Nov. 15, 1938. J. MONFORTS ET AL 2,137,093

OPENING AND CLEANING OF TEXTILE FIBERS

Filed Sept. 22, 1937

Fig. 1.

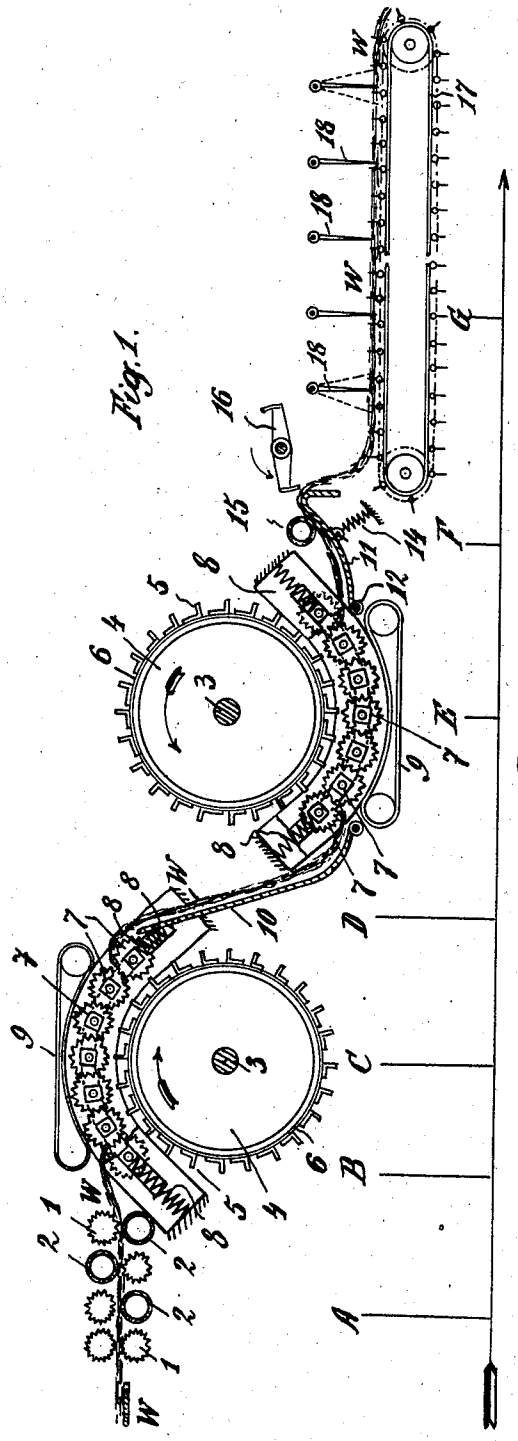
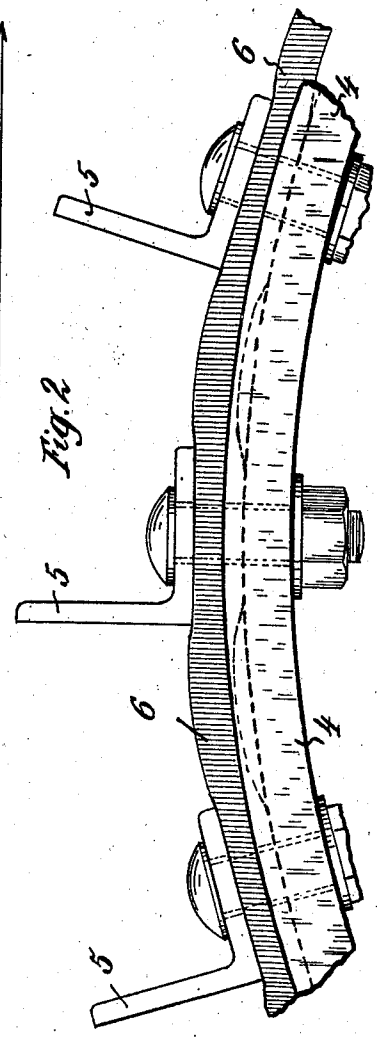


Fig. 2



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Patented Nov. 15, 1938 2,137,093

UNITED STATES PATENT OFFICE

2,137,093

OPENING AND CLEANING OF TEXTILE FIBERS

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Application September 22, 1937, Serial No. 165,028
In Germany October 2, 1936

6 Claims. (Cl. 19—30)

The invention relates to the opening and cleaning of textile fibers in the form of tow, ground straw and the like, its object being to effect the treatment with a minimum of waste and a minimum of damage to the fiber.

The invention consists in subjecting the fiber in the form of a band or lap to a series of known operations, namely breaking, condensing, zig-zag passage through a series of ribbed rolls with simultaneous action of a ribbed drum on the lap, attenuation of the lap, a second zig-zag passage through a series of ribbed rolls; with a ribbed drum acting on the lap, a second attenuation of the lap, and finally beater action, all these operations, insofar as they involve pressure on the lap, being performed by means of elastically mounted appliances or with the lap resting on an elastically mounted support.

An example of apparatus according to the invention is shown in the accompanying drawing, in which

Fig. 1 is a longitudinal section thereof, and

Fig. 2 is an elevation, to a much larger scale, of a portion of one of the appliances.

The drawing illustrates the treatment of a wide band W of tow, which passes through successive stages marked by the letters A to G in Fig. 1.

At A there is a series of breaking rolls 1, 2, the rolls 1 having teeth or spikes, and being driven, and the rolls 2 being of rubber, and not being driven. The fiber at this stage is still very rough, and it is fed in in the form of a fairly thin band. At B the band or lap is condensed, due to a reduction in the rate at which it travels through the next stage C.

For the treatment at C there is a driven shaft 3 having thereon a drum 4 with longitudinal ribs 5 consisting of L-bars resting upon elastic rings or belts 6 of rubber or equivalent material surrounding the drum. Instead of using a cylinder the drum may consist only of two discs or heads with the belts 6 thereon, supporting the ends of the bars. Around a portion of the circumference of the drum there is an arcuate series of longitudinally ribbed rolls 7, the bearings of which are slidable in arcuate guideways 7a, the rolls being however normally held in mesh with each other by coiled springs 8 acting on the bearings of the rolls at the ends of the series. Outside the arcuate series of rolls 7 there is an endless travelling apron 9.

The lap condensed at B is gripped by the rolls 7 and takes a zig-zag course through the series. In the course of its travel it is repeatedly acted on by the ribs 5, which sweep away particles of wood coming to the surface of the lap. As the ribs 5 rest on elastic beds, and the rolls 7 are able to yield elastically, both forwards and rearwards, the lap can be pressed firmly against the ribs without risk of damage to the machine or to the fiber.

After leaving the last roll 7 the lap travels at D down an inclined plate 10, on which it undergoes some attenuation or stretching for the purpose of straightening out knots, if present, the stretch being due to the higher velocity at which the lap travels through the next stage E. The appliances at this stage E are precisely similar to these at stage C, except that the rolls 7 are below the drum, instead of above it.

From the second series of rolls 7 the lap is fed on to a curved plate 11, which is hinged at 12 and rests upon a coiled spring 14. A driven roller 13 bears on the lap travelling on the plate, and is driven at a speed whereby some further attenuation is effected.

The delivery end of the plate 11, where the lap leaves it to enter upon stage G, is downwardly curved, and at this part a rotary beater 16 acts on the lap, opening it and drawing out the longer fibers. Damage to the fibers is prevented by the elastic mounting of the plate 11.

The lap drops from the plate 11 on to a spiked conveyor 17 whereby it is fed out of the machine, and while travelling thereon it is acted on by a series of rakes 18 suspended from pivots above the conveyor.

What we claim as our invention and desire to secure by Letters Patent of the United States is:—

1. The process of opening and cleaning a band of textile fibers, consisting in feeding the band through a breaker, condensing the lap delivered by the breaker, passing the lap in a zig-zag course through a series of elastically mounted ribbed rolls and simultaneously subjecting it to the action of elastically supported beaters, attenuating the lap, passing it through another series of elastically mounted ribbed rolls and simultaneously subjecting it to the action of elastically supported beaters, again attenuating it, and then subjecting it while elastically supported to beater action.

2. In a machine for opening and cleaning a lap of textile fibers, a series of rotary fiber treating elements, arcuate guideways supporting said fiber treating elements in an arcuate group, said fiber treating elements being free to move relative to each other along said guideways, means resiliently pressing said elements together, and a ro-

tary beater mounted coaxially with said group and having beating members adapted to strike the fibers passing through said series of fiber treating elements.

3. In a machine for opening and cleaning a lap of textile fibers, a series of rotary fiber treating elements, arcuate guideways supporting said fiber treating elements in an arcuate group, said fiber treating elements being free to move relative to each other along said guideways, means resiliently pressing said elements together, and a rotary beater mounted coaxially with said group and having elastically supported beating members adapted to strike the fibers passing through said series of fiber treating elements.

4. In a machine for opening and cleaning textile fibers, two scutching units, each comprising a series of rotary fiber treating elements, arcuate guideways supporting said fiber treating elements in an arcuate group, said fiber treating elements being free to move relative to each other along said guideways, means resiliently pressing said elements together, a rotary beater mounted coaxially with said group and having beating members adapted to strike the fibers passing through said series of fiber treating elements, and an apron between said units over which the lap is stretched between said units.

5. In a machine for opening and cleaning a lap of textile fibers, a series of rotary fiber treating elements, arcuate guideways supporting said fiber treating elements in an arcuate group, said fiber treating elements being free to move relative to each other along said guideways, means resiliently pressing said elements together, a rotary beater mounted coaxially with said group and having beating members adapted to strike the fibers passing through said series of fiber treating elements, a yieldably supported plate over which the lap travels from said rotary beater, and a driven roll mounted so as to press the lap against said plate to draw the lap out.

6. In a machine for opening and cleaning a lap of textile fibers, a series of rotary fiber treating elements, arcuate guideways supporting said fiber treating elements in an arcuate group, said fiber treating elements being free to move relative to each other along said guideways, means resiliently pressing said elements together, a rotary beater mounted coaxially with said group and having beating members adapted to strike the fibers passing through said series of fiber treating elements, a yieldably supported plate over which the lap travels from said rotary beater, a driven roll mounted so as to press the lap against said plate to draw the lap out, and a beater mounted to beat the lap against said plate.

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