G. M. WHITIN.

METHOD OF COMBING COTTON.

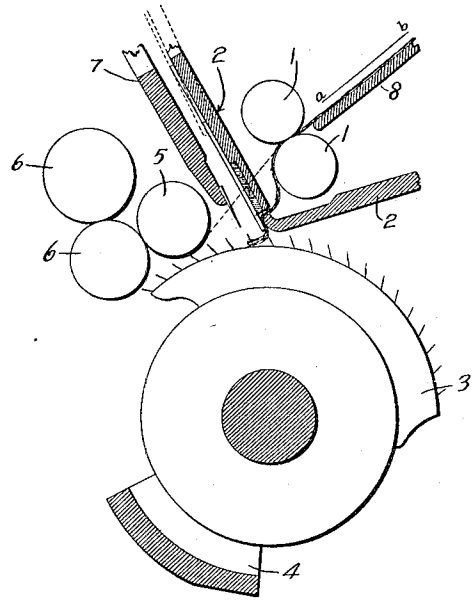
APPLICATION FILED MAY 23, 1913.

1,141,673.

Patented June 1, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



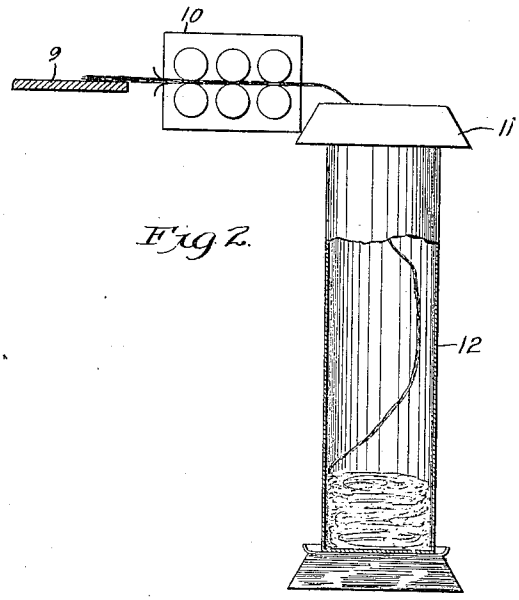


Fig. 2.

Fig. 2.a



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2 SHEETS—SHEET 2.

Fig 3.

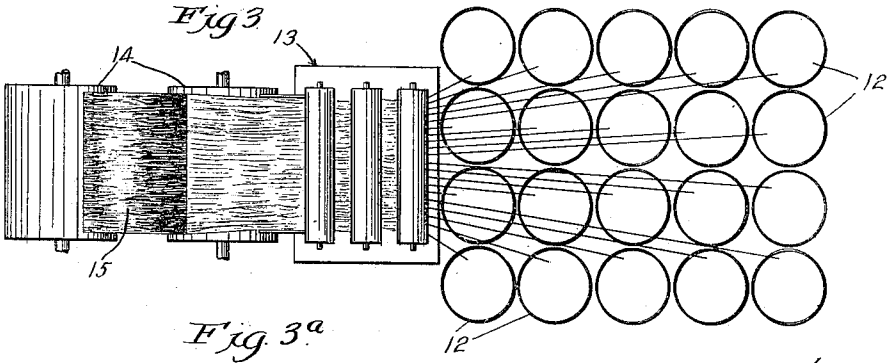


Fig 3a

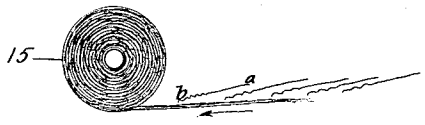


Fig 3b



Fig 4.

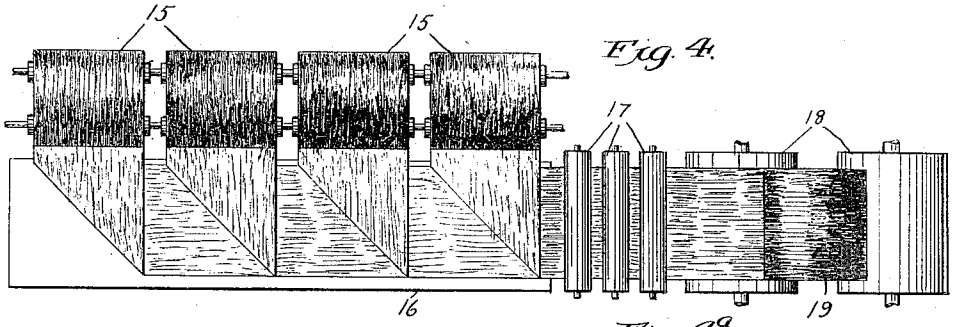


Fig 4a

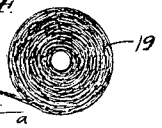


Fig 5.

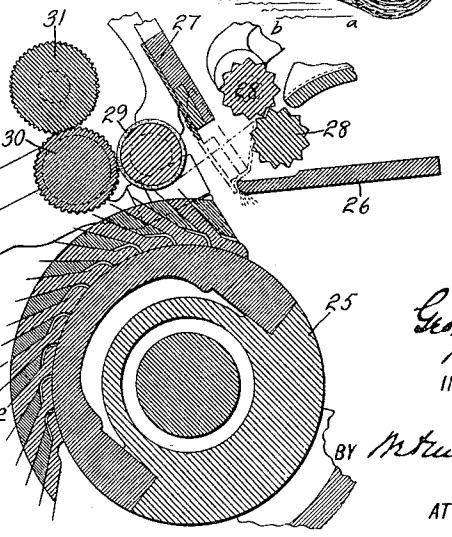
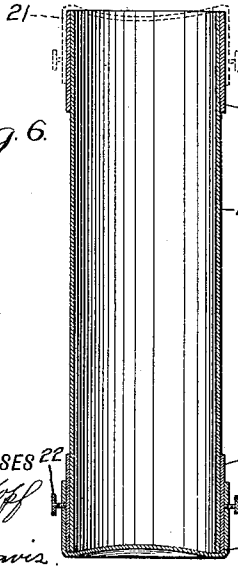


Fig 6.



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UNITED STATES PATENT OFFICE.

GEORGE M. WHITIN, OF WHITINSVILLE, MASSACHUSETTS, ASSIGNOR TO THE WHITIN MACHINE WORKS, OF WHITINSVILLE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

METHOD OF COMBING COTTON.

1,141,673. Specification of Letters Patent. Patented June 1, 1915.

Application filed May 23, 1913. Serial No. 769,348.

To all whom it may concern:

Be it known that I, GEORGE M. WHITIN, a citizen of the United States, residing at Whitinsville, in the county of Worcester and State of Massachusetts, have invented the following-described Method of Combing Cotton.

The invention is a combing method for cotton and other fibers, adapted to improve the luster and strength of the yarn spun from the combed product and more especially to give a superior quality of combing with less waste of good fibers than heretofore. The new method may be carried out in any comber of the Heilman type and consists briefly in twice passing the same stock through such a comber, reversing the direction of the fibers, as they lie in the lap, between passages so as to subject both ends of each fiber to the action of the rotary comb cylinder. In Heilman combers, the forward ends of the fibers constituting the terminal fringe of a cotton lap, are first combed by the rotary comb cylinder after which the fibers are seized by their combed ends and detached from the main body of the lap, being at the same time drawn through the teeth of the depending top by which their tail ends are also combed. Each tuft, combed head and tail in this manner, is laid in overlapping relation upon the tail end of the last previously combed and detached tuft to form a continuous combed sliver which, on being condensed to rounded form, is passed from the machine into a can provided for the purpose and wherein it is coiled. I have found that the luster of yarn spun from such sliver is due not only to the parallelization effected upon the fibers, but also and in very large measure to the polishing the fibers receive from the comb needles which have passed through them, and principally from the needles of the rapidly rotating comb cylinder all of which pass several times through the fibers of the tuft before the fibers are drawn through the top comb. Since only the forward ends of the fibers are combed by the cylinder, it is plain that the luster of the yarn is provided mainly by such forward ends and very little, if any, by the tail ends which have passed through the teeth of the top comb only. By reversing the direction of the fibers and running them through the comber a second time so that the fiber ends that were formerly tails are now presented to the comb cylinder, practically the whole of each fiber receives the polishing action of the cylinder and the appearance of the yarn is correspondingly enhanced, and further, by eliminating the top comb, the waste of good fibers it gives rise to can also be eliminated without sacrificing the appearance or luster of the yarn, or in any way impairing its value. The top comb exercises no selection between valuable fibers and the neps and dirt, but throws down as waste everything that it not seized and drawn through it by the detaching mechanism. The amount of waste that is thus saved is very considerable and in actual practice, far more than offsets the labor and time cost of the second, reversed, operation. The ordinary comber produces waste at the rate of from 12 to 30 per cent. of the combed product, the amount being more or less according to the thoroughness of the cleansing effected, and of course a double combing of the same stock substantially doubles the waste. The reversed combing of the present process without the top comb gives substantially the same result with from $2\frac{1}{2}$ to 4 per cent. of waste for each run.

In carrying out the new method, various means can be used to effect the reversal of the direction of fibers, and in the accompanying drawings I have shown several such methods, Figure 1 representing so much of the head of an ordinary Heilman type comber as will suffice to indicate the action thereof upon the fiber; Fig. 2 the sliver can receiving the combed sliver therefrom; Fig. 2^a a diagrammatic detail of the position of the fibers after passing through the comber; Fig. 3 a diagram of a sliver lap machine; Fig. 3^a a detail showing relation of the fibers; Fig. 3^b a similar detail; Fig 4 a diagram of a ribbon lap machine; Fig. 4^a a detail indicating the relation of the fiber; Fig. 5 is a section of a comber head similar to Fig. 1, without a top comb; and Fig. 6 a longitudinal section of a sliver can.

Fig. 1 illustrates the position of the cotton in an ordinary comber in the act of combing the forward ends of the tuft, 1 being the lap feed rolls, 2 the nipper jaws, 3 the needle half-lap, 4 the detaching segment, 5 and 6 the piecing and detaching rolls, and 7 the ordinary top comb, the tuft held by the nippers with the forward ends of its fibers deflected downwardly into the range of the needles on the half-lap 3. The

forward ends of the fibers, for convenience of reference, may be designated *a*, and the tail ends *b*, as indicated in connection with the lap shown on the lap-plate 8. The *a* ends are in process of being combed and polished. On the arrival of the segment 4 beneath the detaching roll 5, these combed forward ends are nipped against the latter roll and the tuft of cotton is drawn forward, straightening the end of the lap to substantially the position indicated by the dotted line, the upper nipper jaw 2 being raised at this moment as indicated in dotted lines and the position of the top comb, when used, being such that the tuft engages its teeth and is drawn through them. The rolls 5 and 6 are rotated intermittingly or reversingly and piece the successive tufts in the familiar manner forming thereof a continuous lap, which passes through a trumpet, not shown, and thence onto a sliver apron, shown diagrammatically at 9 (Fig. 2). All of the condensed slivers from several heads of a comber are united on this apron and pass thence into a draw-box 10, by which they are attenuated and discharged as a single sliver through a coiler head represented diagrammatically by 11 (Fig. 2) and into a sliver can 12 in which it is coiled. It will be observed that the fibers have entered the sliver can, *a* end first, as indicated by the diagram of Fig. 2[a], these being the ends that have been combed by the revolving half-lap. The tail ends *b* have been combed merely by their passage through the top comb 7. To effect the reversal for the second treatment, according to one method of manipulation, the sliver from these cans 12 instead of being taken direct to the slubber, as customary, is placed behind a sliver lap machine, such as diagrammatically shown in Fig. 3, and the several ends are passed from the cans in parallel relation through the draw-box 13, in which they can be subjected to draft if desired, and thence onto a winding head designated 14, by which they are rolled into a single lap roll 15. The tail ends *b* of the fibers enter this lap roll first, as indicated by Fig. 3[a]. Several lap rolls such as 15, made on a sliver lap machine as just described, are next placed in a ribbon lap machine, as shown in Fig. 4, by which they are unwound—the *a* ends of the fibers moving off of the rolls first—and passed along a suitable apron 16 where they move in superposition through the draw box 17 of this machine and thence to the winding head 18 thereof forming a ribbon lap roll 19 in which the *a* ends of the fibers are disposed toward the center of the roll, as clearly shown in Fig. 4[a]. These ribbon lap rolls 19 are then placed in the comber, such for instance as represented by Fig. 1, and run through the second time, the ends *b* now being the forward ends of the fibers, which are thus in their turn subjected to the combing and polishing action of the rotary comb element, the product of this second combing being a sliver in which both ends of all of the fibers have been subjected to the cleaning and polishing action of many rows of needles in the needle half-lap 3, as will be evident. This sliver may then be worked into yarn in the usual manner.

It will be understood from the diagrams and brief description of the sliver lap and ribbon lap machines that they are the same machines as are commonly used for preparing card sliver for use in the comber and that their use in the present method is simply for the purpose of gaining the reversal of direction of the fibers in the form of a flat lap which will be received by the comber. It will be observed that the use of these two intermediate machines involves several doublings of the sliver, which is an advantage for the second combing. It is however possible to reverse the direction of the fibers without subjecting them to draft, or without the use of two intermediate machines, and a further and also simpler method of manipulation comprises the use of a sliver can such as shown, for example, in Fig. 6, in which the can body 20 has a removable bottom or end closure 21, provided with set screws 22, by which it can be secured to either end of the body. In the figure referred to, 23 is a metal reinforcement at the ends of the can, against which the set screws thrust or with which they may interlock. This form of can is placed to receive the sliver directly from the draw box of the comber during the first run and when full, is capped with a second removable end closure, such as above described, and then reversed end for end and placed behind the sliver lap machine, removing the end closure that was formerly the bottom, so that the *a* ends of the fibers thus precede the *b* ends in their passage through the sliver lap machine, and into the sliver lap roll 15. The position of the fibers in this roll is as indicated by Fig. 3[b], and by placing these rolls in the comber, the *b* ends will be the forward ends in the run through the latter, giving the same result as first above described.

Fig. 5 represents a form of comber, forming the subject of a co-pending application, Ser. No. 768,712 filed May 20, 1913, and adapted to carry out the reversed combing method above described in a most efficient manner. This comber can be properly classed as the Heilman type. Numeral 25 represents the comb cylinder which is the same as that ordinarily employed in Heilman combers, except that it preferably has an enlarged number of comb needles and finer needles. 26 is the lower and 27 the upper, movable, nipper jaw, 28 the feed rolls which feed the lap through the nip-

pers, 29 the detaching roll mounted to engage the detaching segment which is radially higher on the cylinder than the points of the needles; 30 is the piecing roll in contact with the detaching roll, and 31 the clearer roll therefor. The lip on the nipper jaw 27 holds the tuft directed toward the cylinder and penetrating deeply into the needles thereon, so that it receives a thorough cleansing and a high degree of polishing therefrom, as above described. When the jaw rises the tuft is drawn off from the body of the lap, in a straight line through the short unobstructed passage between the bite of the feed rolls to the bite of the detaching roll upon the segment. From the under side of the detaching roll, the tuft passes into the bite of the latter upon the piecing roll, the intermittent forward and back rotation of which causes the piecing of the tufts according to the common Heilman principle. The tail end of the tuft is not combed at all, nor straightened beyond the straightening the fibers get from being drawn away from other compacted fibers still held in the body of the lap. This draft-straightening is accompanied by some removal of neps and leaf which drop onto the cylinder, but by no loss of fiber. The detaching roll works directly in front of the nipper jaws and close to them, because no usual intervening part is required to work in this position, as, for instance, for combing the tail ends. Consequently, and as shown in the figure, the said passage from feed rolls to detaching roll is short as well as unobstructed and the detaching roll and segment therefore get a longer grip on the combed tuft than would otherwise be possible, grasping it nearer the middle. This brings about an even break in the lap so that when the nippers again close, the projecting fringe is of uniform length and the number of straggling fibers to be taken off of it by the comb cylinder are thereby reduced to a minimum. These conditions effect large economies in the loss of good fiber which cannot be obtained where a comb element such as shown at 7 in Fig. 1, intervenes between the nippers and detaching roll. The first run through this machine removes an inconsequential amount of waste, which is mostly dirt and very little fiber, and it gives the forward ends of the fibers a high polish; the second reversed run performs the same operation on the opposite ends and thereby completes the combing of each fiber and also the polishing thereof, so that a superior full-combed product is thus obtained with less waste, as first above stated.

I claim:

1. The method of combing which consists in twice subjecting the same stock to the action of a moving combing element, combing only the forward ends of the fibers during the first operation, and only the opposite ends during the second operation.

2. The method of combing cotton which consists in passing a continuous lap through a comber in which the forward ends only are subjected to the action of a series of moving combing needles and are successively detached from the body of the lap and overlapped on previously detached and similarly combed fibers, then reversing the direction of the sliver resulting from such combing, and repassing the same through a similar comber in such reversed direction.

3. The method of combing which consists in collecting combed sliver from a Heilman type comber in a can or receptacle, reversing such can or receptacle, drawing the sliver from the reversed end of such receptacle and winding the same into a lap roll, and then directly feeding such lap roll through a comber of the same type.

In testimony whereof, I have signed this specification in the presence of two witnesses.

GEORGE M. WHITIN.

Witnesses:
CHESTER C. LAMB,
OSCAR L. OWEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."