Nov. 7, 1939. A. ALLWOOD 2,179,078

METHOD AND MEANS FOR MAKING DRAFTED YARN

Filed Feb. 28, 1938

Fig. 1.

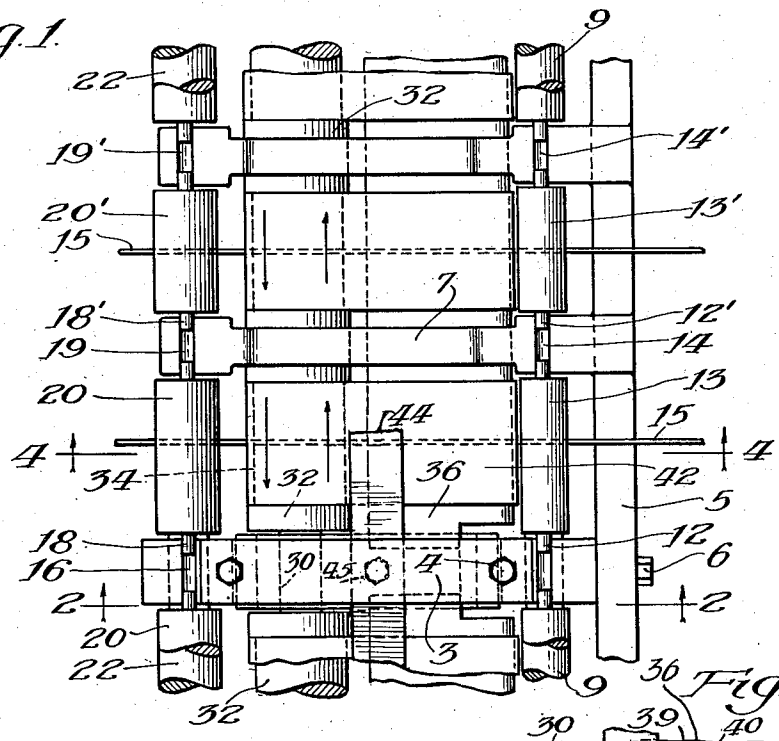


Fig. 3.

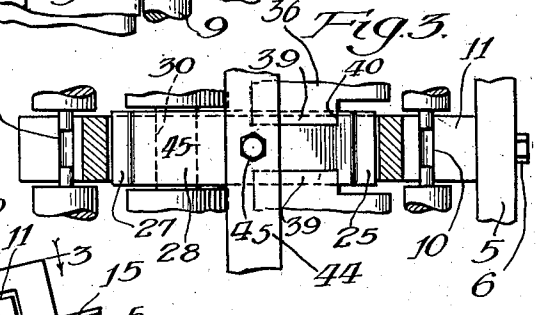


Fig. 2.

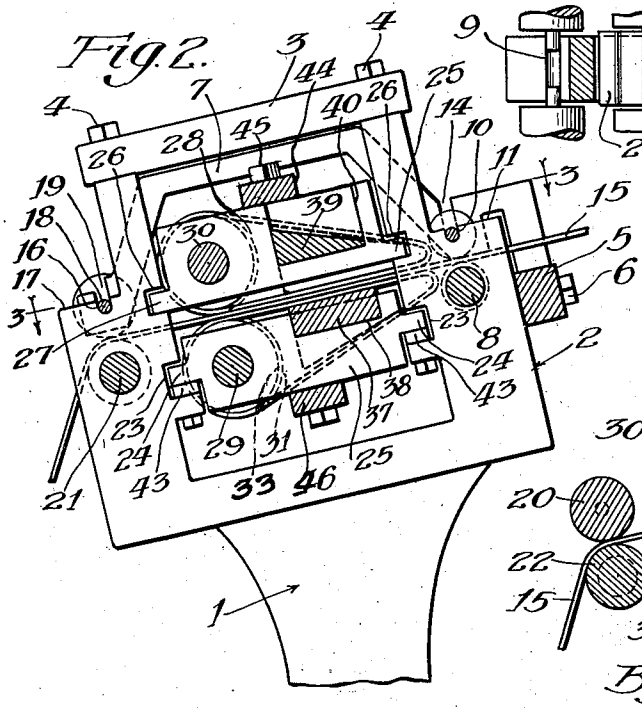
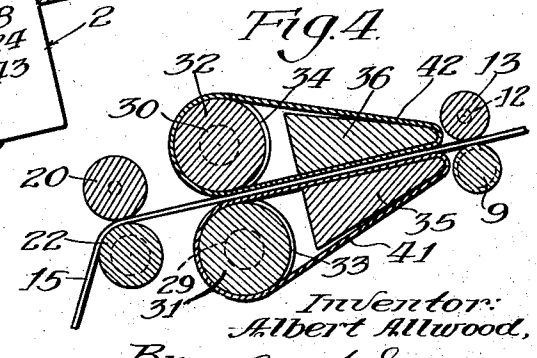


Fig. 4.



Inventor:
Albert Allwood,
By: Lee J. Gary
Attorney.

Published by AsbestosClaims.Law
asbestosclaims.law/library/22205/1

Patented Nov. 7, 1939 2,179,078

UNITED STATES PATENT OFFICE

2,179,078

METHOD AND MEANS FOR MAKING DRAFTED YARN

Albert Allwood, North Charleston, S. C., assignor to Raybestos-Manhattan, Inc., Bridgeport, Conn., a corporation of New Jersey

Application February 28, 1938, Serial No. 193,028

9 Claims. (Cl. 19—131)

This invention relates to improvements in a method and device for drafting fibrous material, particularly asbestos, to form yarn, and refers specifically to a method and device for so "working" the fibrous material in the drafting zone as to secure a uniform pull and distribution of the fibres of the roving or slubbing.

In the usual drafting operation, the roving or slubbing is passed between a plurality of pairs of drafting rolls which are progressively rotated at different surface speeds whereby the individual fibres constituting the roving or slubbing are pulled relative to one another to form, as an ideal condition a strand of uniform diameter and density. However, during the drafting operation this ideal condition is not obtained since the drafting rolls control only the long fibres and the bulk of the fibres move relative to one another in a non-uniform manner and, hence the resulting strand is non-uniform in both thickness or diameter and density.

The usual methods of drafting produce a peculiar yarn which is more noticeable when the fibres of which the yarn is made vary much in length. This peculiarity is that the long fibres are drawn to the center or core of the yarn and the shorter fibres protrude and produce a neppy or lumpy yarn. This condition is more noticeable with drafted asbestos yarn than it is with cotton or any other textile fibre.

In my invention, in the drafting zone, that is, the zone between adjacent pairs of drafting rolls where the roving or slubbing is subjected to tension, I contemplate applying pressure to the roving or slubbing which varies, with respect to the individual fibres. The variation in pressure is brought about by transversely rolling and rubbing, so to speak, the slubbing between two pressure surfaces while the slubbing is simultaneously being carried forward.

The effect of this rolling action is to temporarily anchor certain groups of fibres while other fibres or groups of fibres are free to be drafted. As the rolling continues, those fibres which were temporarily anchored, are released and other groups of fibres are temporarily anchored. The action proceeds during substantially the entire drafting period and results in substantially equal relative movement of all of the fibres, which in turn, results in a more uniform yarn. In addition, since fibres, such as asbestos, have very smooth surfaces, said fibres are reluctant to cling to each other. However, by rubbing the roving transversely during the drafting operation, a felting action is brought about whereby the fibres are compressed and intertwined.

Accordingly, my invention resides in a drafting method and means which produces a more uniform yarn. In addition, since all of the fibres move a limited distance and none of the fibres move an excessive distance, shorter average fibre lengths can be used with a degree of success which has been heretofore unattainable. The resulting yarn is not characterized in that the longer fibres are drawn to the center or core of the yarn since my method controls the movement of both the long and short fibres.

Other objects and advantages of my invention will be apparent from the accompanying drawing and following detailed description.

In the drawing,

Fig. 1 is a top plan view of suitable drafting apparatus for carrying out my invention.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1.

Referring in detail to the drawing, 1 indicates one of a plurality of spaced standards which are adapted to support the drafting mechanism comprising my invention. A standard 1 is disposed at each end of the device and one or more intermediate standards may be provided depending upon the length of the device and the number of drafting operations which can be carried out simultaneously. In Figs. 1 and 2 of the drawing an intermediate standard is illustrated. However, it is to be understood that the remaining standards are substantially identical in construction with the standard illustrated.

A frame 2 is carried at the upper portion of the standard 1 and is substantially U-shaped. A cross bar 3 bridges the open portion of the U so formed, said cross bar being secured to the frame proper by means of bolts 4 or the like. A bar 5 is secured to one side of the frame 2 as by means of bolts 6, said bar being co-extensive in length with the length of the machine and being similarly secured to each of the frames 2. Cantilever trusses 7 are carried at spaced points along the length of bar 5 and extend at substantially right angles to said bar in a direction across the machine.

A shaft 8 is journalled in each of the frames 2, said shaft extending substantially the entire length of the machine. A plurality of rolls 9 are carried by the shaft 8, the number of said rolls

Published by AsbestosClaims.Law
asbestosclaims.law/library/22205/2

depending upon the number of drafting operations which can be performed simultaneously by machine, that is, the number of drafting units which the machine contains. A slot 10 is provided in an offset portion 11 of frame 2, said slot being adapted to receive the end of a shaft 12 upon which an upper drafting roll 13 is carried. The opposite end of shaft 12 is carried in slot 14 provided in the cantilever truss 7, next adjacent the frame 2. Similarly, one end of shaft 12' is carried in the slot 14 and the opposite end thereof is carried in a similar slot 14' provided in the next adjacent cantilever truss. The shaft 12' carries a roll 13' similar to roll 13.

In operation, the shaft 8 is positively driven by any suitable means not shown. The rolls 13, 13' and all other similar rolls, rest upon the surfaces of the rolls 9 and are rotated by means of contact with rolls 9. The rolls 9 and 13 of each drafting unit are referred to respectively as the lower back rolls and the upper back rolls. Roving or slubbing 15 is passed between said lower and upper back rolls at a predetermined linear speed dependent upon the rate of rotation of the driving rolls 9.

A slot 16 is provided in the offset portion 17 of the frame 2 upon the opposite side of said frame. One end of a shaft 18 is carried in said slot and the opposite end thereof is carried in slot 19 provided in the unsupported end of the next adjacent cantilever truss 7. The shaft 18 carries a roll 20. Similarly one end of shaft 18' is positioned in the slot 19 and the opposite end thereof is positioned in a similar slot 19' in the next adjacent cantilever truss 7, the shaft 18' carrying a roll 20' similar to roll 20. The remaining units comprising the machine are all identical with those described.

A shaft 21 is journalled in each of the frames 2 and is substantially co-extensive with the length of the machine proper. A plurality of rolls 22 are carried upon shaft 21, the number of said rolls corresponding to the number of drafting units. Shaft 21 is positively driven by any suitable means and rolls 20—20' rest upon the surfaces of corresponding rolls 22 carried by the shaft 21. Rolls 22 are referred to as the lower front rolls and rolls 20—20' are referred to as the upper front rolls, and each pair of these rolls constitutes a front drafting roll unit. In practice the rolls 22 are driven at a greater peripheral speed than the rolls 9 and the slubbing or roving 15 fed through the back drafting rolls, is passed between the front drafting rolls. In view of the fact that the front drafting rolls move at a greater peripheral velocity the slubbing between said back and front rolls is maintained under tension. This zone will hereinafter be referred to as the drafting zone.

It has heretofore been recognized that if the slubbing or roving in the drafting zone is subjected only to tension, difficulties are encountered due primarily to the fact that the individual fibres constituting the roving or slubbing move relative to one another in a more or less non-uniform manner and, consequently, the resulting yarn passed to the bobbins is non-uniform in thickness and density. To cure this defect various expedients have been suggested such as to confine the slubbing or roving in the drafting zone so as to retard the movement of the fibres. However, none of the expedients heretofore suggested completely cures this disadvantageous feature of the operation and, therefore, a relatively uniform yarn cannot be obtained unless relatively long fibre asbestos is used. As a feature of my invention a relatively uniform yarn can be obtained utilizing the shorter, cheaper fibres.

To carry out my invention I provide opposite slots 23 in the opposite inner walls of the frame 2. The slots 23 are adapted to receive ledges or extensions 24 carried upon the ends of a bearing block 25. The relative dimensions of the slots 23 and extensions 24 are such that the bearing block can be slidably moved in a direction at right angles to the plane of the drawing as viewed in Fig. 2.

An additional pair of slots 26 is also provided in the inner portion of the frame 2 above the slots 23, said slots 26 being adapted to receive extensions 27 provided at opposite ends of a bearing block 28. Similar to the relationship of the bearing block 25 to the frame 2, the bearing block 28 is also movable slidably within the frame.

Bearing blocks 25 and 28 are provided in each frame 2 and shafts 29 and 30 are journalled respectively in blocks 25 and 28, said shafts being coextensive with the length of the machine. Between adjacent frames, rolls 31 are carried upon shaft 29 and rolls 32 are similarly mounted upon shaft 30. At spaced portions along the length of each roll 31, said roll is formed with a restricted diameter, as shown at 33 in Fig. 2, and, similarly, rolls 32 are provided with restricted portions 34. The restricted portions 33 and 34 are in vertical alignment and correspond in number to the number of drafting units contained upon the machine.

A block 35 is positioned adjacent each roll 31, said blocks being of substantially triangular cross-section throughout substantially their entire lengths, as shown best in Fig. 4. Similar blocks 36 are positioned adjacent each upper roll 32. Blocks 35 and 36 are so disposed as to have legs of the triangular section substantially parallel to each other and parallel to the passage of the roving or slubbing 15. The apices of the triangles so formed are positioned closely adjacent the drafting rolls 9 and 13.

At each end of each block 35 a projection 37 is formed which is adapted to register with a slot 38 provided in the upper face of each bearing block 25. In this manner each block 35 is supported by, and confined between adjacent bearing blocks 35 and is movable with said bearing blocks. Similarly, each block 36 carries an extension 39 at each end thereof which is adapted to register with a slot 40 provided in the upper face of each bearing block 28, whereby to support and confine each block 36 between adjacent bearing blocks 28. Blocks 36 are therefore movable longitudinally with bearing blocks 28.

A plurality of endless belts 41 are trained around each roll 31 and around each block 35, one run of said belts being substantially parallel with the paths of travel of the roving 15. There are as many belts 41 as there are drafting units on the machine and each belt in passing over roll 31 is confined in one of the depressed portions of the roll, that is, one of the portions 33 of restricted diameter. Similarly a plurality of endless belts 42 are trained around each roll 32 and each block 36.

It can readily be seen that the belts 41 and 42 at a portion of their runs are parallel and closely adjacent each other, and that the roving or slubbing travels between each pair of belts. The extensions 24 of the lower bearing blocks 25

which are positioned in slots 23 are supported upon spacer-strips 43 which in turn may be moved upwardly or downwardly within said slots. In this manner each of the bearing blocks is movable upwardly or downwardly to bring the belts 41 closer or further away from the belts 42. By this arrangement a desired degree of pressure may be established upon each roving or slubbing by belts 41 and 42.

A bar 44 is secured to the top of each of the spaced bearing blocks 28 by means of bolts 45 or the like, and, similarly, a bar 46 is secured to the bottom portion of each of the lower bearing blocks 25. The bars 44 and 46 are associated with suitable reciprocating mechanism (not shown) for moving said bars longitudinally back and forth, the bars 44 and 46 being reciprocated in opposite directions. In so reciprocating the bars, the bearing blocks 25 and 28 are moved in slots 23 and 26 respectively and rolls 31 and 32, blocks 35 and 36 and belts 41 and 42 are moved at right angles to the direction of travel of the rovings 15. By the provision of the depressions 33 and 34 in the rolls 31 and 32 respectively, the belts 41 and 42 are prevented from being displaced during the reciprocating action.

Shafts 29 and 30 are driven at a desired speed which is preferably such as to cause belts 41 and 42 to move at a surface speed greater than the peripheral speed of rolls 9 and 13 and less than the peripheral speed of rolls 20 and 22 so as to facilitate the drafting action.

It can readily be seen that in the drafting zone the roving is rolled or rubbed by the belts 41 and 42 and consequently a uniform relative movement of the individual fibres with respect to one another is brought about. This results in the production of a yarn of substantially uniform cross-section and density which is the desideratum of the drafting process. Consequently, if a uniform movement of all the fibres is secured, and no fibres or groups of fibres move excessively, shorter length fibres can be readily used, which, of course, is conducive to economy since said shorter fibred material is less expensive than the longer fibred material. In addition, in the drafting zone the roving is simultaneously subjected to pressure and a rubbing action which tends to compress and felt the fibres together.

The degree of oscillation of the bars 44 and 46 is governed by the size of roving being drafted and the amount of drafting taking place. In drafting asbestos roving, so called spinning fibres may be used, that is, fibres having a length of one-quarter inch or longer. If desired, other fibres may be mixed with the asbestos, the proportion being dependent upon the ultimate use of the finished yarn. For instance, 5% to 25% cotton fibres may be used. However, I do not wish to be limited to the drafting of any specific fibrous material or mixtures of fibres since my invention can be advantageously used upon substantially any type of fibres.

Of course, as many drafting units as desired may be employed and many of the specific mechanisms herein shown may be modified without departing from the spirit of my invention; hence I do not wish to be limited except as necessitated by the prior art.

I claim as my invention:

1. A process of drafting roving to form a fibrous yarn which comprises, passing said roving to a drafting zone and subjecting the same to tension, subjecting said roving to pressure between pressure surfaces in said drafting zone, reciprocating at least one of said surfaces transversely relative to said roving to vary the pressure upon, and rub the fibres of said roving.

2. A process of drafting roving to form a fibrous yarn which comprises, continuously passing said roving to a drafting zone and subjecting said roving to tension in said zone, subjecting said roving to transverse pressure in said zone, and rubbing said roving back and forth transversely to felt the individual fibres together.

3. A device of the class described which comprises in combination, a standard, a plurality of pairs of coacting drafting rolls carried by said standards, fibrous roving being adapted to be carried between adjacent pairs of drafting rolls, pressure members acting upon said roving between adjacent pairs of drafting rolls, and means for reciprocating said pressure members in opposite directions transversely to the path of travel of said roving.

4. A device of the class described which comprises in combination, a standard, a plurality of pairs of coacting drafting rolls carried by said standards, fibrous roving being adapted to be carried between adjacent pairs of drafting rolls, movable pressure members acting upon said roving between adjacent pairs of drafting rolls, and means for reciprocating one of said pressure members transversely to and relatively to the path of travel of said roving.

5. A device of the class described which comprises in combination, a standard, a plurality of pairs of coacting drafting rolls carried by said standards, fibrous roving being adapted to be carried between adjacent pairs of drafting rolls, a pair of pressure members movable in a direction substantial longitudinally of said roving acting upon said roving between adjacent pairs of drafting rolls, and means for reciprocating said pressure members in opposite directions transversely to the path of travel of said roving.

6. A device of the class described which comprises in combination, a standard, a plurality of pairs of coacting drafting rolls carried by said standards, fibrous roving being adapted to be carried between adjacent pairs of drafting rolls, pressure members acting upon said roving between adjacent pairs of drafting rolls, said pressure members comprising a pair of belts disposed upon opposite sides of said roving and confining the same under pressure, and means for moving said belts transversely to the path of travel of said roving.

7. A device of the class described which comprises in combination, a standard, a plurality of pairs of coacting drafting rolls carried by said standards, fibrous roving being adapted to be carried between adjacent pairs of drafting rolls, pressure members acting upon said roving between adjacent pairs of drafting rolls, said pressure members comprising a pair of belts disposed upon opposite sides of said roving and confining the same under pressure, and means for simultaneously moving said belts parallel to, and transversely to the path of travel of said roving.

8. A device of the class described which comprises in combination, a standard, a plurality of pairs of coacting drafting rolls carried by said standards, fibrous roving being adapted to be carried between adjacent pairs of drafting rolls, pressure members acting upon said roving between adjacent pairs of drafting rolls, said pressure members comprising a pair of belts disposed upon opposite sides of said roving and confining the same under pressure, and means for

simultaneously moving opposite belts in a direction transversely to the path of travel of said roving and opposite to each other.

9. A process of drafting roving to form a fibrous yarn which comprises, passing said roving to a drafting zone and subjecting the same to tension, subjecting said roving to pressure between pressure surfaces in said drafting zone, reciprocating said surfaces transversely relative to said roving to vary the pressure upon, and rub the fibres of said roving.

ALBERT ALLWOOD.

Published by AsbestosClaims.Law
asbestosclaims.law/library/22205/5