Feb. 24, 1942. L. P. MILLER 2,274,425

METHOD OF MAKING SLIVERS

Filed June 12, 1940 2 Sheets-Sheet 1

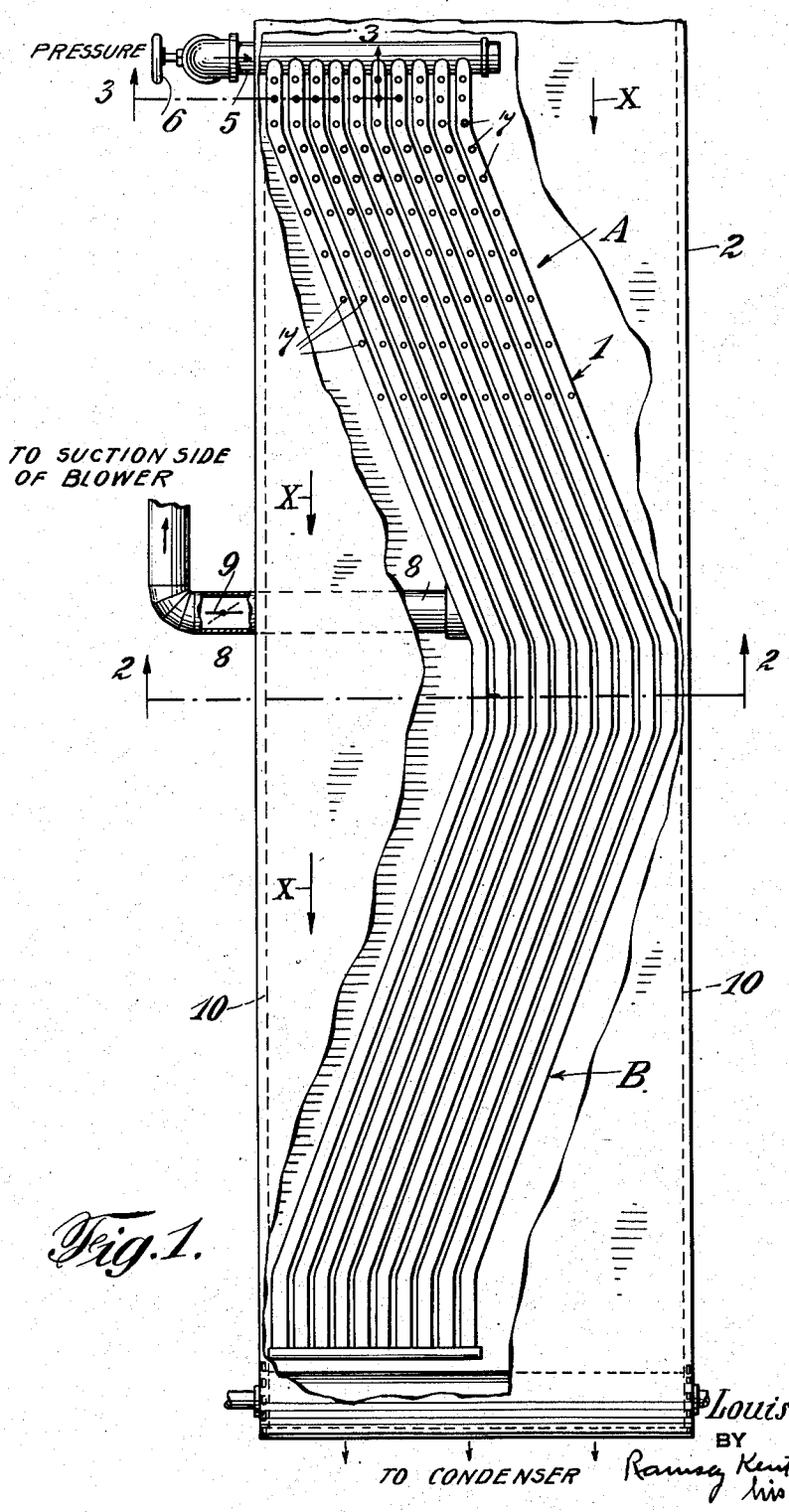


Fig. 1.

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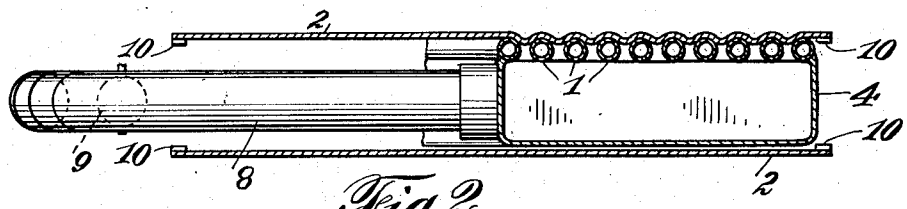


Fig. 2.

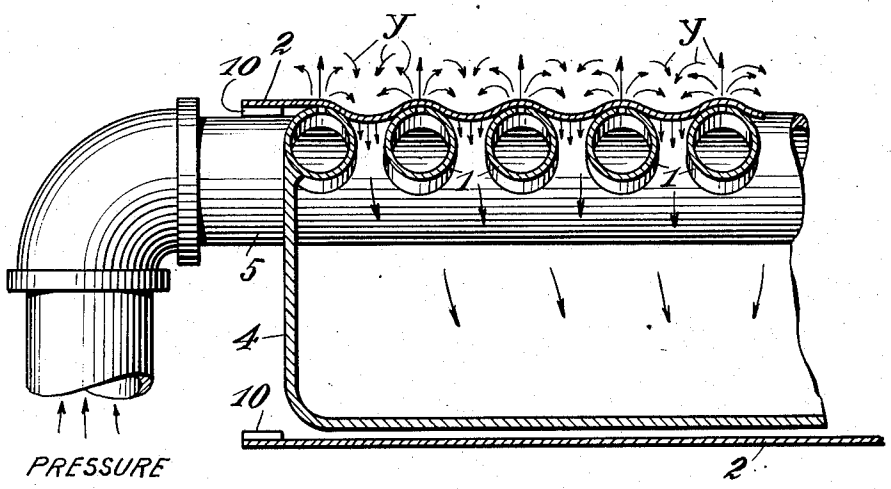


Fig. 3.

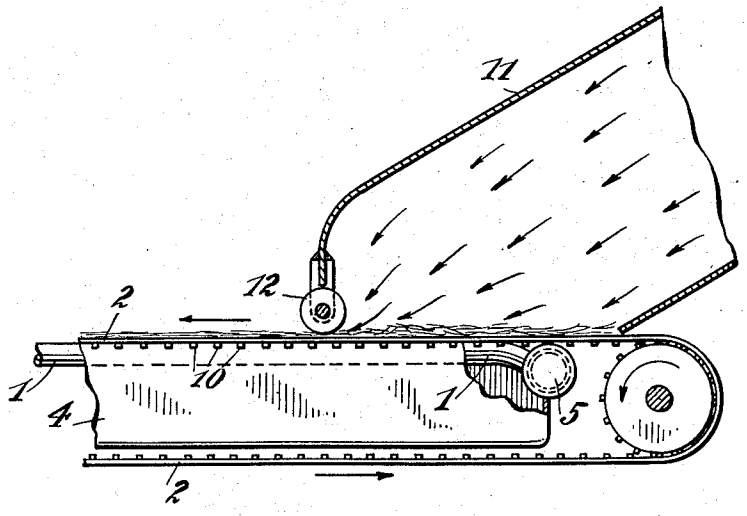


Fig. 4.

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UNITED STATES PATENT OFFICE

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METHOD OF MAKING SLIVERS

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Application June 12, 1940, Serial No. 340,049

13 Claims. (Cl. 19—150)

The present invention relates broadly to textiles and more especialy to a method for making slivers.

The method of the present invention may be carried out in many ways, one of which may comprise the novel mechanism herein disclosed in the form of a plurality of slots angularly disposed to the travel of a porous belt which is pulled down against the slots by suction in such manner as to cause air currents to pass through the belt and into the slots as the belt is moved longitudinally over the slots.

The slots may be made by means of a grate or grid of tubes over which the conveyor belt is moved so as to slide on the upper portions of the tubes. These tubes may extend angularly in one direction and then in the other beneath the upper travel of the belt. The angular direction of the slots relative to the movement of the belt causes a rolling action to the material. It is also desirable in some cases to provide the forward portion of the tops of the tubes with small openings and to supply the tubes with compressed air so that there is a small blast of air blowing upwardly through the porous belt as it passes over the top portion of the tubes at the forward ends thereof and there is a downward current of air of greater volume passing through the porous belt as to that portion which extends over the spaces between the tubes. Flat bars may be used as a grid table, or round tubes may be used to form the suction grid table. Where tubes are used, the tubes being round in form cause the belt to assume a corrugated appearance which produces troughs in which the longitudinally extending loose masses of textile material collect. The suction beneath the belt and the sloping sides of the valleys formed in the belt further facilitate the rolling action produced on the loosely formed material by the angularity of the valleys to the travel of the belt.

Where the belt has travelled a distance of a few feet over the grid of pipes, as previously described, with the suction beneath the pipes and the compression within the pipes, the material is sufficiently compacted to leave the machine in the form of distinct, definite slivers formed in the valleys of the upper travel of the belt. As the belt progresses over the angularly disposed slots, there is a tendency of the upper travel of the belt to carry the material against the side of the corrugation toward which the belt is moving. This tends to free the pores of the belt on the other side from the mass of material and thus, the suction on the low side becomes more effective than that on the high side of the corrugation and this action tends to promote the rolling or turning motion which occurs in the loose mass of material as the belt progresses lengthwise of the machine.

It is to be understood that the degree of suction, or negative pressure, maintained beneath the belt shall be such as not to interfere with the relatively free movement of the fiber in the several valleys of the corrugations formed in the belt but shall be sufficient to cause the fibers to remain in the valleys and to rotate or roll as described. This amount of suction is dependent somewhat on the character of the fiber used and the size of the sliver being made. The degree of suction desired may easily be determined by observing the action of the fibers as the machine is operated.

More specific description of an apparatus for carrying out the present invention will now be set forth in the following specific specification by reference to the accompanying drawings throughout which like parts are indicated by like characters.

The drawings are diagrammatic in view of the fact that the details will be apparent to one skilled in the art and while the drawings illustrate the preferred form of apparatus, it is to be understood that the disclosure is not to be considered in the limiting sense.

Fig. 1 is a plan view of the top of the suction table showing the conveyor belt broken away over the table.

Fig. 2 is a cross-section on line 2—2 of Fig. 1.

Fig. 3 is an enlarged cross-section on line 3—3 of Fig. 1.

Fig. 4 is a diagrammatic illustration showing a hood as one method of feeding material to the apparatus.

Referring now to the drawings and more especially to Fig. 1, a grid or bed of pipes 1 is arranged beneath a porous conveyor belt 2 which is driven by suitable mechanism, not shown, in such manner that the upper run of the belt is in the direction of the arrows X. The pipes 1 are spaced apart in order to provide slots through which air may be drawn downwardly by suction through the porous belt 2. A casing 4 is secured to the outside pipes as indicated in Figs. 2 and 3 in such manner as to form a suction box, the top of which is the pipes 1. Preferably, the pipes 1 are angularly disposed first in one direction and then in the other direction. It is to be understood, however, that the mechanism is fully operative even when the pipes are extended diag-

onally in one direction only beneath the conveyor belt 2. Preferably, the pipes 1 are closed at one end and are connected at the other end with a header pipe 5, which header is connected with a source of air pressure by a pipe containing a control valve 6. The upper or top portions of the forward part of the pipes are preferably provided with small openings 7 through which compressed air within the pipes may blow upward through the porous conveyor belt 2 which slides on the upper surface of the pipes. The connecting pipe 8 connected to the casing 4 leads to some air handling mechanism capable of producing suction or negative pressure so as to maintain a partial vacuum within the suction box 4, and may be provided with a damper, or air valve 9 to regulate the degree of negative pressure in the suction box 4.

The edges of the porous conveyor belt 2 preferably are provided with drive chains 10 which may cooperate with suitable drive sprockets in order that the belt 2 may be properly driven over the grid of pipes 1.

The material to be treated may be fed upon the belt 2 either as a lap or batt, or it may be in the form of loose fibers which are floated through the air by means of a picker cylinder or other suitable mechanism tending to disperse the fibers in the air and permit the fibers to settle gently, as a very loose mass, on the conveyor belt 2 as indicated in Fig. 4. In this construction, preferably, the forward end of the belt 1 is covered by a hood 11 and the forward edge may terminate in a roller 12 which is located closely adjacent to the upper run of the conveyor belt 2.

In the operation of the device, the air currents are generally in accordance with the arrows Y as indicated in Fig. 3. It will be observed that as the material is carried forward over the angular zone A of the pipe grid that there is a tendency to rotate the material clockwise and that as the material is carried over the angular zone B, there is a tendency to rotate the material counter-clockwise as the construction is illustrated in Fig. 1.

The rolling or turning action produced on the material is not so much to produce a twist in the finished product as it is to compact the fibers together and the reverse movement through the zone B is not so much for the purpose of untwisting the fibers that have passed the zone A as it is to continue the orientation of the fibers and the compacting of the loose fibers into a sufficiently compact mass to comprise a sliver which may be handled as such for further treatment in the textile art. If a more compact sliver is desired than that which issues from this machine, the sliver may be fed to suitable condensers where the mass is further compacted.

Since the machine for carrying out the method herein described is illustrated diagrammatically, the various drives for the movable parts have been omitted in order not to complicate the showing in view of the fact that such drives will be obvious to those skilled in the art.

This machine is claimed in my divisional application Serial No. 394,396 filed May 21, 1941.

What I claim is:

1. The method of forming slivers solely from loose textile fibers comprising the following steps forming said fibers into uncompacted elongated masses, moving the masses lengthwise and rotating the same while lying free on a sole underneath support to orient the major portion of the fibers in the general direction of the axis of the elongated masses, applying pressure to the masses transversely of their lengths to compact the same into slivers, and supporting said masses continuously at all times from the beginning of said steps to the end thereof.

2. The method of forming slivers solely from loose textile fibers comprising forming said fibers into uncompacted elongated masses, moving the masses lengthwise to orient the major portion of the fibers in the general direction of the axis of the elongated masses, and supporting said masses and causing currents of air to pass transversely through said masses to compact the same into slivers.

3. The method of making slivers from rabbit fur or the like comprising separating a heterogeneous mass of fibers into elongated uncompacted masses by currents of air applied to said masses, causing each of said elongated masses to be subjected to a rolling motion to tend to orient the fibers and cause the major portion of the same to extend in the general direction of the axes of the elongated masses, and applying pressure to the elongated masses during the rolling action.

4. The method of making slivers from a lap of rabbit fur or the like comprising separating said lap into elongated uncompacted masses, causing each of said elongated masses to be subjected to a rolling motion to tend to orient the fibers and cause the major portion of the same to extend in the general direction of the axes of the elongated masses, and applying fluid pressure to the elongated masses during the rolling action.

5. The method of making slivers from textile fibers comprising separating a portion of a heterogenous mass of fibers into an elongated mass, subjecting the elongated mass to a rolling action while under a fluid pressure sufficient to compact the fibers into a loosely interwoven elongated mass of substantially uniform thickness comprising a sliver.

6. The method of making slivers from textile fibers comprising separating a portion of a heterogeneous mass of fibers into an elongated mass, supporting said elongated mass upon a moving porous member, subjecting the elongated mass to a rolling action while causing air to flow through said elongated mass and said porous member to compact the fibers into a loosely interwoven elongated mass of substantially uniform thickness comprising a sliver.

7. The method of producing slivers from rabbit fur or the like comprising arranging a heterogeneous mass of fibers into an elongated mass, supporting said elongated mass upon a travelling porous member, producing a suction to establish a negative air pressure on the opposite side of said porous member from said elongated fiber mass, causing said elongated fiber mass to roll on said support to rotate and orient the majority of fibers of said elongated mass while the same is being subjected to positive air pressure produced by said suction to compact said fibers into a sliver.

8. The method of producing slivers from a lap of rabbit fur or the like comprising arranging said lap into an elongated mass, supporting said elongated mass upon a travelling porous member, producing a suction to establish a negative air pressure on the opposite side of said porous member from said elongated fiber mass to cause air to flow through said elongated mass, rolling said elongated mass on said support to rotate and orient the majority of fibers of said elongated mass while the same is being subjected to posi-

tive air pressure produced by said suction to compact said fibers into a sliver.

9. The methcd of producing a sliver from a heterogeneous mass of textile fibers comprising separating said heterogeneous mass into an elongated mass of fibers, subjecting said elongated mass of fibers to a compacting force comprising currents of air operating at substantially right angles to the axis of said elongated mass, moving said mass on an inclined surface thereby causing a rotation of said fibers due to the application of said force to compact said fibers into a sliver with a majority of the fibers extending lengthwise of said sliver.

10. The method of producing a sliver from a lap of textile fibers comprising separating said lap into an elongated mass of fibers, moving said elongated mass in the direction of its axis, subjecting said mass of fibers to a compacting force comprising a current of air operating at substantially right angles to the axis of said mass, causing a rotation of said fibers due to the application of said force to compact said fibers into a sliver with a majority of the fibers extending lengthwise of said sliver.

11. The method of producing slivers from a heterogeneous mass of textile fibers comprising separating said heterogeneous mass into a plurality of elongated masses, causing said elonggated masses to move in the direction of their axes toward a surface inclined relative to the direction of movement of said masses, and subjecting said elongated masses to compacting and rotating forces delivered at substantially right angles to the axis of said masses while the same is freely supported to produce a rolling motion adapted to compact said elongated masses into slivers.

12. The method of forming slivers solely from textile fibers comprising supporting said fibers on one side only, dividing a heterogeneous mass of said textile fibers into a plurality of elongated masses, causing said masses to move obliquely of the direction of their length, and subjecting said elongated masses to compacting downward force on one side thereof, and an upward rolling force on the other side thereof delivered at substantially right angles to the axis of movement of said elongated masses to form said elongated masses into slivers.

13. The method of making a sliver comprising subjecting a longitudinally extending mass of fur fibers to fluid forces acting on the individual fibers while in said loosened condition to orient the majority of the fibers in the direction of the length of said mass, said fluid forces being effective at substantially right angles to the axis of said longitudinal mass.

LOUIS P. MILLER.