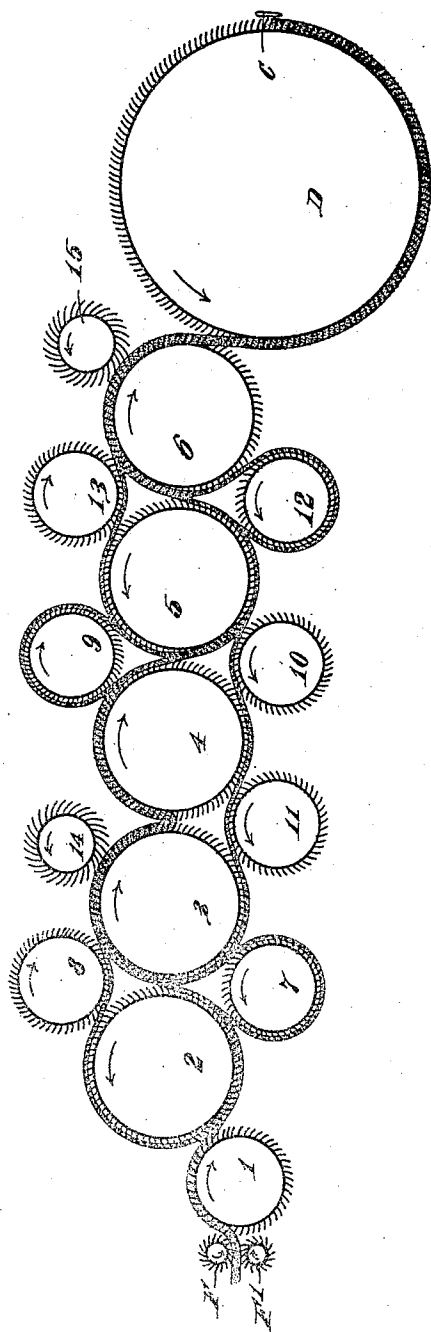


1,087,130.

P. L. McBRIDE.
CARDING ENGINE.
APPLICATION FILED MAR. 7, 1910.

Patented Feb. 17, 1914.



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PATRICK L. McBRIDE, OF GORHAM, MAINE.

CARDING-ENGINE.

1,087,130.

Specification of Letters Patent.

Patented Feb. 17, 1914.

Application filed March 7, 1910. Serial No. 547,878.

To all whom it may concern:

Be it known that I, PATRICK L. McBRIDE, a citizen of the United States, residing at Gorham, in the county of Cumberland and State of Maine, have invented a certain new and useful Improvement in Carding-Engines, of which the following is a specification.

This invention relates to carding engines and consists in the combinations and devices hereinafter described and claimed.

Carding engines have hitherto usually included a main cylinder or "swift" arranged between the feed-rolls and doffer-comb or other means for removing the fibrous materials from the card. Around the circumference of such main cylinder or "swift" are placed a plurality of smaller cylinders, workers or carding rolls, the teeth of the card-clothing on said workers being arranged point to point with the teeth of the main cylinder, for the purpose of removing a portion of the uneven web of stock passing around said main cylinder, which stock is returned to the main cylinder to be again recarded by the same or another worker. Such a main cylinder or swift is driven from fifty to one hundred and twenty-five times faster in surface speed than the workers or carding-rolls and it is necessary to run the main cylinder at a very high speed, say from fifteen thousand to twenty five thousand inches per minute, according to the nature of the stock to be carded, the finer the stock the greater the speed, because all the carding is done by said main cylinder and said workers, the speed of the workers being from seventy five to two hundred surface inches per minute. This great difference in the speed of the main cylinder and workers causes a breaking of the fibers, insufficient carding and loss of production, creates bunches, flyings and waste, increases the cost of the yarn and makes what is known as "tender yarn" or yarn of less strength.

The object of my invention is to provide for carding all kinds of fibrous materials by a plurality of pairs of slowly operating card-clothed rolls arranged in lines between the usual feeding devices and doffer and its comb or other means for removing the carded stock from the carding engine. These rolls are preferably arranged in three horizontal tiers, the top and bottom rolls or rolls of the top and bottom tiers being each

arranged in an angle between two adjacent rolls (hereinafter for distinction called cylinders) of the middle tier and in carding relation with one and in stripping relation with the other of said adjacent cylinders, said top and bottom rolls not returning the stock removed by them to the same cylinder from which it was removed until said stock has been recarded by a roll of the other tier.

By arranging two cylinders with their teeth point to back with each other and operating them at a surface speed of about two thousand to three thousand surface inches per minute and arranging a roll above in the angle between the two and another roll in the lower angle between the two, each roll being in working relation with both cylinders and each roll stripping one cylinder and carding with the other cylinder, the relation of said rolls to the same cylinder being reversed, I have found that I could work any fibrous web so as to make an even blend of it providing I used two sets of these cylinders and rolls, which sets of cylinders are not in speed relation to each other, that is, the speed of one set is not determined by the speed of the other. This is accomplished by arranging between said two sets a conveyer cylinder which revolves in the same direction with the first cylinder of the second set and in the opposite direction to the second cylinder of the first set. This conveyer cylinder permits any desired speed to be maintained for either the first or second set independently of the speed of the other set, so that the stock that is not properly carded on the first or feeding-in set on reaching the second or feeding-out set may again be returned to the second or first cylinder of the first set to pass through the same process previously described.

I do not limit myself to the use of two sets of cylinders and a conveyer cylinder, because three or more sets may be used with a conveyer cylinder between each set and the following set, but I have found that two such sets used with the rolls and the other cylinders herein shown and described are sufficient for practical purposes and occupy no greater floor-space than the ordinary carding engine in which a main cylinder and workers are employed.

In the accompanying drawing the figure is a diagrammatic representation in side elevation of the rolls and cylinders of a card-

ing engine constructed according to my invention with feeding and doffing devices.

F F¹ are feed-rolls; 1 the leader; D the doffer; C the doffer-comb; these parts being all of the usual construction and operation.

The stock is carried by the leader from the feed-roll to the cylinder 2. A part of the stock is delivered by the cylinder to the cylinder 3 and a part of the stock is removed from the cylinder 2 by the roll 7 arranged in the angle below and between cylinders 2 and 3 and by said roll 7 delivered to the cylinder 3, the cylinder 2 and the roll 7 being in carding relation to each other and the cylinder 3 being in stripping relation to the roll 7, the cylinder 3 also stripping the roll 2. The roll 8 arranged above and in the angle between the cylinders 2 and 3 takes a part of the stock from the cylinder 3 with which said roll 8 is in carding relation and returns it to the cylinder 2 causing it to pass through the same course the second time, the rolls 7 and 8 carding the bunches and projecting fibers with the cylinders 2 and 3 respectively and being stripped by the cylinders 3 and 2 respectively.

The cylinders 2 and 3 I call the first and second feeding-in cylinders because they deliver the stock to the conveyer cylinder 4.

The cylinders 5 and 6 I call the first and second feeding-out cylinders and they may be precisely like the cylinders 2 and 3 above described, the cylinder 5 taking stock from the conveyer cylinder 4. The speed of the set of feeding-out cylinders is entirely independent of that of the feeding-in cylinders and may be greater or less, as may be desired.

The rolls 12 and 13 have the same relation to the cylinders 5 and 6 as the rolls 7 and 8 respectively have to the cylinders 2 and 3 above described and may be duplicates of said last-named roll, the roll 12 carding with the cylinder 5 and being stripped by the cylinder 6 and the roll 13 carding with the cylinder 6 and being stripped by the cylinder 5. The stock delivered by the roll 13 to the cylinder 5 may be recarded at the roll 12.

The web taken from the cylinder 3 by the cylinder 4 may be carded by the roll 9 and in turn stripped from said roll 9 by cylinder 5 and recarded by the roll 10, arranged below and in the angle between the cylinders 4 and 5 and in carding relation to the cylinder 5, and delivered to the cylinder 4 and by said last-named cylinder delivered to the transfer roll 11 and thence to the cylinder 3 to be again recarded, from which cylinder 3 the unopened bunches and imperfectly carded stock may be returned to cylinder 2 and caused to pass all the rolls and cylinders above described from cylinder 2 to cylinder 6 inclusive of both.

It will be understood that the bottom roll

7 between the feeding-in cylinders 2 and 3 or the roll 12 between the feeding-out cylinders 5 and 6 may be dispensed with and that in some cases the top roll 8 or the top roll 13 or any of the rolls 9, 10 and 11 may be omitted where the nature of the fibrous material is such as to require but little carding.

While I do not limit myself to the surface-speed of any of the cylinders or rolls I have found that the cylinders 2, 3, 5 and 6 may advantageously be given a speed of from two to six thousand surface inches per minute, the conveyer-cylinder and roll 11 a speed of about one thousand surface inches per minute and the rolls 7, 8, 9, 10, 12 and 13, each a speed of about one hundred and fifty surface inches per minute; it being understood that these speeds may be greater or less according to the nature of the stock.

Cylinders 2, 3, 5 and 6 and roll 11 should revolve in the direction in which the teeth of their wire-clothing point.

Rolls 4, 7, 8, 9, 10, 12 and 13 may revolve in either direction without regard to the direction in which their teeth point and without change of speed. The doffer cylinder D revolves in the usual direction, that is, in the opposite direction to that in which its teeth point and the same is true of the two fancy-rolls 14 and 15 when their teeth are bent or inclined, but straight or radial teeth may be used on these fancy-rolls as is well known.

The fancy-roll 13 is used merely to facilitate the removal of the stock from the second feeding-in roll 3 to the conveyer cylinder 4.

It will be seen that the machine above described may be run at a very low rate of speed, and this has a tendency to avoid the formation of bunches which are frequently caused in the ordinary carding engine by the excessive difference of speed between the main cylinder and the workers, which tends to roll the fibers together into bunches, parts of which are embedded below the points of the wire-clothing of the main cylinder and are not removed by the action of subsequent workers nor until raised by the fancy-roll which just precedes the doffer, so that these bunches are removed by the doffer and enter the yarn.

I have found that with this machine running at low rates of speed relatively to the speed of the main cylinder of the ordinary carding engine the production of the machine is not only not diminished, but very greatly increased, that a luster and uniform shade are added to the web, that greater strength is imparted to the yarn subsequently made, and that the cost of labor for operating and repairs, the cost of card-clothing, grinding, power, oil and belting and the amount of floor-space required are greatly diminished.

I claim as my invention:—

1. In a carding engine, the combination of two feeding-in cylinders, a conveyer cylinder in carding relation with the second of the feeding-in cylinders and two feeding-out cylinders in stripping relation with each other, the first of said feeding-out cylinders being in stripping relation with said conveyer cylinder.
2. In a carding engine, the combination of two feeding-in cylinders, a roll arranged in an angle between said feeding-in cylinders and in carding relation with the second of said cylinders and in stripping relation with the first of said cylinders, a conveyer cylinder in carding relation with the second feeding-in cylinder and two feeding-out cylinders, the first of which is in stripping relation with said conveyer cylinder and with the second of said feeding-out cylinders, and a roll arranged in the angle between said feeding-out cylinders and in carding relation with the second of said feeding-out cylinders and in stripping relation with the first of said feeding-out cylinders.
3. In a carding engine, the combination of a set of feeding-in cylinders, a set of feeding-out cylinders, a conveyer cylinder arranged between said sets and in carding relation with the last cylinder of the first set and in stripping relation with the first cylinder of the second set, the speed of each set being independent of the speed of the other set.
4. In a carding engine, the combination of two feeding-in cylinders, a conveyer cylinder in carding relation with the second of the feeding-in cylinders, two feeding-out cylinders in stripping relation with each other, the first of said feeding-out cylinders being in stripping relation with said conveyer cylinder, and rolls arranged in the angles between said feeding-in cylinders above and below, each roll being in carding relation with one of said cylinders and in stripping relation to the other of said cylinders and the relation of said rolls to the same cylinder being reversed.
5. In a carding engine, the combination of a set of feeding-in cylinders, a set of feeding-out cylinders, a conveyer cylinder arranged between said sets and in carding relation with the last cylinder of the first set and in stripping relation with the first cylinder of the second set and rolls arranged above and below in the angles between the cylinders of each set, each roll being in carding relation with one of the cylinders and in stripping relation with the other cylinder of the corresponding set and the relation of

said rolls to the same cylinder being reversed.

6. In a carding engine, the combination of a set of feeding-in cylinders, a set of feeding-out cylinders, a conveyer cylinder arranged between said sets and in carding relation with the last cylinder of the first set and in stripping relation with the first cylinder of the second set, rolls arranged above and below in the angles between the cylinders of each set, each roll being in carding relation with one of the cylinders and in stripping relation with the other cylinder of the corresponding set and the relation of said rolls to the same cylinder being reversed and transfer rolls.

7. In a carding engine, the combination with feeding and doffing devices of a set of feeding-in cylinders, a set of feeding-out cylinders, a conveyer cylinder arranged between said sets and in carding relation with the last cylinder of the first set and in stripping relation with the first cylinder of the second set, rolls arranged above and below in the angles between the cylinders of each set, each roll being in carding relation with one of the cylinders and in stripping relation with the other cylinder of the corresponding set and the relation of said rolls to the same cylinder being reversed and transfer rolls.

8. In a carding engine, the combination with feeding and doffing devices, of a feeding-in cylinder, a feeding-out cylinder, a conveyer-cylinder arranged between said first named cylinders, and in carding relation with said feeding-in cylinder and in stripping relation with said feeding-out cylinder, and rolls arranged in the angles between said cylinders, each roll being in stripping relation with said conveyer-cylinder.

9. In a carding engine, the combination with feeding and doffing devices, of a feeding-in cylinder, a feeding-out cylinder, a conveyer-cylinder arranged between said first named cylinders and in carding relation with said feeding-in cylinder and in stripping relation with said feeding-out cylinder, a fancy-roll in operative relation with said feeding-in cylinder and a carding roll arranged in the angle between said conveyer roll and said feeding-out cylinder and in carding relation with the conveyer-cylinder and in stripping relation with the feeding-out cylinder.

In witness whereof, I have affixed my signature in presence of two witnesses.

PATRICK L. McBRIDE.

Witnesses:

GEORGE CROCKETT,
HOWARD E. PERKINS.