(No Model.)

W. FERGUSON.

Carding Engine for Making Mottled Yarns.

No. 240,821. **Patented May 3, 1881.**

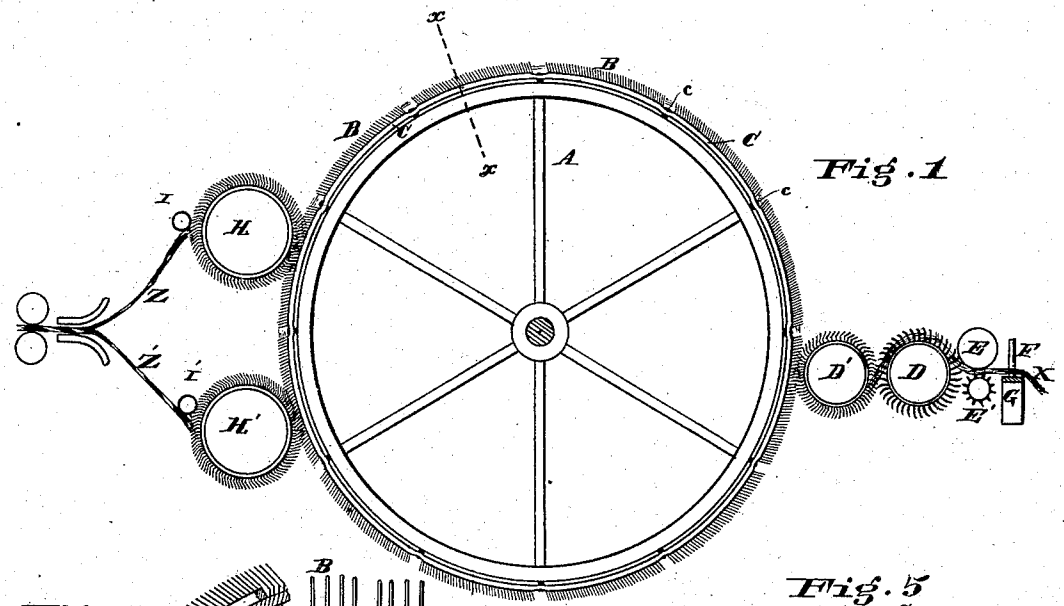


Fig. 1

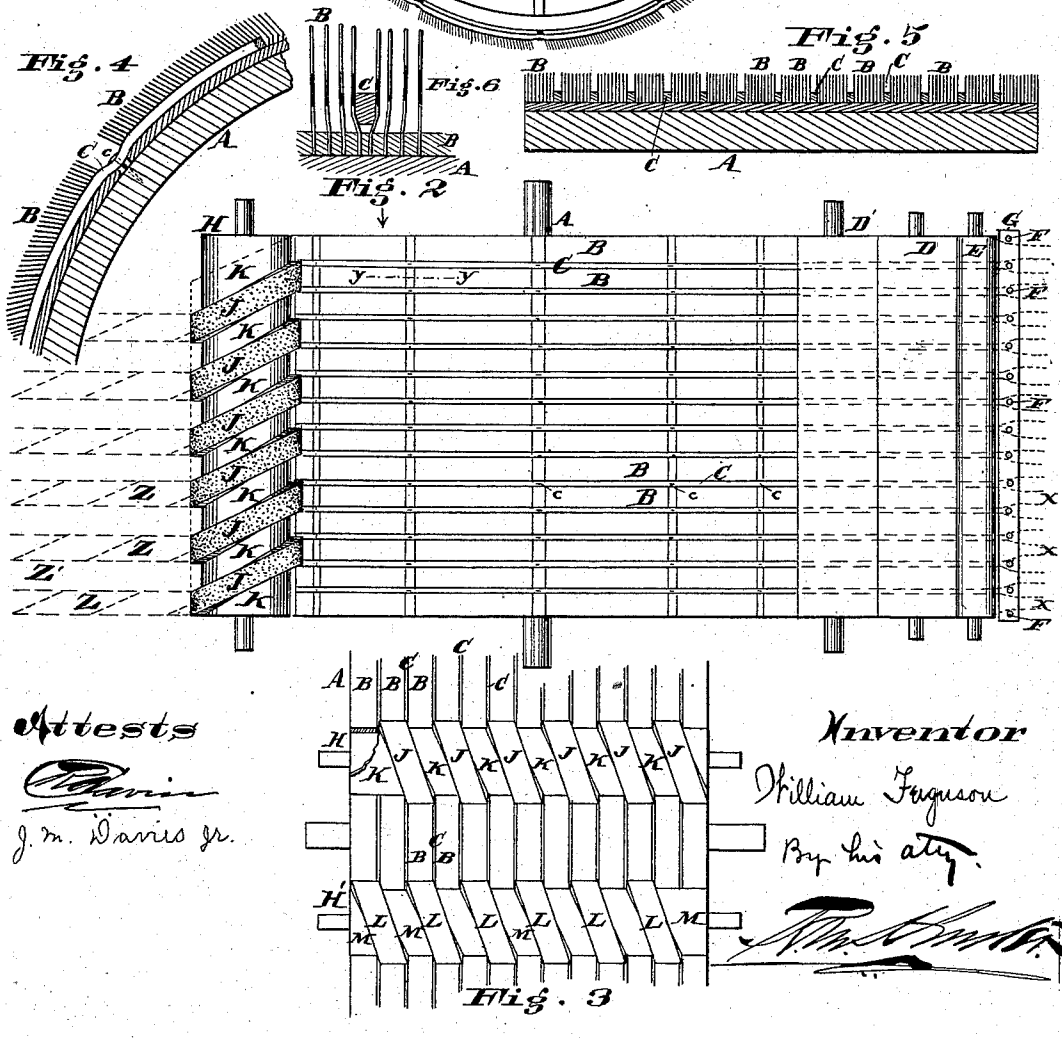


Fig. 4

Fig. 6

Fig. 2

Fig. 5

Fig. 3

Attests

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UNITED STATES PATENT OFFICE.

WILLIAM FERGUSON, OF GERMANTOWN, PENNSYLVANIA.

CARDING-ENGINE FOR MAKING MOTTLED YARNS.

SPECIFICATION forming part of Letters Patent No. 240,821, dated May 3, 1881.

Application filed May 11, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM FERGUSON, of Germantown, in the county of Philadelphia and State of Pennsylvania, have invented an Improvement in Carding-Engines for Making Mottled Yarns, of which the following is a specification.

My invention relates to carding-engines designed to produce clouded or mottled yarns; and it consists in a novel construction of the carding-cylinder and doffers, and their combination to produce a new result, which is fully described in the following specification, shown in the accompanying drawings, and referred to in the appended claims.

Heretofore clouded or mottled yarns have been produced in the manner set forth in the English patent to Ballantyne, No. 3,566 of 1869, in which a single doffer has its surface composed of movable or sliding and fixed bars alternately, so that the cards which are fixed upon the sliding bars may be moved from side to side or reciprocated and come in contact at each movement with a different part of the cylinder on which the said doffer acts, and on which cylinder the different-colored wools are laid, thus receiving from the cylinder at each movement wool of a different color from that which is received by the card on the fixed bar, and when the card on the movable bar is slid back even with that on the fixed bar, and the doffer-knife or wiper removes the sliver or roping, it is made up of the different colors removed by the sliding cards and the regular color removed by the fixed cards, the joining edge between the colors being at right angles to the length of the roping.

In my invention I produce a sliver or roping which is composed of the different colors, as in the foregoing case, but, unlike that roping, the different colors are removed in diamond-shaped sections, and the joining edge is in an oblique line with the direction of the length; and, further, the machinery to produce this mottled or clouded roping varies greatly from the foregoing, as will be hereinafter seen.

In the drawings, Figure 1 is a side skeleton elevation of a carding-engine embodying in it my improvements. Fig. 2 is a plan of same. Fig. 3 is a front elevation of the doffers, with part of the carding-cylinder in the rear. Fig. 4 is a section of part of the cylinder on line *y y*, Fig. 2. Fig. 5 is a section of part of the carding-cylinder on line *x x*. Fig. 6 is an enlarged section, showing how the cards on the cylinder are separated into strips or rings to receive separate colored drawings.

A is the carding-cylinder, and is constructed in the usual manner, with the exception that the usually even cards are divided into circumferential rings B by bands C, of leather or similar material. After placing the cards on the cylinder, one end of the band C is secured to the cylinder on the circumferential line of parting, and then the said band is drawn tight between the card-teeth, spreading them slightly from side to side, as shown in Figs. 5 and 6. This band C is kept tight against the cylinder by nails *c* or other equivalent means. By encircling the cylinder A with a series of these parallel circumferential bands C the carding-teeth are made to form a corresponding series of carding rings or bands, B, each of which is designed to receive a separate drawing or colored yarn, as shown in Fig. 2. The drawings X are fed between guides F on support G to the rollers E E′, which, in turn, feed the said drawings to the cylinders D D′, and thence onto the circumferential bands or rings of cards B on the carding-cylinder or swift. The cylinder A rotating at a higher velocity than the feed-cylinders, the drawings are soon caused to assume a very light appearance; but the different colors do not mix, as was formerly the case. After all of the knots, &c., have been removed in the usual manner, the slivers meet the upper doffing-cylinder, H, which removes one-half, or thereabout, the wool or cotton, the remainder being removed from the cards on the cylinder A by the second or lower doffer, H′. These doffers are so constructed that they remove a portion of each colored sliver, as previously described, and when the resulting ropings Z Z′ are removed from the doffers by the wiping-rollers I I′ they are passed to the condensing-cylinders.

The construction of the doffers is as follows: The cylinder has a series of rings of cards, J, secured firmly upon it, which rings are set obliquely to the axis of rotation of the doffer. These rings J are kept apart by leather rings K a distance equal to, or very slightly less

than, the width of the ring. The reason of this is, that only one-half of the slivers will be removed by the rings from the cylinder. The remaining half will have to be removed by the oblique card-rings L on the lower doffer. It is necessary to have two doffers, one above the other, and so set that the rings of one correspond to the openings or spaces of the other, or, in other words, so setting the rings on the doffers that when the same are in contact with the face of the cylinder the whole width of the face shall be in contact with the doffer-rings, half by one doffer and half by the other. To prevent waste, two doffers must be used, and, if desired, more than two doffers can be used. These doffers are so set one above the other that there is from six to eight inches between them. The obliquity of the rings and diameter of the doffers govern the number of colors which can be incorporated into a mottled or clouded yarn or roping from the slivers covering a given carding-cylinder. The dotted lines, Fig. 2, show the ropings Z Z′ as they leave the doffers. The oblique lines indicate the joining-line of the colors.

The doffer-rings, Fig. 2, are shown as designed to make a mottled roping or yarn of three distinct colors, and the rings of the doffers shown in Fig. 3 are shown as designed to make a mottled roping or yarn of two colors, as the colors in the roping or yarn is dependent upon the width of the slivers and obliquity of the rings on the doffers; but supposing the width of the slivers to be uniform, then the number of colors in the roping is wholly dependent upon the obliquity of the rings on the doffers; hence the rings J in Fig. 2 being more oblique than those in Fig. 3, they are consequently capable of taking a part of the cotton from three distinct slivers, whereas those on Fig. 3 are able to take from two only.

In the English patent referred to there is nothing whatever to cause the different colors of cotton or wool to adhere or stick together to make a continuous roping with uniform strength. It is evident that in that case the strength of that part of the roping made up of the joining edges of two adjacent colored yarns must be very small, whereas with my improvement the line of joining is in an oblique direction to the length, thereby making the roping of perfectly uniform tenacity or strength, and particularly so when made into thread or yarn, and which is very necessary to good yarn. The obliquity of the rings tends to pack or join the edges of the different-colored slivers, since their motion on the cylinder is laterally sliding (produced by the rotary motion of the oblique rings) and tends to join the colors firmly, and as the joining-line is oblique, when the said ropings are spun into yarn or thread, the thread will be of uniform strength throughout.

The doffers H and H′ are rotated in the same direction and with uniform velocity, and if set with reference to each other as previously set forth, the apparent reciprocating motion to the card-teeth forming the rings will be in the same direction at the same time on both doffers. This is necessary to cover the whole surface of the carding-cylinder.

Doffers have been constructed with wide rings of card-clothing placed around said doffers in serpentine or wavy lines, with very narrow supporting-ribs of lead to hold said cards in place and support the teeth. The object of such wavy clothing and ribs was to constantly traverse or vary their place of contact with the surface of the swift or cylinder to a very slight extent, to clear the swift of fiber at every revolution, whereas before a narrow ridge or ridges of fiber always remained on the swift between the rings on the doffer. This is shown in English patent to Fairburn, No. 37 of 1864; but the construction of the doffer in this case differs greatly from that, and the objects and results are not similar, but are widely different. Neither could a doffer constructed as set forth and shown in Fairburn's patent produce a mottled yarn at all. To produce the desired results the doffers must be constructed as set forth in this specification.

If desired, the rings B on the cylinder A may be put on separately in strips or rings, or in any other manner, my invention being in the dividing up of the surface of cards on the cylinder into bands or rings, each to hold a different-colored sliver, so that the teasers, top-flats, and other usual carding devices which act upon the surface of the cylinder shall not spread the colors, but deliver them again to the cylinder in their proper position.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a carding-engine, the cylinder A, having its surface divided into circumferential rings B by leather or analogous bands C, which are pressed between the teeth, in combination with two doffers arranged one above the other, said doffers being furnished with oblique rings of cards and spaces of equal, or nearly equal, width, the rings on the upper doffer being over the spaces on the lower doffer, the whole constructed substantially as shown and described.

2. In a carding-engine, the combination of support G, provided with guide-pins F, feed-wheels E E′, cylinders D D′, carding-cylinder A, having its cards divided into circumferential rings B by leather bands C, and two doffers, H H′, arranged one above the other, and provided with rings of cards set obliquely thereon, substantially in the manner shown and described.

In testimony of which invention I hereunto set my hand.

WILLIAM FERGUSON.

Witnesses:
JOHN M. DAVIES, Jr.,
SAMUEL E. CAVIN.