Oct. 21, 1930. R. C. SUNDBERG 1,778,873

COMBING MACHINE

Filed Oct. 24, 1929

Fig. 1.

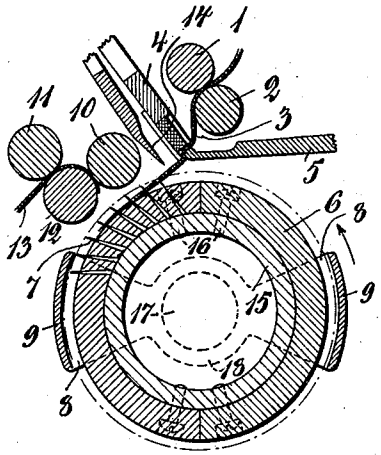


Fig. 2.

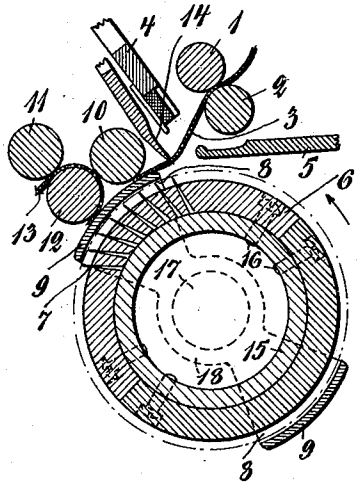
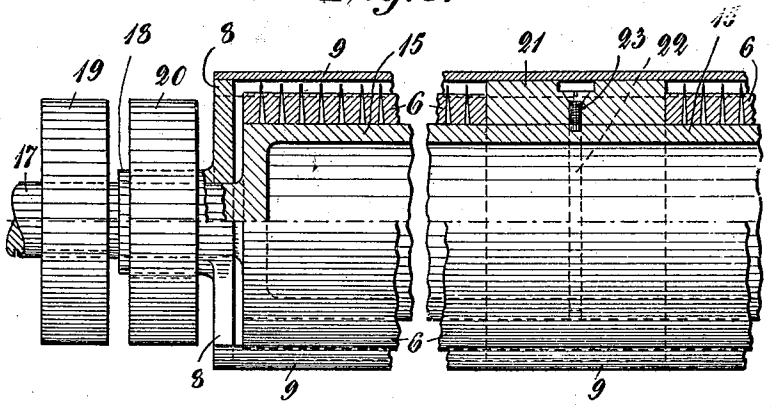


Fig. 3.



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UNITED STATES PATENT OFFICE

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COMBING MACHINE

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The present invention relates to an arrangement in combing machines by means of which many disadvantages are removed and several advantages are gained. Instead of arranging a combing segment and a detaching segment on the same combing cylinder, the combing and detaching members are according to this invention arranged each on its own cylinder or the like, which cylinders are coaxial and are operated independently of each other with suitable adjustable speeds. Hereby it is possible to reach a more effective and quicker combing as considerably higher speeds can be given to the combing cylinder. The combing cylinder can be provided with needles of the same size and coarseness suitably arranged around the whole surface of the cylinder. Previously only a certain part of the cylinder surface corresponding to the curve length of the combing segment could be utilized for the combing of each fibre piece, whereas with the present invention the fibre piece will be subjected to a continuous uniform combing of a considerably larger comb surface, namely the surface corresponding to that part of the circumference of the comb cylinder that has time to pass before the detaching segment covers the needles on the combing cylinder.

The detaching segment consists namely, according to the invention of one or more cylindrical surfaces that are parts of a cylinder coaxial with and embracing the combing cylinder, its inner diameter being somewhat greater than the outer diameter of the combing cylinder. The effective comb surface that participates in the combing action will thus be dependent on the speed of the combing cylinder. Said effective comb surface can amount to several times the whole surface of the combing cylinder or only a part thereof depending on the circumstances.

The invention has the following advantages:

The fibre pieces do not need to be completely clean-carded.

The fibre pieces do not need to be thin to be completely combed through. They can be considerably thicker and dirtier than before, whereby a corresponding increase in the production of the machine is reached.

Also longer and dirty fibre slivers as flax, flax tow and even short flax can be effectively clean-combed.

The effect can be regulated by increasing or decreasing the speed.

One form of the invention is by way of example illustrated in the accompanying drawings, in which:—

Figures 1 and 2 show cross-sections through the combing device in two different positions during the combing action.

Figure 3 shows a longitudinal section through the combing and detaching members.

In the drawing, 1 and 2 are the feed rollers that in the known way are rotated intermittently, thereby passing forwards a fibre lap or sliver 3 of a suitable length. The also known movably arranged jaws 4 and 5 will thereupon hold the fibre piece during the combing. The combing action is carried out by needles 7 arranged on the continuously rotating combing cylinder 6. The needles 7 are arranged in rows, suitably around the whole circumference of the cylinder (only a part of them are shown in the drawing). They can all be of the same coarseness. In Figure 1 the fibre piece is shown in position during the combing action.

Concentrically with the combing cylinder 6, there are arranged one or more (in the illustrated example two) cylinder segments 9. Their inner radius is somewhat larger than the radius of the circle that is described by the needle points so that the needles can freely pass inside of the said segments. These segments are rotating in the same direction as the combing cylinder but at a slower speed. The combing action is going on unimpaired as described above until the next following detaching segment (the right one in Figure 1) has rotated so far that its fore end begins to enter between the needles and the fibre piece and remove it outwards from the needles a distance of about the thickness of the segment. As in hitherto known combing machines, there is arranged a detaching roller 10 that is movable in a radial direction against the combing cylin-

der. The heretofore necessary mechanism can be of the same kind as in hitherto known combing machines. Said mechanism is so adapted that, when the sector 9 enters between the fibre piece and the needles, the roller 10 is moved against the segment 9 so that the fore end of the fibre piece is seized between the roller and the segment which during the continued rotation hold the fibre piece and carry it forward. The fibre piece breaks close to the feed rollers 1 and 2. Just before this the jaws 4 and 5 have in the known way been separated from the fibre piece.

11 and 12 are two piecing rollers between which the combed fibre piece 13 is carried further. These rollers are arranged in the known way and are driven by a known reversible mechanism in such a way that the rollers are alternately rotated in opposite directions. In Figure 1 the direction of rotation has just been reversed so that they are feeding back the aft end of the fibre piece. During this motion this end of the fibre piece will be combed ready. After the completion of the combing of the fore end of the fibre piece 3 as described above the roller 10 and the segment 9 carry the same forward so that its fore end will overlap the back end of the previously combed fibre piece, which now has been returned by the rollers 11 and 12, so that an effective joining is the result (see Figure 2). By means of the said mechanism the direction of rotation of the rollers 11 and 12 is then reversed and the fibre pieces are transported further. 14 signifies a top comb of known kind arranged above the path of the fibre piece. When the combing of the fore end of the fibre piece has been completed as described above and the same has been seized by the roller 10 and the segment 9, the comb 14 is lowered by a known mechanism into the path of the fibre piece so that when the latter is carried forward, it is drawn through the needles of the comb 14 and properly treated. However, this top comb 14 may also be omitted and the combing of the aft end of the fibre piece be carried out by the combing cylinder alone when the fibre piece is returned by the rollers 11 and 12 as described above.

Figure 3 shows one way of arranging the combing cylinder and the detaching segments in relation to each other. Each combing machine can be provided with a set of several combing cylinders 6 in alignment with each other. They are attached to the same hollow drum 15 by means of screws 18. Each combing cylinder is suitably made up of two cylinder halves as shown in Figures 1 and 2. The detaching segments 9 are common to all of the combing cylinders of the combing machine as they are extended along the whole machine. They are at each end united and supported by means of cylinders or discs 8. The cylinders or discs 8 are supported by the shafts 17 of the hollow drum 15 that form bearings for the hollow shafts 18 of the discs 8 (see Figure 3). Gear wheels 19 and 20, pulleys or the like are attached to the shaft 17 and 18 respectively. These wheels are driven independently of each other by suitable mechanisms so that the combing cylinders and detaching segments can obtain the desired speeds of rotation independent of each other.

To prevent the deflection of the comparatively long detaching segments 9 it is suggested to arrange loose cylinder rings 21 between neighbouring combing cylinders. These rings are so fitted on the hollow drum 15 that they can be freely turned around the drum. To prevent the tendency of axial motions a circular groove 22 is made around the drum, and the end of one or several screws 23 screwed into the ring 21 protrude into said groove and form guides for the ring. The outer radius of said rings should be slightly less than the inner radius of the detaching segments. By this arrangement the detaching segments are provided with satisfactory supports.

I claim:—

1. Combing machine for the textile industry wherein the combing is effected by means of a rotating combing cylinder provided with needles, characterized therein that there are provided one or several detaching members for the combed fibre piece consisting of rotating cylinder segments that are arranged concentrically with the combing cylinder and have an inner radius somewhat larger than the radius of the circle described by the needle points so that when one of said cylindrical segments passes the fibre piece subjected to combing by the combing cylinder, it removes said fibre piece from the needles and thereupon together with a detaching roller of known kind carries the same further, the said combing cylinder and the said cylinder segments being arranged to be rotated independently of each other.

2. Combing machine for the textile industry wherein the combing is effected by means of a rotating combing cylinder provided with needles, characterized therein that there are provided one or several detaching members for the combed fibre piece consisting of rotating cylinder segments that are arranged concentrically with the combing cylinder and have an inner radius somewhat larger than the radius of the circle described by the needle points so that when one of said cylindrical segments passes the fibre piece subjected to combing by the combing cylinder, it removes said fibre piece from the needles and thereupon together with a detaching roller of known kind carries the same further, the said combing cylinder and the said cylinder segments being arranged to be rotated independ-

ently of each other, whereby the combing cylinder is provided with needles around its whole circumference.

3. Combing machine for the textile industry wherein the combing is effected by means of a rotating combing cylinder provided with needles, characterized therein that there are provided one or several detaching members for the combed fibre piece consisting of rotating cylinder segments that are arranged concentrically with the combing cylinder and have an inner radius somewhat larger than the radius of the circle described by the needle points so that when one of said cylindrical segments passes the fibre piece subjected to combing by the combing cylinder, it removes said fibre piece from the needles and thereupon together with a detaching roller of known kind carries the same further, the said combing cylinder and the said cylinder segments being arranged to be rotated independently of each other, whereby the ends of the cylinder segments are united by means of cylinders or discs provided with hollow shafts that are rotatably supported around the shaft of the combing cylinders, the last named shaft being common to all of the combing cylinders in the same machine.

4. Combing machine for the textile industry wherein the combing is effected by means of a rotating combing cylinder provided with needles, characterized therein that there are provided one or several detaching members for the combed fibre piece consisting of rotating cylinder segments that are arranged concentrically with the combing cylinder and have an inner radius somewhat larger than the radius of the circle described by the needle points so that when one of said cylindrical segments passes the fibre piece subjected to combing by the combing cylinder, it removes said fibre piece from the needles and thereupon together with a detaching roller of known kind carries the same further, the said combing cylinder and the said cylinder segments being arranged to be rotated independently of each other, whereby the ends of the cylinder segments are united by means of cylinders or discs provided with hollow shafts that are rotatably supported around the shaft of the combing cylinders, the last named shaft being common to all of the combing cylinders in the same machine, and the said cylinder segments are extended along the whole combing machine and additionally supported by means of rings loosely arranged around the shaft of the combing cylinders and between the ends of neighbouring combing cylinders, the outer radius of the said rings being slightly less than the corresponding inner radius of the said cylinder segments.

In testimony whereof I have hereunto set my hand.

RUDOLF CONSTANTIN SUNDBERG.