Aug. 7, 1934. P. M. STRANG 1,968,860

FIBER CLEANING MACHINE

Filed March 12, 1932

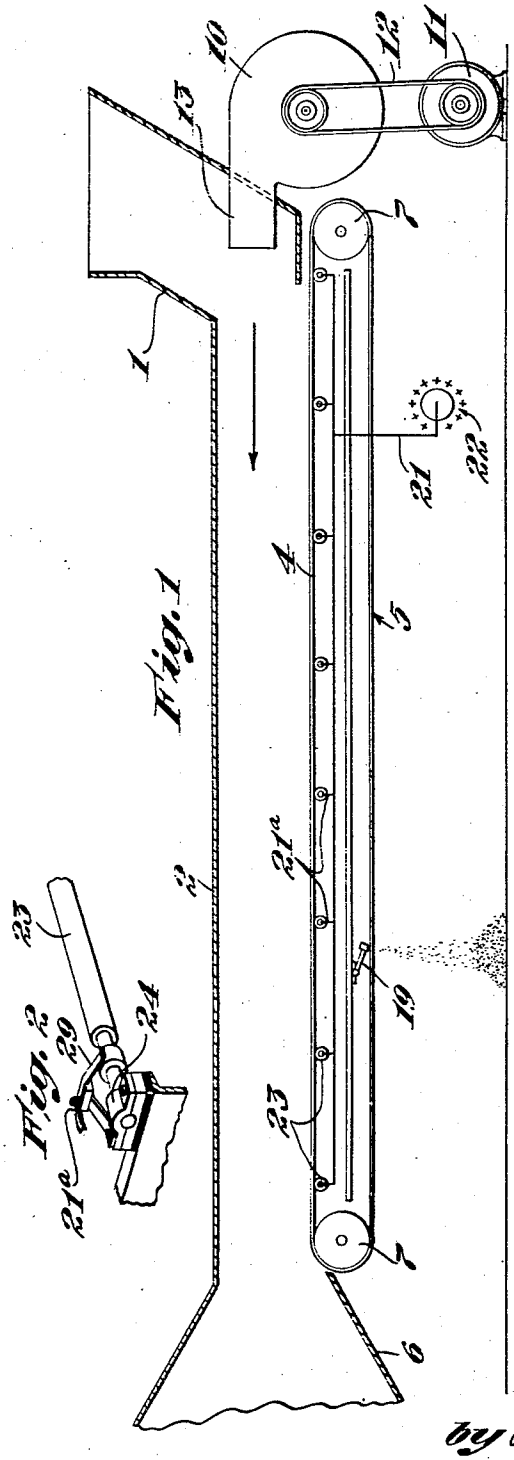


Fig. 1

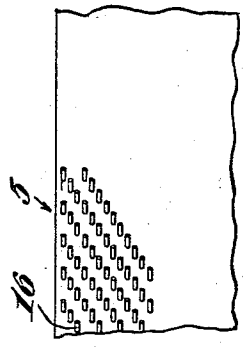


Fig. 5

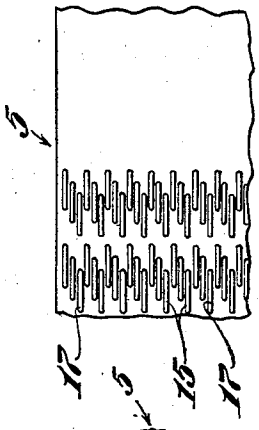


Fig. 4

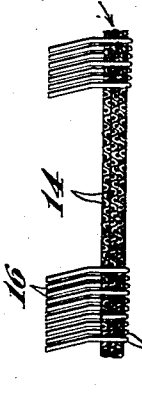


Fig. 3

Fig. 2

Inventor
Peter M. Strang
by Roberts Cushman & Woodberry,
Att'ys.

Patented Aug. 7, 1934

1,968,860

UNITED STATES PATENT OFFICE

1,968,860

FIBER CLEANING MACHINE

Peter M. Strang, Washington, D. C.

Application March 12, 1932, Serial No. 598,455

6 Claims. (Cl. 19—35)

This invention relates to improved apparatus for treating entangled fibrous material such for example, as cotton, and more particularly the present invention affords improved mechanism to facilitate the opening up and cleaning of fibrous material of this character preparatory to spinning or subsequent cleaning operations. My prior application, No. 575,495, filed November 16, 1931, relates in general to a method and apparatus for treating fibers of this type by electricity. The present invention affords a further development of and improvement upon the principles set forth in the prior application and particularly facilitates the treatment of a continuous stream of cotton received, for example, from the bale breakers or the like. Heretofore mechanical arrangements such as pickers and carding machines have been primarily depended upon for the treating of the cotton fiber which is received from the bale breaker in a closely entangled, irregularly lumped condition and which is suitably opened up by the pickers and further opened and straightened by the carding machines to permit the fibers to lie more or less in parallelism and to be ready for the spinning operation. During these operations, and particularly during the carding operation, much foreign matter, such as sand, vegetable particles and the like are separated from the fibrous material so that it is rendered relatively clean. The present invention affords a machine to receive a continuous stream of entangled, irregularly bunched fibrous material such as cotton received from a bale breaker upon a suitable moving surface, preferably in the form of a belt conveyor which is provided with an electrical charge or charges to cause a relative straightening of the fibers and to separate them from their closely entangled condition. This arrangement permits the irregularly bunched and closely entangled fibers to distribute themselves in a much more uniform condition with a preponderant direction of extent which may be vertical to the surface of the conveyor belt. The belt itself preferably is provided with means to effect the proper electrical treatment of the fibers and for this purpose it may have numerous metallic points at which the electrical charges tend to concentrate. For example, card clothing is advantageous for this purpose since it comprises a plurality of staple-like metallic elements with outstanding points that are adapted to engage the fibrous material and thus aid the physical movement of the fibers through the machine while also affording numerous points of concentration for the electrical charges. Due to the comb-like action of the outstanding prongs afforded by such card cloth there is a tendency to effect mechanical cleaning of the fibrous material so that bodies of foreign material such as sand are loosened therefrom. The electrical treatment of the fibers causes their disengagement and aids this loosening effect, so that the foreign material falls to the belt between the outstanding prongs and may pass to a region where means is provided to clean the belt, the cotton continuing to a suitable outlet duct. In the accompanying drawing:

Fig. 1 is a diagrammatic view partly in side elevation and partly in section showing a typical embodiment of my invention;

Fig. 2 is an elevational detail showing the arrangement of one of the means employed for conducting the electrical charge to the conveyor belt;

Fig. 3 is a section through the belt; and

Figs. 4 and 5 are elevational details of opposite faces of the belt.

In the accompanying drawing, the numeral 1 designates a hopper which may receive fibrous material, such as cotton from any suitable source, for example a bale breaker. The lower end of the hopper 1 is connected to an elongate horizontal duct 2, whose floor may be formed in whole or in part by the upper run 4 of a conveyor belt 5 which is so disposed that cotton received from the hopper may pass downwardly into the region of the upper run of the belt. The belt is supported upon any suitable insulated or insulating rollers 7, at opposite ends of the duct 2, one or both of these rollers being driven by suitable means, not shown. Below the hopper 1 is a blower 10 driven by an electric motor 11 by means of the belt 12 and having an outlet pipe 13 venting air at high velocity into the duct 2. Thus cotton falling through the hopper 1 is picked up by the air received from the outlet pipe 13 of the blower and is distributed over a wide area of the duct 2, tending however to fall to the region of the run 4 of belt 5. The duct 2 is provided with a flared extension 6 which affords an outlet adjoining the end of the belt, the lower edge of this outlet being juxtaposed to the belt as it passes over the adjoining roller 7.

The belt 5 may conveniently be made of card clothing which is illustrated more particularly in Figs. 3, 4, and 5, and comprises a plurality of layers of textile fabric 14 with metallic staple

elements 15 penetrating the textile layers. Each of the elements 15 preferably is provided with a pair of points 16 which are formed at the extremities of the prong portions of opposite legs of a staple, these legs being connected by a metallic bight portion 17 which is disposed upon the inner surface of the belt, i. e. the surface that contacts rollers 7. Adjoining the lower run of the belt 5 a vibratory hammer 19 may be driven by any suitable means in order to impart rapid vibratory movements to the lower run of the belt to loosen dirt and foreign matter which has collected between the ends of the staples 15.

A conducting lead 21 may be connected to a static electrode 22 to which high voltage electricity is supplied, this lead also having branches 21^a connected to a plurality of metallic rollers 23 which underlie the upper run 4 of belt 5. These rollers are mounted upon insulated bearings 24 and are connected to the branches 21^a by brush elements 29 as shown in Fig. 2.

In the operation of a machine of this character, the blower 10 is operated to supply a blast of air to the duct 2, and cotton or the like is fed through the hopper 1 to the duct 2 where it is picked up by the blast of air and is deposited upon the run 4 of belt 5. The run 4 is driven in the direction of the air blast, i. e. toward the outlet extension 6 of the duct, and electrical charges are constantly received from the rollers 23 by the bight portions 17 of staples 15 which contact with the charged rollers as the inner face of the belt passes over the same. The charges tend particularly to collect at the points of the outstanding legs 16 of the staples, thus affording regions of relatively high concentration of electricity at numerous closely spaced points. Accordingly, the cotton fibers are subjected to the electrical charge and tend to separate and straighten out so that their original closely entangled relationship is materially loosened, and so that foreign materials caught in the entangled fibers may fall away from the same. Such materials normally become trapped between the prongs 16 of the belt 5 upon its outer face and remain on the surface of the belt as the latter moves toward the discharge end of the machine and passes downwardly about the adjoining roller 7. Since the lower edge of the extension 6 of the duct 2 is spaced closely adjoining the belt, the cleaned cotton moves off of the belt and passes outwardly, being aided in this movement by the air blast. The belt then passes to the region of the vibratory member 19 which vibrates the belt so that foreign particles collecting upon its outer surface readily fall from between the prongs 16 to the floor or any suitable receiving receptacle. Cotton fibers or the like treated in a machine of this character are thus supplied to its discharge end 6 in a loosened and a substantially straightened condition, having been cleaned due to the mechanical separating action afforded by the prongs 16 and due to the natural loosening of the fibers under the electric charge.

I claim:

1. A machine of the class described comprising a duct, a belt having an upper run forming the floor of the duct, said belt including metallic means capable of receiving an electrical charge, means for supplying fibrous material to one end of the duct and for receiving fibrous material discharged from the other end of the duct, and means to supply an electrical charge to said metallic means, the side and upper walls of the duct being fixed and free from electrical connection with the belt and the electrode.

2. A machine of the class described comprising a duct, a belt having an upper run forming the floor of the duct, said belt including metallic means capable of receiving an electrical charge, means for supplying fibrous material to one end of the duct and for receiving fibrous material discharged from the other end of the duct, means to supply an electrical charge to said metallic means, and blast inducing mechanism to direct a pneumatic blast through the duct in the direction of the belt movement.

3. A machine of the class described comprising a duct, a belt having an upper run forming the floor of the duct, said belt including metallic means capable of receiving an electrical charge, means for supplying fibrous material to one end of the duct and for receiving fibrous material discharged from the other end of the duct, and means to supply an electrical charge to said metallic means, said metallic means being in the form of numerous metallic elements having end portions projecting from the belt to afford regions of electrical concentration.

4. A machine of the class described comprising a duct, a belt having an upper run forming the floor of the duct, said belt including metallic means capable of receiving an electrical charge, means for supplying fibrous material to one end of the duct and for receiving fibrous material discharged from the other end of the duct, means to supply a high potential electrical charge to said metallic means, said metallic means being in the form of numerous metallic elements having prongs projecting from the belt to afford regions of electrical concentration, and means imparting vibratory movement to another run of the belt to effect loosening of foreign matter that has collected between the prongs.

5. A machine of the class described comprising a duct, a belt having an upper run forming the floor of the duct, said belt including metallic means capable of receiving an electrical charge, means for supplying fibrous material to one end of the duct, said belt being formed of card clothing, and the metallic means consisting of staples having bight portions upon the inner face of the belt and having outstanding legs affording prongs on the outside of the belt, said bight portions being contactible with conducting elements which receive electricity.

6. A machine of the class described comprising a duct, a belt having an upper run forming the floor of the duct, said belt including metallic means capable of receiving an electrical charge, means for supplying fibrous material to one end of the duct and for receiving fibrous material discharged from the other end of the duct, and means to supply a high potential electrical charge to said metallic means, metallic rollers disposed beneath the upper run of said belt and contacting the metallic means, said rollers being connected to a source of electricity.

PETER M. STRANG.