METHOD AND DEVICE FOR CLEANING THE REMOVAL ZONE ON A CARDER/CARDING MACHINE

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ABSTRACT

The present invention relates to a method or device for removing dust, waste and short fibres in the removal zone of a carder or carding machine, having a stripper roller or dolfler, a dolfling cylinder, an upper and a lower press roller, and a transverse conveyor belt. A solution according to the present invention provides at least one of the following means: means, for example a compressed air device, for generating a preset air flow in the region between the stripper roller, the dolfling cylinders and the press rollers; an exhaust device for the area of the lower stripper and the lower press roll; an exhaust device for the area above the upper most knife.
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[0001] The present invention relates to a method or a device for removing dust, waste and short fibres in the removal zone of a carder or carding machine, which has a stripper roller or doffer, a doffing cylinder, an upper and lower press roller, and a transverse conveyor belt.

[0002] Carders and carding machines are used for cleaning and opening cotton or other fibrous material. During these cleaning stages a large quantity of dust, short fibres and other waste is released and accumulates in the carder. When these agglomerates partially grown into flakes of dust and short fibres are again dragged along by the fibrous web or the sliver, this causes contamination or thick pockets in the final product of the carder or of the carding machines. These are extremely undesirable effects and can result in impairment to the subsequent spinning process.

[0003] A fibrous web is formed, concentrated by the transverse conveyor belt to form a sliver in the removal zone, defined by the arrangement of a stripper roller or doffer, a doffing cylinder, an upper and a lower press roller and optionally a transverse conveyor belt. In this region the fibres are transferred several times from roller to roller, with the corresponding arrangements of the rollers producing spaces where contamination can accumulate at will. The result of this, caused by the small air movements, is that circular air movements, which also have a negative effect on removing this contamination, occur especially due to the press rollers in these spaces.

[0004] It is in the space between the stripper roller, the doffing cylinder and the press roller and the space between the press roller and the transverse conveyor belt where this accumulation of particles is most frequently a problem.

[0005] The degree of contamination in these spaces depends on the material to be processed, the production quantity, the degree of contamination of the raw material and the cleaning efficiency of the upstream cleaning processes, and also depends on general conditions such as temperature and relative humidity in the production plant.

[0006] In the case of high water vapour content in the air the dust and the short fibres will develop adhesive properties and build up in areas where there is no air flow. In contrast, with a relatively deep water vapour content the dust and the short fibres tend to remain scattered and accumulate in circulating air flows.

[0007] When production is increased the cleaning efficiency of the carder drops, resulting in more dust and short fibres coming loose during processing of the material in the removal zone of the carder. The degree of contamination in the spaces increases accordingly. This applies to the same extent also when raw material with a greater proportion of dirt or short fibres is used.

[0008] Regular removal and cleaning in several places of the discharge zone can prevent or reduce accumulation of dust and short fibres. It is therefore the object of the invention to propose a method and a device, which enables concentrated cleaning of the interstices in the discharge zone of the carder or the carding machines, without thereby influencing the uniformity of the produced web or of the card sliver.

[0009] A solution according to the present invention provides at least one of the following means:

[0010] a means, for example a compressed air device, for generating a preset air flow in the region between the stripper roller, the doffing cylinders and the press rollers;

[0011] an exhaust device for the region of the lower stripper and the lower press roller on the side of the crossbelt device;

[0012] an exhaust device for the region above the upper mote knife and the crossbelt device.

[0013] By way of advantage the compressed air device is positioned in the region between the stripper roller, the doffing cylinders and the press roller, such that the air current from the opening gap blows through between the lower press roller and stripper roller. The air current should be such that it does not disturb or impede the normal course of web removal.

[0014] It is also advantageous, if the duration of the generated air currents can be adjusted, depending on the degree of contamination. The compressed air device can then selectively produce a continuous air current or operate at intervals, for example intervals of 1 to 60 minutes, advantageously 3 to 30 minutes, and produce an air blast for a duration of up to 60 seconds, preferably up to 10 seconds. It would be an advantage if the interval sequence and/or intensity were adjusted and/or regulated by the control unit, for example with an adjustable and/or controllable magnetic valve.

[0015] Each additional component conceals the danger of causing an accumulation of particles. Integration of two components can reduce possible attachment points for fibres. Because of this the compressed air device is integrated advantageously into a web baffle plate or a web baffle bridge, if available. Such integration should be done without influencing or impairing the function of the web baffle plate or the web baffle bridge.

[0016] The compressed air device can be made of any suitable material, advantageously from a hollow profile of chrome steel plate or aluminium, optionally anodised. To produce the air current according to the present invention the profile can selectively be provided in the appropriate area with at least one slot or hole. Combinations of slotted, oval or round openings are conceivable. The choice of form and number of holes is dependent on the working width of the entire compressed air profile and the number of feed positions for compressed air feed in the profile. An example of a solution according to the present invention is a linear arrangement of several round holes with feed at the head or foot of the compressed air device. The holes can also be arranged in a pattern or can be offset.

[0017] By way of advantage, a waste baffle plate is attached below the gap, where dirt is blown out, which transports the dirt particles outside the carder shelling, from where they are removed during normal floor cleaning. The construction of the waste baffle plate can also be of any suitable material, advantageously chrome steel plate or aluminium, optionally anodised. Antisooting treatment of the surface of the material, for example a polished layer, can further still improve dirt removal.
[0018] An alternative solution would be to arrange an exhaust device under the gap. This exhaust device can advantageously be attached to the already available central exhaust device of the carder. The dirt is directed to a filter system by this.

[0019] The inventive solution of removing the accumulated material is rather the arrangement of one or several exhaust devices for the space between the press roller and the transverse conveyor belt.

[0020] For the arrangement of the crossbelt device relative to the press rollers a decisive role can be played by how much unwanted material accumulates and whether an exhaust device is needed in the region of the sliver spout, where particles mostly accumulate, or over the entire working width of the carder. This can also be decisive, as to whether an exhaust device is needed at the top and bottom. The sliver spout can be arranged in the middle or at the side; the partial exhaust device therefore also in the middle or at the side.

[0021] The exhaust device according to the present invention for the space above the upper mote knife and the crossbelt device is formed by an exhaust funnel, via which the air laden with dust and fibres is exhausted. A similar arrangement is provided for the space next to the lower stripper and the lower press roller on the side of the crossbelt device. These funnels can be made of any material. Here also the inside of the funnel can be treated with antisoling.

[0022] At the top the discharge area is covered with a pivoting cap; another solution according to the invention would entail integration of the upper exhaust device 11 in this cap.

[0023] Another solution according to the present invention for the lower exhaust device would be integration under the crossbelt device in the pivoting part, wherein the exhaust opening must be arranged laterally, depending on the overall construction.

[0024] Even these exhaust devices can advantageously be connected to the available central exhaust device of the carder.

[0025] The exhaust force in the upper and lower exhaust devices is dependent on the selected width and slot opening. With a very high degree of contamination several separate exhaust devices can be provided on one side, preferably with a gradual exhaust force, increased in the direction of the actual sliver spout. Alternatively, this can also be accomplished by adapting the suction slot and/or by subdividing the funnel into several chambers, for example a slot widening continuously in the direction of the sliver spout. According to the invention the strongest exhaustion should occur in the region of the fibre spout, though without impeding the sliver forming over the entire working width.

[0026] FIG. 1 shows a carder in diagrammatic representation.

[0027] FIG. 2 shows the device according to the present invention in the region of removal.

[0028] FIG. 3 is a front elevation of the device according to the present invention in the region of discharge of the card sliver/sliver.

[0029] FIG. 1 diagrammatically shows an example of a carder 1. Flakes of the carder 1 are fed into a flake filler shaft 2. The flakes reach the lower region of the flake filler shaft 2 at lickers-in 3, 3’ and 3” of the carder 1. The three lickers-in 3, 3’ and 3” open the fibre flakes. The last licker-in 3’ transfers the coarsely parallelised fibres to a carder drum 4. The carder drum 4 cooperates with flats 5 and parallelises the fibres further still. After the fibres have partly described several revolutions on the carder drum 4, they are removed by a stripper roller 7 from the carder drum 4, fed to the press roller 8 and finally deposited as card sliver 9 in a can stock 10 into a can.

[0030] FIG. 2 shows a detailed diagrammatic representation of the removal region of a carder. The fibres are stripped off by the stripper roller 7 via a dollying cylinder 16 and with the aid of a web baffle bridge 13 guided in between two press rollers 8, resulting in a fibrous web. This fibrous web is concentrated by the transverse conveyor belt 17 and formed into a card band or sliver. Unwanted accumulations of dust, dirt and short fibres tend to occur in space A, which is delimited by the stripper roller 7, the dollying cylinder 16 and partially by both the press rollers 8. Likewise, accumulations occur in the space of the gap between the press roller 8 and the mote knife 12, 14 on the one hand and the crossbelt device 17 on the other hand, with the increased danger of particles accumulating especially in the region of the transverse belt edges B and C.

[0031] A compressed air device 13 according to the present invention can be used to clean spaces A and exhaust devices 11 and 15 according to the present invention are provided for cleaning spaces B and C. Depending on the work rate, material throughput and proportion of short fibre and dirt, but also depending on the general conditions in the production plant, such as temperature and relative humidity, individual cleaning components according to the present invention or combinations thereof are required.

[0032] The upper and lower exhaust devices can be arranged according to the present invention over the entire working width of the carder or just over a part thereof. The region around the sliver spout is mostly at risk, because fibres and dirt dragged in here can be combined with the newly formed sliver.

[0033] FIG. 3 shows an arrangement with partial exhaust devices 11 and 15 in the form of a funnel above and below the sliver spouts (view of front working side, indicated in FIG. 1 by a star). In addition to this the flow of the exhaust air is shown. The sliver 19 is transported forwards between the two conveyor belts 20, 20’.

1. A device for removing dust, waste and short fibres in the removal zone of a carder or carding machine having a stripper roller or doffer, a dollying cylinder and an upper and a lower press roller, characterised in that means for generating a preset air flow are arranged in the region between the stripper roller, the dollying cylinder and the press roller.

2. The device as claimed in claim 1, characterised in that the means is a compressed air device.

3. The device as claimed in any one of the foregoing claims, characterised in that the generated air current from the opening gap flows through between the lower press roller 8 and stripper roller 7.
4. The device as claimed in any one of the foregoing claims, characterised in that the stream of generated air current is not directed on the lower press roller 8 and or stripper roller 7.

5. The device as claimed in any one of the foregoing claims, characterised in that the generated air current is continuously produced.

6. The device as claimed in any one of the foregoing claims, characterised in that an interval sequence, defined by a duration and the frequency of the generated air current, can be set.

7. The device as claimed in any one of the foregoing claims, characterised in that the generated air current lasts up to 5 seconds, in any case up to 15 seconds, or up to 60 seconds.

8. The device as claimed in claim 10 characterised in that the air current can be generated in intervals of 1 to 60 minutes, or 3 to 30 minutes.

9. The device as claimed in any one of the foregoing claims, characterised in that the interval sequence can be controlled.

10. The device as claimed in any one of the foregoing claims, characterised in that it forms a component of the web baffle plate or the web baffle bridge.

11. The device as claimed in any one of the foregoing claims, characterised in that a waste baffle plate is arranged below the gap through which the dirt is blown.

12. The device as claimed in any one of the foregoing claims, characterised in that an exhaust device is arranged below the gap through which the dirt is blown.

13. The device for removing dust, waste and short fibres in the removal zone of a carder or carding machine, having a stripper roller or doffer, a doffing cylinder and an upper and a lower press roller, characterised in that a lower exhaust device is provided for the region of the lower stripper and the lower press roller.

14. The device as claimed in any one of the foregoing claims, characterised in that the lower exhaust device comprises the entire working width of the carder.

15. The device as claimed in any one of the foregoing claims, characterised in that the lower exhaust device comprises only a part of the working width of the carder, under the region where the sliver spout is located.

16. The device for removing dust, waste and short fibres in the removal zone of a carder or carding machine, having a stripper roller or doffer, a doffing cylinder and an upper and a lower press roller, characterised in that an upper exhaust device is provided for the region above the upper mote knife and upper press roller.

17. The device as claimed in any one of the foregoing claims, characterised in that the upper exhaust device is arranged over the entire working width of the carder.

18. The device as claimed in any one of the foregoing claims, characterised in that the upper exhaust device is arranged over that part of the working width of the carder where the sliver spout is located.

19. The device as claimed in any one of the foregoing claims, characterised in that the upper exhaust device is integrated in the cap.

20. A method for removing dust, waste and short fibres in the removal zone of a carder or carding machine, having a stripper roller or doffer, a doffing cylinder and an upper and a lower press roller, characterised in that particles such as dust, dirt or short fibres accumulated by a preset air flow can be blown away in the region between the stripper roller, the doffing cylinder and the press roller.

21. The method for removing dust, waste and short fibres in the removal zone of a carder or carding machine, having a stripper roller or doffer, a doffing cylinder and an upper and a lower press roller, characterised in that the air can be exhausted into the region under the lower stripper and the lower press roller.

22. The method for removing dust, waste and short fibres in the removal zone of a carder or carding machine, having a stripper roller or doffer, a doffing cylinder and an upper and a lower press roller, characterised in that the can be exhausted into the region for the area above the upper mote knife and upper press roller.