July 2, 1946. J. LOCKE 2,403,384

CARDING ENGINE

Filed April 7, 1944

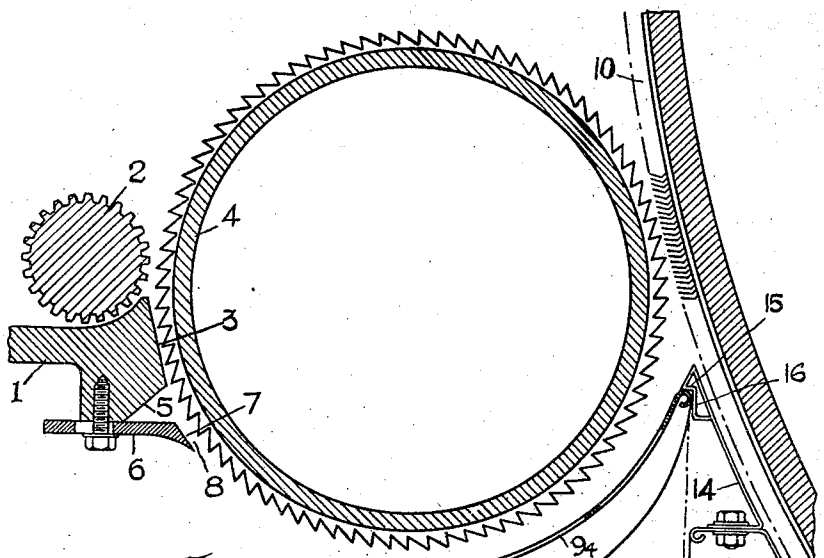


Fig. 1

Fig. 3.

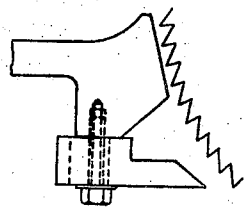
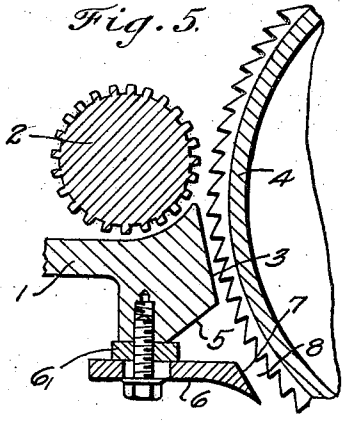


Fig. 4.

Fig. 5.



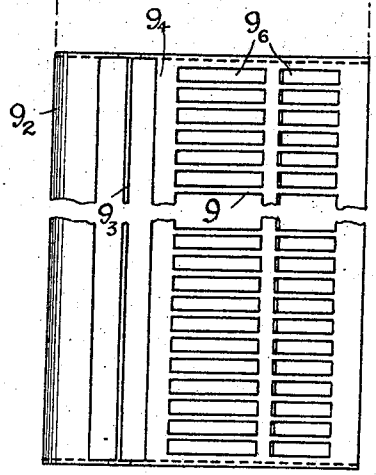


Fig. 2.

Inventor
JOHN LOCKE
By: Francis E. Boyce
ATTORNEY.

Patented July 2, 1946

2,403,384

UNITED STATES PATENT OFFICE

2,403,384

CARDING ENGINE

John Locke, Didsbury, Manchester, England, assignor to The British Cotton Industry Research Association, Didsbury, Manchester, England, a British association

Application April 7, 1944, Serial No. 529,942
In Great Britain April 23, 1943

7 Claims. (Cl. 19—105)

1

The object of my invention is to improve the cleaning action of the taker-in of the carding engine. In carding engines of known type, it is usual to strike the material from a dish feed by a toothed taker-in and to carry it between an undercasing or grid and the lower part of the taker-in surface, after which it travels upward and forward to the card cylinder. To prevent undue loss of good fibre between the dish feed and the undercasing, it is usual to place blades called mote knives in this region. These have their upper edges fitting very close to the teeth of the taker-in. They serve to keep the cotton near to the taker-in surface by virtue of the convergence of the air stream, set up by the fan action of the taker-in, towards the narrow gap between their edges and taker-in surface. This arrangement has two disadvantages. In the first place these air streams tend to draw in the lighter trash: and secondly the mote knives tend to obstruct the fall of trash particles so that many which might be projected out of the region where upward air currents operate, are retained and may be drawn back into the stream of cotton.

According to the invention, a device for obtaining an improved cleaning action in the taker-in region of a carding engine comprises a control member constructed to provide an enclosed wedge-shaped space below the striking face of the dish plate, and having an upper surface which faces the on-coming stream of material from the striking face, which surface is disposed at an acute angle to the taker-in, and a striking edge forming a second striking surface below such space disposed in a plane at an obtuse angle to the striking face of the dish plate.

Moreover I arrange that there is no direct communication between the air space above the member and that below it, except through the gap between the member and the taker-in surface. I make the space above the member entirely enclosed except for this gap and that between the dish feed and the taker-in. I find that this arrangement, which temporarily traps the heavier trash particles after they have been struck from the feed region, has no deleterious effect on their ultimate separation and deposition.

This member controls the position round the arc of the surface of the taker-in at which material not actually caught in the teeth of the taker-in is projected into the air space below the taker-in. This control member, as it may be called, may be shaped differently or placed in different positions so as to give a control position to suit different requirements. This may be made lower to cure excessive loss of good cotton, or it may be made higher if it is considered worth while to sacrifice a little cotton for the sake of better cleaning.

2

Co-operating with the control member I make use of a collecting member to take the place of the known form of taker-in undercasing or grid. The function of this member is to collect the cotton, much of which in the absence of mote-knives will have been projected into the space below the taker-in: and it will at the same time collect a certain amount of light trash and dust. This collecting member as it will therefore be termed will join with the cylinder undercasing at its upper end and will be provided with a suitably shaped nose piece at the lead-in end. It will be adjustable at both ends as regards its distance from the taker-in surface and at the lead-in end as regards the position of the nose piece along the arc of the taker-in surface so that the length of arc which is "open" or "free" between the control member and the nose piece may be varied to suit different requirements. It will be understood that these adjustments, like those of the control member affect the cleaning and the loss of good cotton. For example the larger the gap between the nose piece and the taker-in surface or the less the arc of the free surface of the taker-in the less the loss of cotton and the worse the cleaning action.

To obtain these adjustments I may make the collecting member in two or more sections; adjusting, for example, the free surface of the taker-in by sliding one part on the other.

My experiments show that with my devices I can get, for a given loss of cotton, better cleaning than with known devices.

Means for carrying out my improvements are hereinafter described in detail and in reference to the accompanying drawing wherein

Fig. 1 is a sectional elevation of the taker-in region of a carding engine to which my improvements have been applied.

Fig. 2 is a plan view of my collecting member.

Fig. 3 is an auxiliary side elevation showing means for adjustably fixing the collecting member near its leading edge.

Fig. 4 shows an alternative form of control member.

Fig. 5 is a broken away detail view illustrating a modified form of mounting the control member

Fig. 1 shows the taker-in region of a carding engine to which my invention has been applied.

The dish-plate 1 is of known type accommodating on its upper face a feed roller 2 and having a striking face 3 suitably set with regard to the teeth of the taker-in 4, and below said striking face the dish-plate 1 is cut away sharply from the surface of the taker-in to provide a face 5. According to my invention the space thus formed is partially closed by a control member 6 which is fixed to the underface of the dish-plate, and this member is shaped to provide an upper surface which faces the oncoming stream of material and converges to the surface of the taker-in at an acute angle, so that the upper surface is roughly horizontal or even sloping downwards at an appreciable angle towards the taker-in, so as to form a converging wedge towards the taker-in and at its edge forming a second striking surface 7 oriented at an obtuse angle to the plane of the striking face 3. The gap 8 between this surface and the surface of the taker-in at its narrowest point is relatively large compared, for example, with the setting of a mote knife. Thus it might be $\frac{3}{16}$'' as compared with 10/1000''. The function of the surface 7 is to catch dirt particles struck from the striking face 3 and reflect them back to the taker-in surface, where they are struck again by the taker-in teeth and projected into the dirt box. In this way I obtain a double striking action first at the striking face where the particles are released from entanglement with, or attachment to fibres, at a relatively low velocity, and secondly after reflection from the surface 7, where, being free, they are given a velocity more nearly approaching that of the taker-in teeth. In this way instead of merely the heavier dirt particles being deposited, many which are so light that with ordinary arrangements they would be carried forward, are also deposited.

In order that the width of the gap 8 may be capable of variation I provide slots in the control member 6 through which it may be fixed by screws to the lower face of the dish plate, the screws and slots being so located that in the most forward position of the member 6, the slots do not protrude into the space between the face 5 and the taker-in surface. Moreover it may be necessary in order to obtain the best cleaning arrangements for a particular material, to extend this space. I may do this by means of a packing piece 6 (Fig. 5) between the control member 6 and the lower face of the dish feed, or, as shown in Fig. 4 by suitably shaping the member 6. I may use similar means to vary the orientation of the surface 7, for example by making the packing piece 6, wedge-shaped.

Below the gap 8 I leave the surface of the taker-in entirely free over an arc which may be as large as 60°. This enables dirt particles struck by the taker-in teeth at various angles to fall freely into the dirt box, and also allows of the gravitational separation of lighter particles. In consequence of the absence of mote knives over such a wide arc the fibrous material is allowed to travel a considerable distance away from the taker-in and I therefore make use of special collecting means.

This consists of a collecting member 9 shown in Fig. 1 and also in plan in Fig. 2. The operative parts of this are held between side plates 9_1 and consist of a nose-piece 9_2, bar 9_3 and a curved sheet 9_4 extending from a turned-down portion 9_5 separated by a narrow gap from the bar 9_3 to the undercasing of the cylinder 10. The curved sheet has perforations in the form of slots 9_6 cut in it in the direction of its arc and its upper edge connects with the cylinder undercasing. The manner of this connection is hereinafter described for two types of carding engine. The member 9 is set at a relatively large distance (e. g. ½'') from the taker-in surface as compared with an ordinary perforated and closely positioned taker-in undercasing or grid.

I make the upper and lower settings of the collecting member 9 to the taker-in surface independently variable as hereinafter described. The variable lower setting enables as much or as little of the fibre to be collected as desired. I find that a widening of the lower setting enables me to collect more fibre (i. e. diminish the loss of fibre) without appreciably increasing the amount of trash carried forward.

As a consequence of the wide upper setting and the provision of the slots, air carried forward by the cylinder, together with the dust and fly in it, is released at this point, passing through the slots into the region below the taker-in where the dust and fly are deposited. Ordinarily this air is blown out in the region of the flats into the card room. My invention has thus the merit of diminishing the dust and fly in the card room. The use of slots while having the advantage of giving the maximum air release does not lead to loss of fibre since the free fibres in accordance with a well-known principle become orientated in the narrow channel between the taker-in surface and the member 9 at right angles to their direction of travel.

I may adopt any suitable known means of providing adjustable upper and lower settings of the collecting member 9. Thus for the lower setting I may provide brackets 11 adjustably fixed to the sides 12 of the machine and carrying pegs 13 fitting into holes in the sides 9_1 of the member 9. I preferably fix these pegs in the sides of the brackets contiguous to the frame sides 12, thus enabling the member 9 to extend nearly the full width of the machine as shown in Fig. 3, thus minimising "blow-out" at the sides of the machine.

Fig. 1 illustrates particular means for providing an adjustable upper setting of the collecting member 9, applicable to carding engines in which the customary grid is integral with a member forming the terminal portion of the cylinder undercasing. The removal of this customary grid thus leaves an exposed portion of the cylinder, and to cover this I provide a member 14 bolted to the cylinder undercasing and carrying at its upper edge an attachment shaped to provide abutments 15 and 16 to accommodate the upper edge of the member 9. Variation of the upper setting of the member 9 may be obtained by using members 14 covering different angles of arc of the cylinder, but I preferably obtain this adjustment by rotating the whole cylinder undercasing about the axis of the cylinder.

In other types of carding engine the cylinder undercasing extends right up to the point where it connects with the customary grid, the undercasing carrying at its upper edge a member shaped to provide abutments similar to 15 and 16 of Figure 1. In this case I use these abutments to accommodate the upper edge of the member 9, and I obtain a suitable upper setting by rotating the whole cylinder undercasing about the axis of the cylinder.

It will be understood that I arrange my device to give as large a free arc of the taker-in as is

consistent with the avoidance of too great a loss of good fibre. For example for long staple cotton I should have a larger arm than for short-staple, since the latter tends to leave the taker-in surface more readily than the former. I may vary the free arc by varying the position along the arc of the taker-in surface of either the surface 7 or the nose piece 9_2. The former adjustment may be made, for example, as previously described, by the use of a packing piece between the control member 6 and the lower face of the dish plate 1. To obtain the latter adjustment, which is preferred, I use collecting members covering different lengths of arc. I might make the collecting member in two parts slidable over each other, but I prefer to make use of different sizes of the collecting member. I find that for the entire range of varieties of cotton, not more than three sizes are sufficient.

I declare that what I claim is:

1. In a carding machine having a taker-in and a dish plate provided with a complementary striking face disposed adjacent to said taker-in for cooperation therewith, said dish-plate having a second face below said striking face and extending at an obtuse angle therefrom, a cleaning device comprising a control member carried by said dish plate and having an upper surface lying in a plane facing the oncoming stream of material from said striking face, said surface being disposed at an acute angle to the taker-in and forming with said second face a wedge-shaped space diverging toward the taker-in, said control member having also a striking edge disposed in a plane at an obtuse angle to the striking face of the dish plate and forming a second striking surface below said wedge-shaped space.

2. A carding machine having a cleaning device as set forth in claim 1, in combination with a collecting member disposed below the taker-in and having a wide setting relative thereto.

3. In a carding machine as set forth in claim 1, said control member being secured to the underface of the dish plate.

4. In a carding machine as set forth in claim 1, said control member being secured to the underface of the dish plate, but spaced therefrom by a packing piece.

5. In a carding machine as set forth in claim 1, said control member being formed so that its said upper surface lies in a plane below the point of connection of the control member with the dish plate.

6. In a carding machine as set forth in claim 1, a collecting member comprising an arcuate sheet disposed in proximity to said taker-in and having one end lower than the other, said sheet having depending side plates, and brackets adjustably secured to the side frame of the machine and provided with pegs engaging holes in the side plates of the collecting member for supporting the lower end thereof.

7. In a carding machine as set forth in claim 1, a collecting member comprising an arcuate sheet disposed in proximity to said taker-in and having one end lower than the other, said sheet having depending side plates, brackets adjustably secured to the side frame of the machine and provided with pegs engaging holes in the side plates of the collecting member for supporting the lower end thereof, and abutments carried by the machine frame for retaining the upper end of said collecting member.

JOHN LOCKE.