April 25, 1939. T. W. HOLT ET AL 2,155,598

PRODUCTION OF SLIVERS FROM TEXTILE FIBERS

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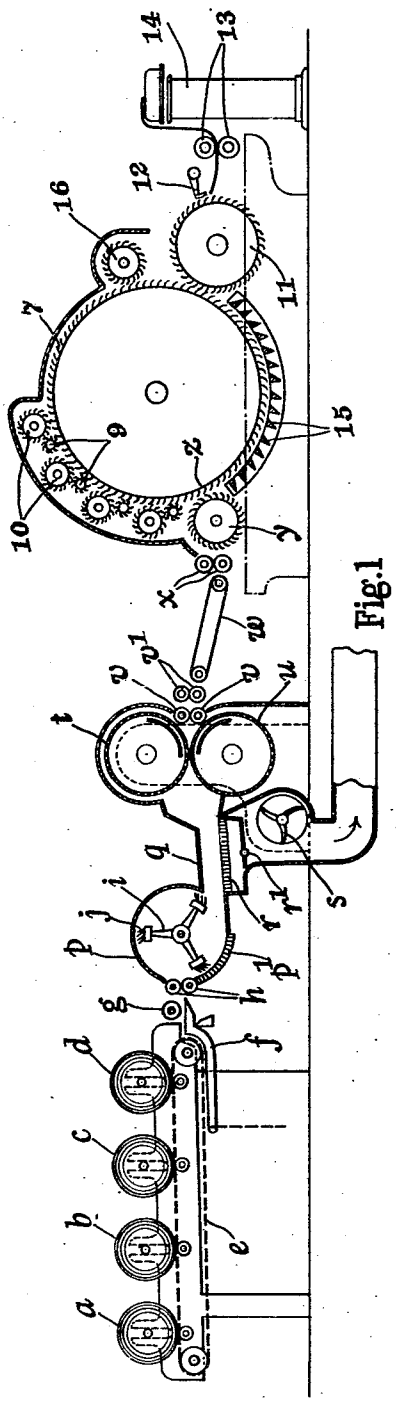


Fig.1

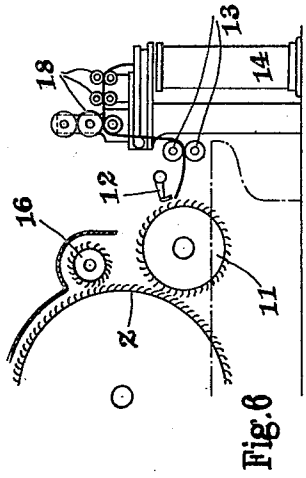


Fig.6

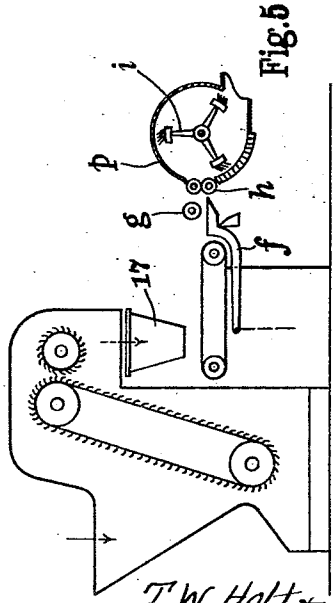


Fig.5

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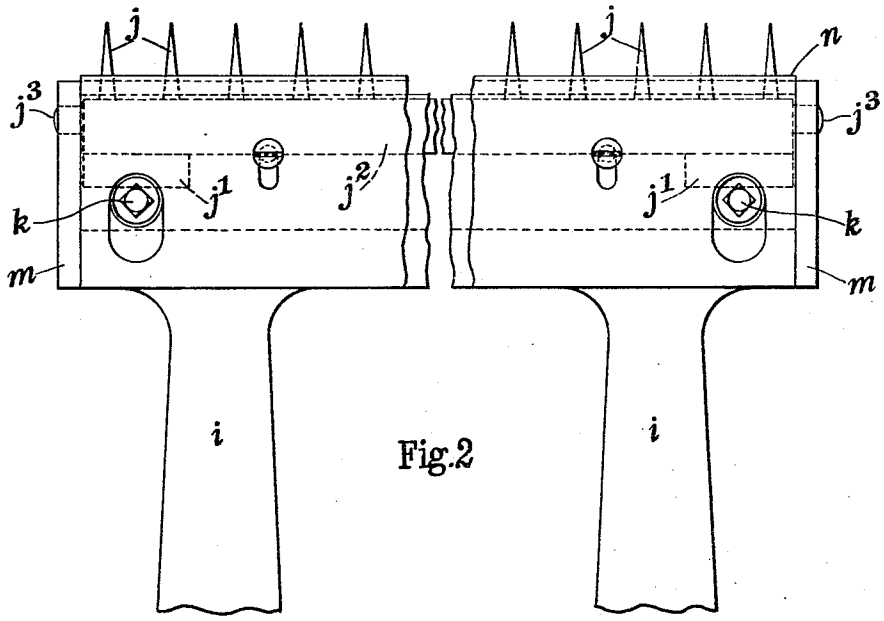


Fig.2

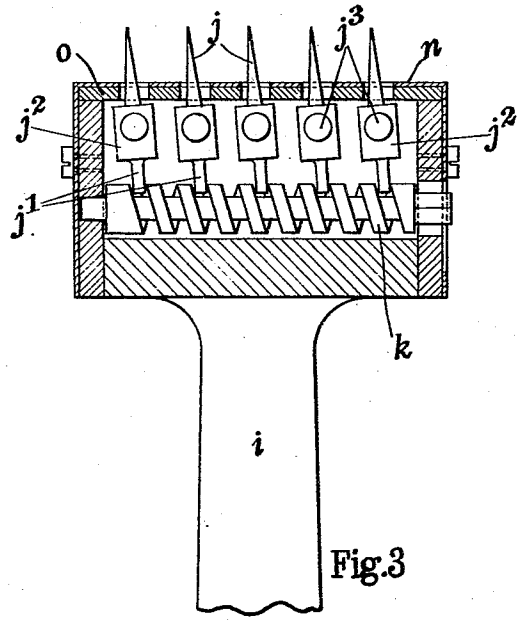


Fig.3

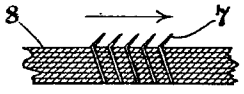


Fig.4

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UNITED STATES PATENT OFFICE

2,155,598

PRODUCTION OF SLIVERS FROM TEXTILE FIBERS

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Application May 22, 1937, Serial No. 144,262
In Great Britain May 29, 1936

3 Claims. (Cl. 19—150)

This invention relates to the treatment of textile fibers with the object of producing slivers of even density in which the fibers are parallel, so that for producing yarn of fine counts a plurality of the slivers can be assembled on a Derby doubler or sliver lap machine and presented to a revolving flat carding machine, with the result that the production capacity of the latter can be increased because the work it has to perform is reduced whilst the quality of the product of such machine is maintained. For the production of yarn of coarse counts, the slivers can be subjected to drafting and the resultant yarn put directly into the spinning creel.

The invention comprises delivering the fibers in a uniform layer upon a conveyor to a beater with teeth of adjustable angle upon its arms, the fibers then passing on to suction cages which extract dust and solid impurities therefrom, the fibers now passing on to a cylinder with short spikes or teeth projecting therefrom which work in conjunction with other rollers with wire teeth to parallelise the fibers, the latter being removed from the cylinder and delivered as a sliver with or without drafting.

The invention further comprises delivering a plurality of laps of fibers of the same or differing qualities to the conveyor controlled by the pedal motion.

The invention further comprises the provision of means for controlling the extent of projection of the teeth as well as the angle of the teeth upon the beater arms.

The invention further comprises the arrangement of drafting rollers between the suction cages and the spiked or toothed cylinder.

The invention further comprises the provision in the path between the beater and the suction cages of a grid to which suction is applied through an adjustable valve to clean the fibers.

Referring to the accompanying explanatory drawings:

Figure 1 is a general view of a combined scutcher-comber constructed and arranged in accordance with this invention.

Figure 2 is a side view and Figure 3 a sectional end view of the adjustable teeth of the Kirschner type opener shown in Figure 1.

Figure 4 is a detail view of the teeth of the card clothing of the cylinder shown in Figure 1.

Figure 5 shows a modified arrangement of the feed end of the machine shown in Figure 1.

Figure 6 shows a modified arrangement of the delivery end of the machine shown in Figure 1.

The laps *a*, *b*, *c*, *d* which may be of the same or different qualities of fibers are fed along the conveyor lattice *e* to a regulating pedal motion comprising weighed pedals *f* and a roller *g*, the combined laps passing between the pedals and roller. The pedals act in the known manner to control the drive to the conveyor lattice *e* so that there is always a substantially uniform thickness of material delivered to the feed rollers *h*, the speed being decreased when the thickness is above and increased when it is below a predetermined amount. The material then passes to the revolving beater *i* having steel teeth *j* at the ends of the arms constituting the beater. The said teeth can have their angularity varied by turning the screws *k* with which engage the projecting ends j^1 of each bar like member j^2 having trunnion like fulcrums j^3 at its ends mounted in plates *m* secured to the beater arm. The teeth *j* project from the bars j^2 through a shield *n* secured to the beater arm. The extent to which the teeth *j* project from the beater arms can be altered by placing different thicknesses of packing *o* between the shield *n* and the end of the beater arm.

The rotation of the beater causes the teeth to straighten out the fibers fed to the casing *p* by the rollers *h*. In addition the beaters set up an air current along the duct *q* which has a dust grid *r*, the bars of which may be of adjustable angle, at its lower side to which suction may be applied by the fan impeller *s* through the butterfly valve r^1 when this is opened. There is a grid or mote knives at p^1 in the casing *p* by which dust and heavy impurities are discharged from the fibers within the casing.

The fibers leaving the duct *q* are received by the revolving perforated cages *t*, *u*, to the interiors of which suction is applied so that the fibers on the cages are subjected to a vacuum cleaning action. The fibers in lap form pass from the cages to the delivery rollers *v* and the conveyor *w* by which the lap is fed to the feed rollers *x*, and licker-in *y* of a cylinder *z* which has short teeth 7 projecting therefrom, the said teeth being without any knee or bend in the part which projects from the laminated material 8 in which they are embedded as shown in Figure 4. The shortness of the teeth (say about 5/64 of an inch) prevents material being retained at the base of the teeth so that it is all removed by the doffer 11. The teeth are less in number per square inch (say about 60 to 80 per square inch) than usual and are rectangular in section and strong. The cylinder *z* runs at a high speed (say 220 R. P. M.) so that a quick carding action

is obtained. Around the revolving cylinder *z* are disposed the working rollers 9 which comb out the fibers upon the cylinder, and in association with the working rollers are clearer rollers 10 which have coarse wire clothing thereon and which return the fibers to the cylinder *z*.

We may provide two pairs of delivery rollers *v*, v^1 through which the lap from the cages *t*, *u* passes so that by rotating the rollers v^1 at a higher speed than the rollers *v*, the lap can be drafted.

The lap of fiber upon the cylinder *z* is acted on by the wire toothed roller 16 which loosens the fibers from the teeth 7 and then the lap passes on to the doffing roller 11 and is stripped therefrom by the vibrating stripping blade 12. The lap is then drawn in to form a sliver, passes between the rolls 13 and into the coiler can 14. There are hinged mote knives 15 below the cylinder *z*.

The machine illustrated cleans and parallelises the fibers and produces a sliver of good uniform quality.

Instead of feeding a lap or plurality of laps to the pedal motion at the feed end of the machines shown, we may feed the fibers to the creeper conveyor *e* by means of an automatic hopper feeder as shown diagrammatically in Figure 5, the feed to the conveyor being controlled automatically by the weighing hopper 17. In this case the pedal motion for controlling the conveyor *e* may be dispensed with as the thickness of the lap of fibers is automatically controlled by the feeder.

The cylinder *z* may be divided circumferentially into sections, each section delivering a separate fleece for formation into a separate sliver.

The slivers from the coiler may be assembled in a Derby doubler and fed to a revolving flat carding machine which can be speeded up beyond what is usual because the fibers have already been parallelised. This process is employed when fine yarns are to be spun. For coarse yarns the sliver may be passed through drafting rollers 18 as shown in Figure 6 before entering the coiling can 14. Thereafter it can be passed through a drawing frame with four lines of rollers, wound into bobbins and taken directly to the spinning creel. By the use of our invention, we can when dealing with coarse counts, say up to 20 counts, cut out two heads of drawing frames and slubbing, intermediate and roving frames, as the bobbins go directly into the ring spinning frame or mule. In the case of fine counts, up to 50's, the sliver from the flat carding machine is transferred to a coarse roving frame, where from sliver up to five hank roving (that is a roving of five times eight hundred and forty yards to the pound) can be produced to go into the creel of the ring spinning frame or mule.

What we claim is:

1. Apparatus for the production of slivers of textile fibers of a high degree of uniformity, comprising in combination a revolving arm type beater, teeth on the ends of said arms, means for adjusting the angle of setting of said teeth relatively to the plane of rotation of said arms, means for varying the extent of projection of said teeth from the ends of said arms, a conveyor to feed textile fibers in a uniform layer to said beater, suction cages disposed to receive said fibers on passing from said beater, drafting rollers to act on the said fibers after passing between said suction cages, means to feed the fibers passing from said drafting rollers directly in layer form to a carding machine, said carding machine comprising a rotary cylinder, short, straight spikes projecting therefrom and rollers with wire teeth co-operating with said cylinder, and means to form the fibers passing from said carding machine into a sliver.

2. Apparatus as claimed in claim 1 comprising also means to deliver a plurality of laps of textile fibers to the conveyor feeding the beater.

3. Apparatus as claimed in claim 1, comprising also a substantially horizontal grid disposed between the beater and the suction cages over which the textile fibers are arranged to pass, means to apply downward suction through said grid and means to control the intensity of said suction.

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