contains thick and thin areas and sometimes even heavy rolls of lint are delivered. Such rolls or wads of lint are choking in the feed works of the lint cleaner, thus preventing the lint cleaner from operating efficiently.

To overcome the above and other difficulties, I introduce lint continuously into the housing of the battery condenser while withdrawing air continuously from the condenser housing. Air is continuously withdrawn from the condenser housing through a suction pick-up manifold which communicates with the condenser housing in position to remove loose lint therefrom. A negative pressure differential is maintained within the suction pick-up manifold relative to the inside of the condenser housing whereby the loose lint is removed continuously through the suction pick-up manifold where it is transferred to the condenser for the lint cleaner or comber.

Apparatus embodying features of my invention is illustrated in the accompanying drawings, forming a part of this application, in which:

FIG. 1 is an elevational view, partly broken away and in section;
FIG. 2 is an enlarged fragmental sectional view showing the condenser drum and housing and the suction pick-up manifold associated therewith;
FIG. 3 is a fragmental sectional view taken generally along the line 3-3 of FIG. 2;
FIG. 4 is an enlarged fragmental view taken generally along the line 4-4 of FIG. 3;
FIG. 5 is an elevational view, partly broken away and in section, showing a modified form of my invention in which the lint from the lint cleaner is returned to the battery condenser from which it was originally removed; and,
FIG. 6 is an elevational view, partly broken away and in section, showing a further modified form of my invention in which the condenser drum rotates in a direction reverse to that shown in FIGS. 1-5, the lint thus being removed at a position beneath the condenser drum.

Referring now to the drawings for a better understanding of my invention, and more particularly to FIGS. 1-4, I show a battery condenser 10 having a condenser drum 11 which is incased by a condenser housing 12. The condenser drum is covered with a screen 13 and air is withdrawn from the interior of the drum 11 in the usual manner. The lint cotton is introduced into the condenser housing 12 through an inlet 14.

The battery condenser 10 may be provided with the usual doffing rollers 16 which are positioned adjacent the down-going side of the condenser drum 11. Where the doffing rollers 16 are employed, the lint cotton is doffed into the lint slide, indicated generally at 17.

The apparatus just described may be a conventional type battery condenser. In order to continuously remove the lint cotton from the battery condenser 10, wherein it is in a loose condition, I mount a suction pick-up manifold 18 above the upper portion of the condenser drum 11. That is, the suction pick-up manifold 18 communicates with the upper portion of the condenser housing 12 whereby lint may be removed from the condenser housing 12 through the suction pick-up manifold 18.

A suitable conduit 19 connects the suction pick-up manifold 18 to an auxiliary condenser 21 which is mounted over a lint comber or cleaner 22. The cleaned lint cotton discharged from the lint cleaner 22 passes through a conduit 23 to a condenser 24 where it is discharged into the lint slide 17.

In order to withdraw the loose lint from the condenser housing 12 through the suction pick-up manifold 18, I maintain pressure differentials of approximately 2 inches and negative pressure on the water gauge within the suction pick-up manifold relative to the inside of the condenser housing 12. This pressure differential is provided through a suitable fan or blower 26 mounted in the discharge end of the auxiliary condenser 21. In removing the lint directly from the battery condenser 10, I remove with the lint approximately 4,000 cubic feet of air per minute.

The remaining volume of air coming from the gins and the condenser discharges through the battery condenser screen 13 and the discharge duct for the condenser screen in the usual manner. As is well understood, the volume of air going into the battery condenser varies with the number of gin stands and the type of saw doffing mechanism employed in the gin stands. This volume of air usually varies from 1,500 cubic feet per minute per gin to approximately 5,500 cubic feet per minute per gin. In normal practice, the number of gin stands usually varies from 2 to 6 and in some cases 7 gins per battery.

The suction pick-up manifold is located at an angular distance of from approximately 75° to 135° from the horizontal, as viewed from the direction of rotation of the condenser drum 11.

Hingedly supported adjacent the side of the suction pick-up manifold 18 which is nearest the lint inlet 14 for the battery condenser as a baffle member 27, which may be in the form of an enlarged plate. Hingedly supported adjacent the other side of the suction pick-up manifold 18, on the side thereof adjacent the doffing rolls 16, is a baffle member 23 which is constructed and
arranged to engage the condenser drum 11, as shown in FIGS. 1 and 2. Secured to the free end of the baffle member 28 is a light strip of rubber flashing 29 which forms a seal between the baffle member 28 and the screen 13 of the condenser drum. In actual practice, I have found that a satisfactory arrangement is provided by providing a baffle member 27 which extends to within approximately 5 inches of the screen 13 and is spaced approximately 5 inches from the baffle member 28. The baffle members 27 and 28, when in the position shown in FIGS. 1 and 2, serve as a suction pick-up nozzle for introducing the loose lint into the suction pick-up manifold 18.

Each hinge for the baffle members 27 and 28 is preferably in the form of a shaft 31 which extends through a series of cylindrical members carried by the housing 12 and the baffle member 27 or 28, as the case may be, to form a suitable hinge as shown in FIG. 3. To adjust the angular position of each of the baffle members 27 and 28, an arm 32 may be secured non-rotatably to the shaft 31 outwardly of the condenser housing 12, as shown in FIGS. 3 and 4. The arm 32 extends beneath an arcuate bracket 33 having an arcuate slot 34 therein. Projecting outwardly from the free end of the arm 32 is a threaded member 36. Threadedly engaging the member 36 outwardly of the arcuate member 33 is a wing nut 37 which holds the arm 32 in selected angular positions relative to the housing 12. By locating the baffle member 27 and 28 whereby their lower ends are swung forward and upward against the under surface of the condenser housing 12, the loose lint is free to by-pass the suction pick-up manifold 18. That is, by decreasing the fan 26 or cutting off the pick-up air through the suction pick-up manifold 18 and moving the baffle members to their uppermost positions adjacent the under surface of the condenser housing 12, the lint cotton will remain on the screen and be doffed by the doffing rolls.

From the foregoing description, the operation of my improved apparatus shown in FIGS. 1 to 4 and the manner of carrying out my improved process will be readily understood. The baffle members 27 and 28 are moved to their lowermost positions, as shown in FIGS. 1 and 2 whereby the flashing member 29 at the free end of the baffle member 28 engages the screen 13 of the condenser drum to form a seal therewith. The baffle member 27 being spaced from the screen 13 defines with the baffle member 28 a suction pick-up nozzle for introducing the loose lint cotton into the suction pick-up manifold 18. The fan 26 is operated at a speed to maintain a negative pressure differential within the suction pick-up manifold of approximately 2 inches negative pressure on the water gauge relative to the inside of the condenser housing 12. That is, the fan 26 is operated at a speed to remove approximately 4,000 cubic feet of air per minute through the suction pick-up manifold 18. The remaining volume of air introduced into the battery condenser is removed through the condenser screen and discharge duct therefor in the usual manner. In view of the fact that the lint cotton on the condenser drum and entrained in the air is in a very loose condition before it passes through the suction pick-up manifold 18, much of the lint does not bat on the screen of the battery condenser but goes directly to the suction pick-up manifold 18, thereby conveying the cotton continuously through the condenser 21 to the lint cleaner 22, whereby the lint is presented to the cleaner in a uniform bat. By introducing a uniform bat into the lint cleaner, more uniform cleaning is obtained as well as trouble-free operation of the cleaner. The introduction of a uniform bat into the lint cleaner is very important where the operating capacities of the cleaner is from 3,000 pounds per hour to 6,000 pounds per hour. That is, where the battery condenser delivers a bat which contains thick and thin areas and sometimes heavy rolls or wads of cotton, the feed works of the lint cleaner are choked, thereby preventing efficient cleaning by the lint cleaner.

If it is desired to by-pass the suction pick-up manifold 18, the baffle members 27 and 28 are moved to their forward and uppermost position against the undersurface of the condenser housing 12 and are locked in this position by the wing nuts 37. The pick-up air through the suction pick-up manifold is then cut off whereby the lint cotton remains on the drum 11 and is doffed by the doffing rollers 16 in the usual manner.

Referring now to FIG. 5 of the drawings, I show a modified form of my invention in which the lint from the lint cleaner 22 is returned to the battery condenser, from which it was originally removed for lint cleaning, rather than transferring the cleaned lint to a supplemental condenser 24 over the lint slide 17. The lint is introduced into a battery condenser 10 having a condenser drum 11 which is incased by a condenser housing 12. The condenser drum is covered with the usual screen 13 and lint is introduced into the housing 12 through an inlet conduit 14. Suitable doffing rollers 16 are positioned adjacent the downstream side of the condenser drum 11 in position to discharge the lint into a lint slide 17.

A suction pick-up manifold 18 is in communication with the housing 12 above the upper portion of the condenser drum 11 whereby the lint may be removed from the condenser housing 12. Communicating with the suction pick-up manifold 18 is one end of a conduit 19. The other end of the conduit 19 is in communication with the auxiliary cleaner 21 mounted over the lint comb or cleaner 22, as described hereinabove.

The loose lint is withdrawn from the condenser housing 12 through the suction pick-up manifold 18 by maintaining a pressure differential of approximately two inches negative pressure on the water gauge within the suction pick-up manifold relative to the inside of the condenser housing 12, as described hereinabove with reference to the apparatus shown in FIGS. 1-4. That is, the construction and operation of the suction pick-up manifold 18 is substantially the same as the construction and operation of the suction pick-up manifold 18.

Hingedly supported adjacent the side of the suction pick-up manifold 18 are nearest the lint inlet 14 is a baffle member 27a and hingedly supported adjacent the other side of the suction pick-up manifold 18, on the side thereof adjacent the doffing roll 16a, is a baffle member 28a. A light strip of rubber flashing 29a is attached to the free end of the baffle member 28a in position to engage the screen 13 and to provide a seal between the condenser drum 11 and the baffle member 28a. The baffle members 27a and 28a are constructed and arranged in substantially the same manner as the baffle members 27 and 28 shown in FIGS. 1-4. That is, the baffle members 27a and 28a, when in the position shown in FIG. 5, serve as a suction pick-up nozzle for introducing loose lint into the suction pick-up manifold 18. Also, the baffle members 27a and 28a are secured non-rotatably to shaft members 31 which are held in selected angular positions by the wing nut 37 which clamps the arm 32 to the arcuate member 33, as shown in FIG. 4 of the drawings.

Communicating with the condenser housing 12 between the doffing rollers 16a, or the discharge thereof, and the baffle member 28a is an inlet duct 25 which communicates with conduit 23 which in turn is connected to the outlet of the lint cleaner 22, whereby the cleaned lint is returned to the battery condenser 12 where it is doffed by the doffing rollers 16b onto the lint slide 17b. Preferably, the lint duct 25 is positioned adjacent the baffle member 28a, as shown in FIG. 5, whereby upon moving the baffle member 28a upwardly against the top of the condenser housing 12 the baffle member closes the inlet duct 29. Also, when both baffle members 27a and 28a are moved upwardly against the condenser housing, the lint bypasses the suction pick-up manifold 18 whereby it
moves around with the condenser drum 11 and is doffed by the doffing rollers 16 onto the lint slide 17.

With the baffle members 27 and 28 in the position shown in FIG. 6, the lint is removed from the housing 12b by the suction pick-up manifold 18b whereby it is transferred in a loose condition by conduit 19b to the auxiliary condenser 21. After passing through the lint cleaner 22, the lint may pass through the conduit 23 to the condenser 24, as shown in FIG. 1.

While I have claimed the condenser housing as being spaced from and incasing a portion of the condenser drum, it will be understood that this language is intended to cover a condenser housing which not only incases a portion of the condenser drum but also a condenser housing which incases the entire condenser drum, as shown in FIGS. 5 and 6.

From the foregoing, it will be seen that I have devised an improved process and apparatus for removing lint cotton from a condenser whereby the lint is continuously removed in a uniform manner to an auxiliary condenser where the lint cotton is then presented to a lint cleaner in a uniform batt. By providing the uniform batt in the lint cleaner, the cotton is thoroughly cleaned in an efficient manner and there is no chocking of the feed mechanism thereafter.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. A process for transferring lint from a battery condenser, having a condenser drum and a housing spaced from and incasing a portion of the drum together with perforations in said drum for the withdrawal of air from the condenser drum, to a lint cleaner having a condenser mounted thereon which comprises the steps of, introducing lint continuously into said housing, withdrawing air continuously from the condenser drum of the battery condenser, transferring air continuously from said housing to the condenser of the lint cleaner, said air being withdrawn from said housing at a location which is outwardly of said drum and spaced angularly in the direction of rotation of said drum from the point of introduction of lint into the housing and at a rate to create a negative pressure differential at said location relative to the inside of said housing, whereby loose lint is removed continuously from said battery condenser and transferred to the condenser of the lint cleaner, and returning the lint to the condenser housing intermediate the location of the lint being removed therefrom and the discharge section of the condenser housing.

2. A process for removing lint in a loose, uniform condition from the housing of a condenser having a rotatably mounted drum and a housing spaced outwardly from and incasing a portion of the drum together with perforations in said drum for the withdrawal of air from the condenser drum which comprises the steps of, withdrawing air continuously from said condenser drum, introducing a stream of lint continuously into said housing between said housing and said condenser drum whereby a loose uniform stream of lint is formed therebetween, and continuously withdrawing air outwardly from said housing at a location above said loose uniform stream of lint and spaced angularly in the direction of rotation of said drum from the point of introduction of said stream of lint into said housing and at a rate to create a negative pressure differential outwardly of said housing at said location relative to the inside of said housing whereby said stream of lint passes in a loose uniform condition through said housing to said location and is then removed continuously from said housing at said location.

3. A process for removing lint in a loose, uniform condition from a condenser as defined in claim 2 in which the negative pressure differential outwardly of said location relative to the inside of the housing is approximately 2 inches negative pressure on the water gauge.

4. A process for removing lint in a loose, uniform condition from a condenser as defined in claim 2 in which the condenser drum rotates in a direction opposite to the direction of movement of said lint to be removed from the housing adjacent the down-going side of said drum and the location at which the lint is removed from the housing is positioned above and in spaced relation to the condenser drum an angular dis-
tance of from approximately 45° to 135° from the horizontal as viewed from the direction of rotation of the condenser drum.

5. In a process for transferring lint in a loose, uniform condition from the housing of a battery condenser to a lint cleaner having a condenser mounted thereon, said battery condenser having a rotatable condenser drum and a housing spaced outwardly from and incasing a portion of the drum together with perforations in said drum for the withdrawal of air from the condenser drum, the steps which comprise withdrawing air continuously from said condenser drum, introducing a stream of lint continuously into said housing between said housing and said condenser drum whereby a loose uniform stream of lint is formed therebetween, and continuously withdrawing air outwardly from said housing at a location above said loose uniform stream of lint and spaced angularly in the direction of rotation of said drum from the point of introduction of said stream of lint into said housing and at a rate to create a negative pressure differentially outwardly of said housing at a location relative to the inside of said housing whereby said stream of lint passes in a loose uniform condition through said housing to said location and is then removed continuously from said housing at said location and transferred to the condenser of the lint cleaner.

6. In apparatus for removing lint in a loose, uniform condition from the housing of a condenser having a rotatable condenser drum and a condenser housing spaced outwardly from and incasing a portion of said condenser drum together with perforations in said drum for the withdrawal of air from the condenser drum, means to introduce lint continuously into said outwardly spaced condenser housing between said housing and said condenser drum whereby a loose, uniform stream of lint is formed therebetween, a suction pick-up manifold communicating with the outwardly spaced condenser housing outwardly of said drum at a location above said loose, uniform stream of lint and spaced angularly in the direction of rotation of said drum from the point of introduction of lint into said condenser housing, and means maintaining a negative pressure differentially outwardly of said housing and within said suction pick-up manifold relative to the inside of said housing whereby the lint in a loose uniform condition is removed continuously through said suction pick-up manifold.

7. In apparatus as defined in claim 6 in which the condenser drum rotates in a direction for lint to be removed from the outwardly spaced condenser housing adjacent the down-going side of said condenser drum and the suction pick-up manifold communicates with said outwardly spaced condenser housing at a location above the drum and at an angular distance of from approximately 45° to 135° from the horizontal as viewed from the direction of rotation of the condenser drum.

8. In apparatus as defined in claim 7 in which the negative pressure differential within the suction pick-up manifold relative to the outwardly spaced condenser housing is approximately 2 inches negative pressure on the water gauge.

9. In apparatus for removing lint from a condenser having a condenser drum and a housing spaced from and incasing a portion of said condenser drum together with perforations in said drum for the withdrawal of air from the condenser drum, a suction pick-up manifold communicating with the condenser housing at a location which is spaced angularly in the direction of rotation of said drum from the point of introduction of lint into the housing in position to remove loose lint from the condenser housing, a first baffle member hingedly supported adjacent the side of said suction pick-up manifold which is nearest the lint inlet for said condenser, said first baffle member being spaced from said drum to permit lint to pass between said first baffle member and said drum, a second baffle member hingedly supported adjacent the other side of said suction pick-up manifold and disposed to engage said drum, means to adjust the position of the baffle members whereby they are selectively moved toward and away from said drum, means maintaining a negative pressure differential within said suction pick-up manifold relative to the inside of said condenser housing whereby the loose lint is removed continuously through said suction pick-up manifold.

10. In apparatus as defined in claim 9 in which a resilient flashing strip is mounted adjacent the free end of the second baffle member in position to seal against the drum when the second baffle member is moved inwardly toward the drum.

11. An apparatus for removing lint from a condenser having a condenser drum which rotates in a direction for lint to be removed therefrom adjacent the down-going side, dolfing rollers, a housing spaced from and incasing a portion of said drum and there being perforations in said drum for the withdrawal of air from the condenser drum, a suction pick-up manifold communicating with the condenser housing above the upper portion of the condenser drum in position to remove loose lint therefrom, a first baffle member hingedly supported adjacent the side of said suction pick-up manifold which is nearest the lint inlet for said condenser, said first baffle member being spaced from said drum to permit lint to pass between said first baffle member and said drum, a second baffle member hingedly supported adjacent the side of said suction pick-up manifold which is nearest the dolfing rolls, said second baffle member being constructed and arranged to engage said drum when moved toward said drum to define with said first baffle member a suction pick-up nozzle for said manifold, said second baffle member being disposed to define a lint passageway between said second baffle member and said drum when said second baffle member is moved away from said drum, means maintaining a negative pressure differentially within said suction pick-up manifold relative to the inside of the condenser housing while said second baffle member is in engagement with said drum whereby the loose lint is removed continuously through said suction pick-up manifold, means for moving said second baffle selectively toward and away from said drum, and means deenergizing said means maintaining said negative pressure differential upon movement of said second baffle member away from said drum, whereby the lint bypasses the pick-up manifold.

12. In apparatus as defined in claim 11 in which means is provided for moving both of the baffle members away from the drum when the means maintaining said negative pressure differential is deenergized, whereby the lint bypasses the pick-up manifold.

13. In apparatus as defined in claim 11 in which the suction pick-up manifold is located above the condenser drum an angular distance of from approximately 75° to 135° from the dolfing rolle
means maintaining a negative pressure differential outwardly of said housing and within said suction pick-up manifold relative to the inside of said housing whereby the lint in a loose, uniform condition is removed continuously through said suction pick-up manifold and transferred through said conduit to the condenser of said lint cleaner.

15. In apparatus as defined in claim 14 in which the condenser drum rotates in a direction for lint to be removed through the suction pick-up manifold adjacent the down-going side of said drum and the suction pick-up manifold is located above and in spaced relation to the condenser drum an angular distance of from approximately 45° to 135° from the horizontal as viewed from the direction of rotation of the condenser drum.

16. In apparatus as defined in claim 14 in which the negative pressure differential is created by a fan positioned in the discharge end of the condenser for the lint cleaner.

17. In apparatus as defined in claim 14 in which approximately 4,000 cubic feet of air per minute is removed from the condenser housing of the battery condenser through the suction pick-up manifold.

18. In apparatus as defined in claim 14 in which the discharge section of the lint cleaner is in communication with an auxiliary condenser.

19. The combination with a battery condenser embodying an inlet section, a discharge section, a condenser drum and a housing spaced from and incasing a portion of the drum, there being perforations in said drum for the withdrawal of air from the condenser drum, of a suction pick-up manifold communicating with the battery condenser housing at a location which is spaced angularly in the direction of rotation of said drum from the point of introduction of lint into the housing in position to remove lint from the housing, means maintaining a negative pressure differential within said suction pick-up manifold relative to the inside of the battery condenser housing, a lint cleaner having an inlet and an outlet with a condenser in communication with the inlet thereof, a conduit communicating said pick-up manifold with the condenser of the lint cleaner, a second conduit communicating the outlet of the lint cleaner with said battery condenser housing intermediate the pick-up manifold and said discharge section thereof whereby the cleaned cotton is returned to said battery condenser housing between the pick-up manifold and the discharge section of the battery condenser.

20. In apparatus for removing a loose, uniform batch of lint from the housing of a condenser of the type having a condenser housing spaced outwardly from and incasing a portion of a condenser drum which rotates in a direction for lint to be removed therefrom adjacent the up-going side thereof, together with perforations in said drum for the withdrawal of air from the condenser drum, a suction pick-up manifold communicating with the outwardly spaced condenser housing outwardly of the lower up-going side of the condenser drum in position to remove loose lint from said outwardly spaced condenser housing, and means maintaining a negative pressure differential within said suction pick-up manifold relative to the inside of the outwardly spaced condenser housing whereby the loose lint is removed continuously through said suction pick-up manifold.

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