

Jan. 7, 1969

AKIRA MORIWAKI

3,419,941

COMBING CYLINDER OF COMBING MACHINE

Filed June 21, 1966

Sheet 1 of 5

FIG. 1

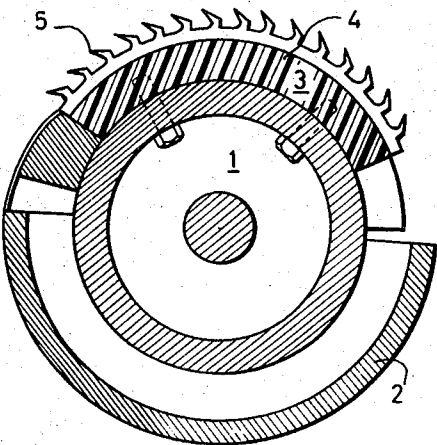


FIG. 3

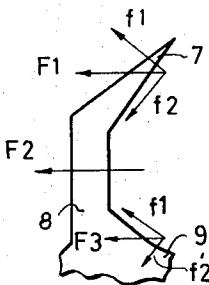


FIG. 2A

FIG. 2B

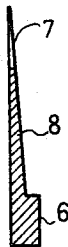
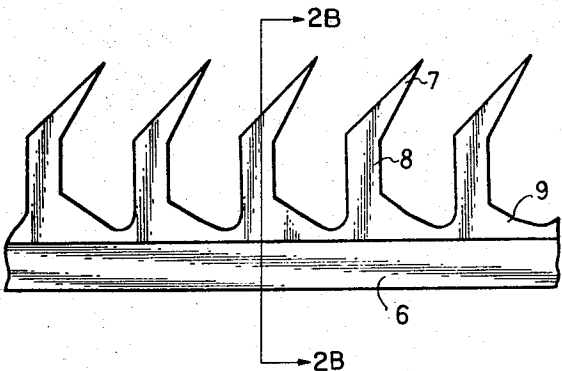


FIG. 5

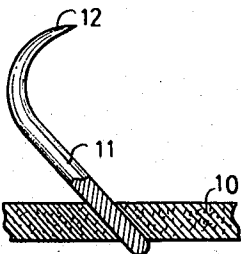
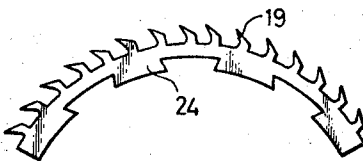


FIG. 11



Jan. 7, 1969

AKIRA MORIWAKI

3,419,941

COMBING CYLINDER OF COMBING MACHINE

Filed June 21, 1966

Sheet 2 of 5

FIG. 4

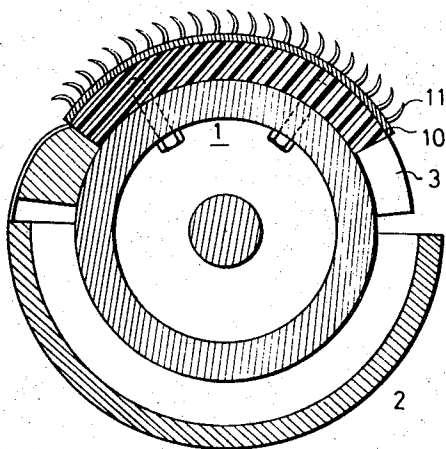


FIG. 7

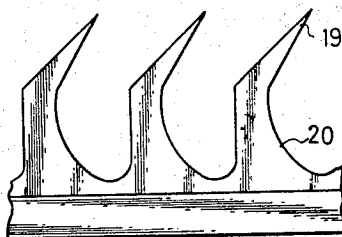


FIG. 9

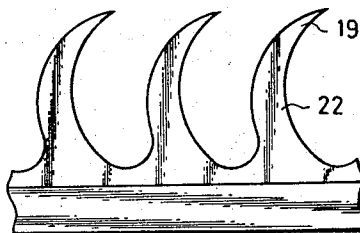


FIG. 6A

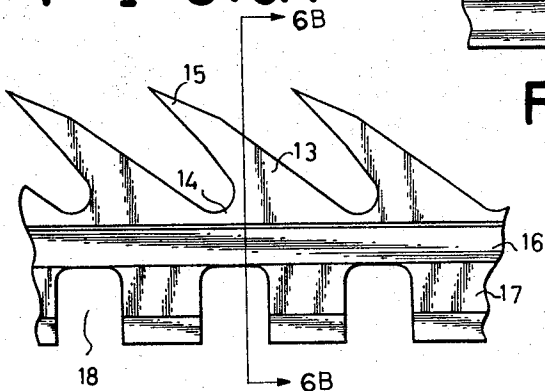


FIG. 6B

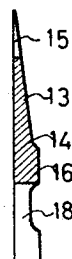


FIG. 8

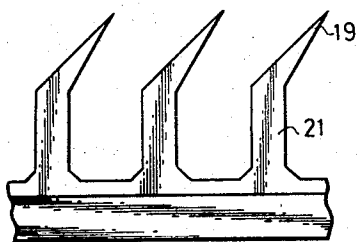
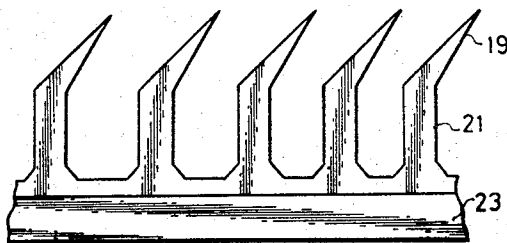


FIG. 10



Jan. 7, 1969

AKIRA MORIWAKI

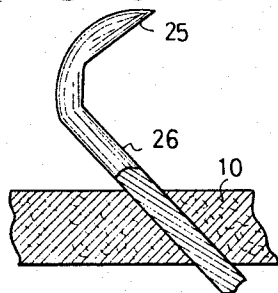
3,419,941

COMBING CYLINDER OF COMBING MACHINE

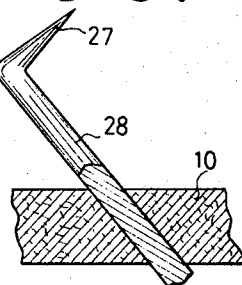
Filed June 21, 1966

Sheet 3 of 5

F I G . 12

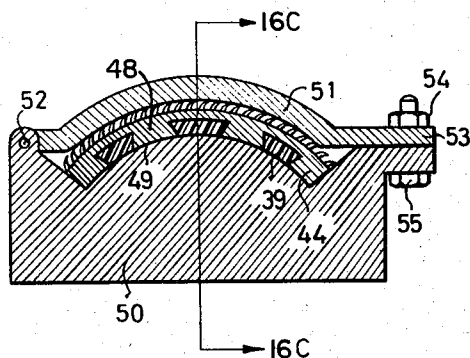
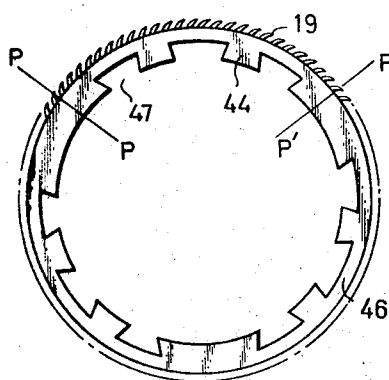


F I G .13

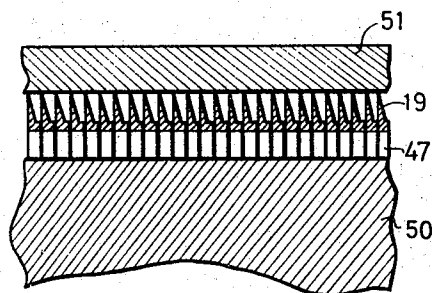


F I G . 16A

F I G. 16B



F I G . 1 6 C



Jan. 7, 1969

AKIRA MORIWAKI

3,419,941

COMBING CYLINDER OF COMBING MACHINE

Filed June 21, 1966

Sheet 4 of 5

FIG. 14A

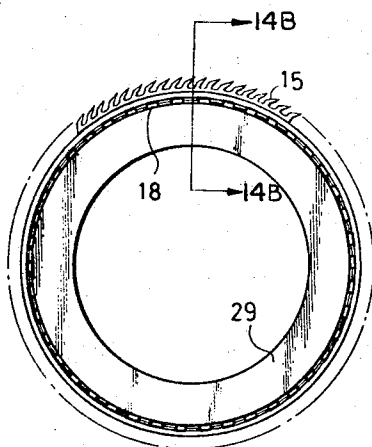


FIG. 14B

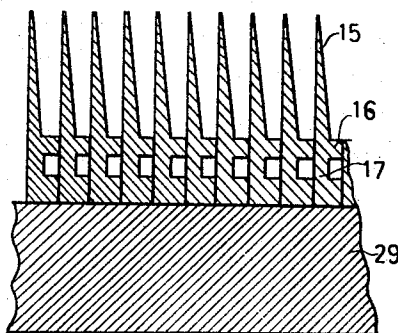


FIG. 14D

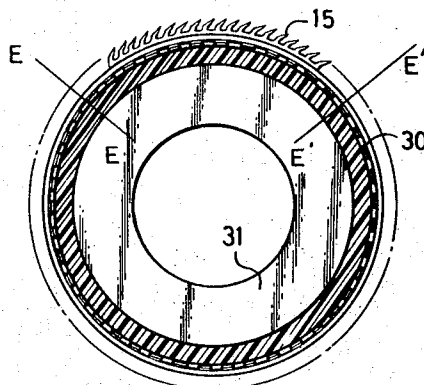


FIG. 14C

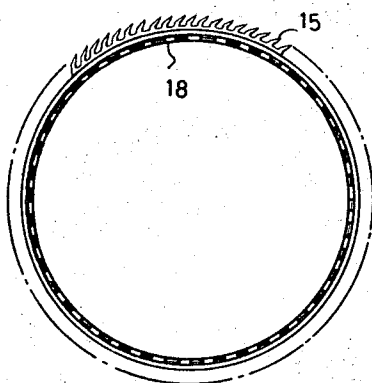


FIG. 14F

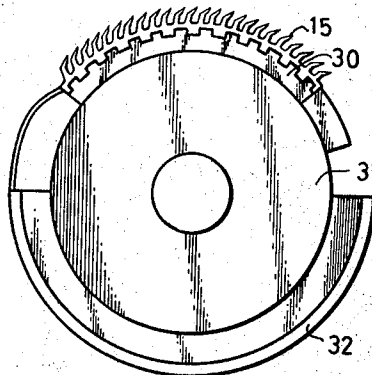
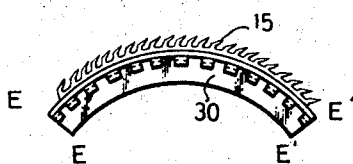


FIG. 14E



Jan. 7, 1969

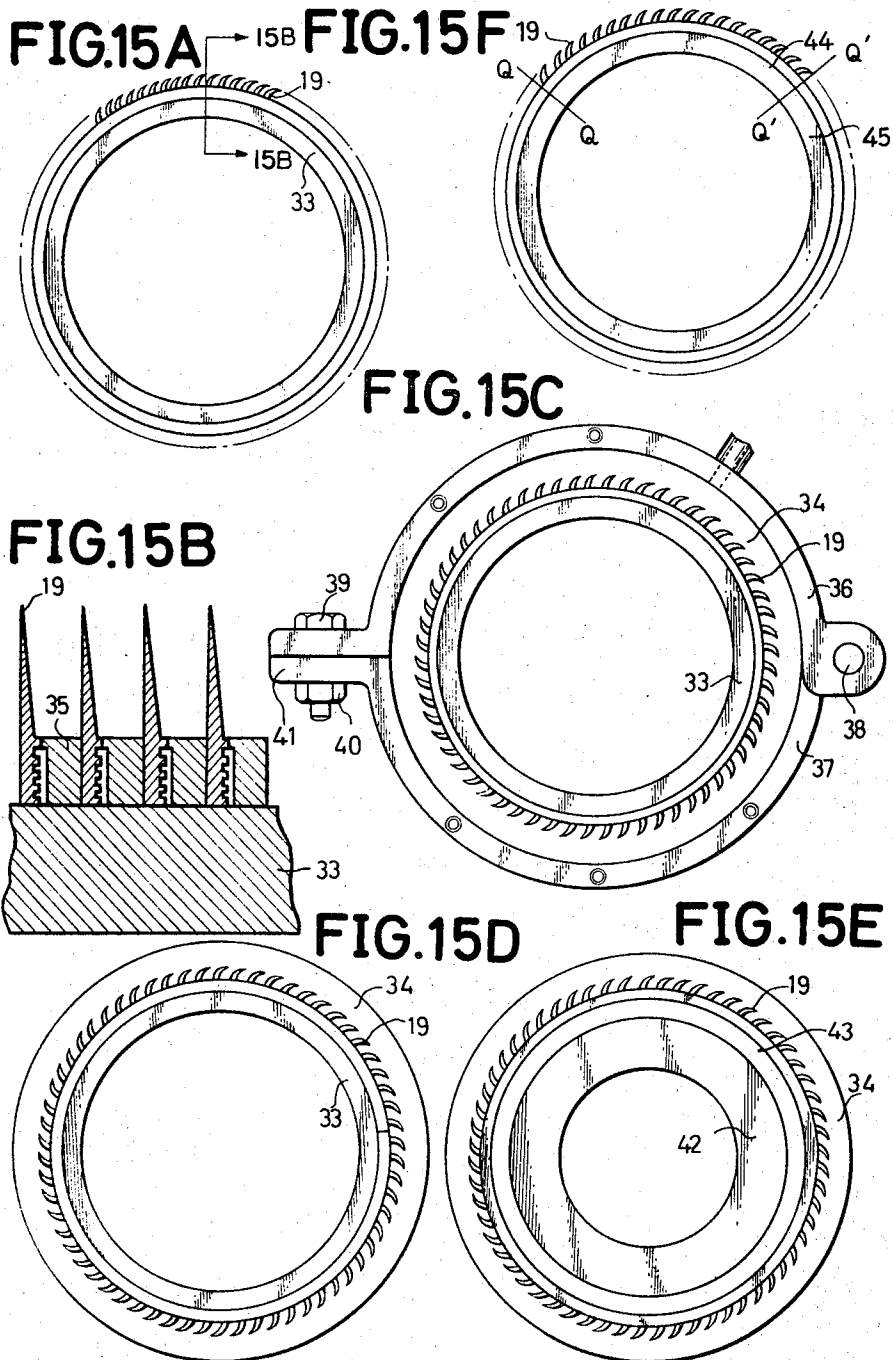
AKIRA MORIWAKI

3,419,941

COMBING CYLINDER OF COMBING MACHINE

Filed June 21, 1966

Sheet 5 of 5



1

3,419,941

COMBING CYLINDER OF COMBING MACHINE

Akira Moriwaki, 381-6, Kamishibutani-cho,
Ikeda-shi, Osaka-fu, Japan

Filed June 21, 1966, Ser. No. 559,186

Claims priority, application Japan, June 25, 1965,
40/38,010, 40/38,011

U.S. Cl. 19-234

Int. Cl. D01g 19/10

8 Claims

ABSTRACT OF THE DISCLOSURE

A combing cylinder for a combing machine in which a bare cylinder has a plain arcuate segment thereon and an arcuate combing segment detachably secured covering a part of a remainder of said base cylinder or core. The combing segment has a plurality of wires having saw-teeth disposed rigidly on a base member of the combing segment. These teeth have a point extending in the direction of rotation of the combing cylinder. The teeth are perpendicular to tangents to the cylinder or inclined to these tangents in the direction of the axis of the cylinder no more than 45°. The teeth are formed on wires that are mounted on the base member of the combing segment. The density of the teeth is such that it decreases in a direction toward the trailing end of the combing segment or laterally in a direction of the axis of the combing cylinder.

The present invention relates to a combing cylinder attached to a combing machine and also to a method for manufacturing the above-mentioned combing cylinder.

In the conventional process of cotton or worsted spinning, the following three types of combing machines: Nasmith type comber, Heilman type comber and Noble comber have been used. Particularly, the former two types of comber have been used widely in cotton and worsted spinning processes, respectively. However, the same combing principle has been used as the combing action of the above-mentioned combers up to the present, for example, in the combing action, a web of fibers is gripped between a pair of gripping members such as a nipper knife and nipper plate of a Nasmith type comber and is combed by the needle segment attached to a combing cylinder in such a manner that the web is combed roughly in the first step of combing and is combed finer in stages. To operate the above-mentioned comber for combing the web, the needles of the first segment are imbedded with low density on the first base element having thicker cross sectional diameter, the needles of the second segment are imbedded more densely on the second base element and have finer cross sectional diameter than that of the first one, the needles of the third segment are imbedded even more densely on the third base element and have finer cross sectional diameter than that of the second one, and so on. Each needle has a straight shape and each needle segment is disposed on the combing cylinder in such a manner that each point of the needles inclines toward the rotational direction of the combing cylinder so that each point of the needles can stab the web easily. To obtain fine combing action, it has been necessary to use needles of small diameter although the possibility of the point of the needles breaking easily is great. Therefore, in the conventional combing operation, it has been desirable to carry out the combing action at low speed in order to prevent breakage of the needle and have good, continuous combing action. Depending on the inclination of the needles toward the direction of rotation of the combing cylinder, some fibers and impurities have a tendency to be carried to the bottom portion of the

2

spaces between the needles, therefore, it has been necessary to remove the fibers disposed on the needle segments by suitable mechanical means, such a pneumatic means, for keeping the needle segment in a clean condition. As it is well known, the quantity of fibers disposed on the needle segment, hereinafter called waste, should be controlled from the point of view of yarn quality and production cost of combed yarn. Therefore, the setting of the needle segment on the combing cylinder should be made carefully.

The principal object of the present invention is to provide a combing cylinder having a simple construction and a method for manufacturing the above-mentioned combing cylinder, more particularly to provide a combing cylinder having a combing segment comprising a base plate and plurality of saw teeth or curved needles rigidly secured to the base plate, and a method for manufacturing the above-mentioned combing cylinder.

Another object of the invention is to provide a novel combing action by use of the above-mentioned combing cylinder.

A further object of the invention is to provide good quality combed sliver or top with combing action at a higher speed and a smaller quantity of waste than that of the conventional combing.

Further features and advantages of the invention will be apparent from the ensuing description with reference to the accompanying drawings to which the scope of the invention is in no way limited.

FIG. 1 is a sectional view of an embodiment of a combing cylinder according to the present invention,

FIG. 2A is a side view of an embodiment of metallic wire for use in the combing cylinder in FIG. 1,

FIG. 2B is a sectional view, taken along line 2B-2B of the metallic wire in FIG. 2A,

FIG. 3 is an explanatory drawing for showing the combing action by the metallic wire according to the present invention,

FIG. 4 is a sectional view of another embodiment of the combing cylinder according to the invention,

FIG. 5 is a needle imbedded in a fabric base for use as member for combing cylinder shown in FIG. 4,

FIG. 6A is a side view of the metallic wire for use as combing segment of the combing cylinder according to the invention, and FIG. 6B is a cross sectional view of the metallic wire, taken along line 6B-6B in FIG. 6A,

FIGS. 7, 8, 9 and 10 are side views of other embodiments of metallic wire according to the invention,

FIG. 11 is a side view of an element of combing segment of combing cylinder according to the invention,

FIGS. 12 and 13 are side views, partly in section, of other embodiments of needles according to the invention,

FIGS. 14A, 14B taken on section line 14B of FIG. 14A, 14C, 14D, 14E and 14F are explanatory drawings of an embodiment for manufacturing combing cylinder according to the present invention,

FIGS. 15A, 15B taken on section line of 15B of 15A, 15C, 15D, 15E and 15F are explanatory drawings of another embodiment for manufacturing combing cylinder according to the present invention,

FIGS. 16A, 16B, and 16C taken on section line 16C of FIG. 16B are also explanatory drawings of another embodiment for manufacturing combing cylinder according to the invention.

The combing cylinder of the present invention has superior features when used in Nasmith type comber, or a Teilman type comber as described below. In the drawing, FIG. 1, a combing cylinder comprises a base cylinder 1, and a plain segment 2 and a combing segment 3 secured to the base cylinder 1, respectively. The combing segment comprises a plurality of saw-toothed members

5 and a base member made of thermosetting synthetic material 4 for fixing the saw-toothed member 5 to the base cylinder 1. The base member 4 forms a portion of an imaginary cylinder having uniform thickness and fitted to the base cylinder 1, the saw-toothed members 5 are fixedly disposed on the cylindrical surface of the base member 4 by means of the base thermosetting resin member 4 in such a way that the longitudinal direction of each saw-toothed member is perpendicular to the axial direction of the cylinder 1, or inclined toward the axial direction of the cylinder 1, and the intervals of the saw-toothed members are constant. As shown in the drawing of FIGS. 2A and 3, the saw-teeth member comprises a base portion 6 and a plurality of saw-tooth positioned on the base portion 6. Each saw tooth has a point portion 7 which inclines toward the rotational direction of the combing cylinder, a vertical stem portion 8 and a root portion 9, as shown in the drawing.

Therefore, when the combing cylinder rotates and the points of saw-tooth stab a tuft gripped between the nipper plate and the nipper knife of the combing machine, fibers come to the vertical stem portion 8 of each saw-tooth and are combed thoroughly by the respective stem portion 8. The reason why the fibers are carried to the respective stem portion 8 is easily understood as follows; as shown in FIG. 3, fibers are pushed in the direction of the forces F1 and F2 and F3, by the rotation of the combing cylinder 1, two imaginary divided forces f_1 , f_2 whose direction are vertical to and parallel to the face edge of the top portion 7, respectively, can be considered as the force F1, and two divided forces f_1' , f_2' which are vertical to and parallel to the face edge of the bottom portion 9 of each saw-tooth, can be considered as the Force F3. The fibers which are pushed to the face edge of each saw-tooth are brought to the stem portion 8 by the divided force f_2 , and the divided force f_2' prevent the fibers from going to the base portion 9 of the saw-tooth. Therefore, the fibers of the web are combed by the top portion and the stem portion of the saw-tooth, and there is little possibility of fibers to remain in the combing segment after its combing action, and if some fibers are disposed in the combing segment by separation from the web, these can be removed easily by conventional means for cleaning the combing cylinder.

As the metallic wire of the saw-teeth are disposed on the surface of combing the cylinder with the same lateral intervals and with some inclination up to 45° toward the rotational axis of the combing cylinder, the webs gripped between the nipper plate and the nipper knife can be combed very finely by the above-mentioned inclination of the metallic wire toward the rotational direction of the combing cylinder and the density of the saw-teeth, the combing action is provided, in the same condition during each rotation of the combing cylinder, to the web gripped between the nipper knife and the nipper plate.

The above-mentioned combing action is the main feature of the combing action using the combing cylinder according to this invention.

As shown in the drawing of FIG. 4, curved needle wires 11, secured to a base element 10 which is rigidly secured to a portion of a semicylindrical element 3, can be used according to the invention. Each needle wire 11 has a top portion 12 curved toward the rotational direction of the combing cylinder and a stem portion 11 inclined in the reverse direction of the rotational direction of the combing cylinder. A large number of the above-mentioned needle wires is disposed on the base element 10 in such way that the distribution of the points of needle wires is almost the same as that of the above-mentioned metallic wire. Therefore, when the above-mentioned combing cylinder having needle wires is used, almost the same effect or combing action as that of the above-mentioned metallic wire can be obtained.

In the drawing other kinds of metallic wire for the combing cylinder of the present invention are shown. In

the drawing of FIGS. 6A and 6B, the metallic wire comprises a base portion and a saw-toothed portion disposed on the base portion, each saw-tooth having a top portion 15 inclined toward a certain direction, an intermediate portion 13 also inclined toward the same direction as that of the top portion 15, a bottom portion 14 having an edge inclined toward the reverse direction to the inclination of the top 15 and the intermediate portion 13. A base portion 16 is provided with longitudinal groove 17 and a plurality of recesses 18 opening downward spaced at equal intervals.

In the drawing of FIG. 7, a metallic wire having a curved base portion 20 of some length is shown. In case of the metallic wire shown in FIGS. 7 and 8, the shape of the saw-tooth is almost the same as that of the saw-tooth shown in FIG. 2. Therefore, when a combing cylinder using the metallic wire shown in FIG. 7 is used, the combing action can be obtained in such a way that the web gripped between the nipper knife and nipper plate can be combed roughly by the first saw-tooth and then combed finer in stages. The other effect of the combing action is almost the same as that of the above-mentioned case, however, in case of a combing cylinder using the metallic wire shown in FIG. 9, the effect is almost the same as that of the first embodiment of the combing cylinder according to the present invention.

In the drawing of FIG. 10, a metallic wire is provided with a plurality of saw-teeth disposed with changing density of the saw-teeth along the longitudinal direction. Saw-teeth 21 are disposed on a base 23 in such way that the density of saw-teeth decreases in one direction. Another embodiment of a wire 19 having a base 24 and teeth is illustrated in FIG. 11.

In the conventional combing cylinder, the setting of the needle segment requires highly skilled workmen for preparing and adjusting the setting of needle segments, however, according to the present invention, the setting of the combing segment can be obtained easily and precisely because of the rigid construction of the combing segment. Therefore, maintenance can be carried out easily compared with that of the conventional combing cylinder.

According to the combing cylinder of the present invention, an excellent quality combed yarn can be produced with high efficiency of the combing machine and with a smaller quantity of noil because the combing action is carried out precisely in a continuous combing condition and there is very little possibility of having the fibers disposed on the combing segment.

In the following description, some embodiments of a method for manufacturing the combing cylinder of the present invention are explained.

In FIGS. 14A, 14B, 14D, 14E and 14F, a metallic wire 15 having the same base construction as that of the metallic wire shown in FIG. 6A is wound around a cylinder 29 in such way that the bases of the adjacent wire contact each other as shown in the drawing of FIG. 14B and an axial length of the cylinder 29 wound by the metallic wire 15 corresponds exactly to that of combing segment secured to a desired combing cylinder. Therefore, a cylindrical reticulate space comprising a plurality of recesses 18 and side grooves 17 is formed between the metallic wire 15 and the cylindrical surface of the cylinder 29. Some kind of thermosetting resin, such as epoxy or polyester resin in a liquid condition containing a hardner is poured into the above-mentioned space. After the resin has set, the cylinder 29 is separated from the cylindrical metallic wire 15, which is rigidly formed by the thermosetting resin of reticulate form. The cylindrical metallic wire 15 is supported coaxially by a core cylinder 31 by a suitable mechanical means, then the same thermosetting resin in liquid form containing a hardner as mentioned above is poured into a space 30 which is formed coaxially between the inner surface of the cylindrical metallic wire 15 and the outer surface of the core cylinder 31

while both sides of the core are sealed by a suitable mechanical means, and the thermosetting resin is subjected to hardening by conventional manner, for example, maintaining at room temperature for a suitable time. After the thermosetting resin has hardened completely, the core cylinder is removed from the product of the above-mentioned process, and then the product is cut into a suitable size, for example, cut into a segment 3 having a fan-shaped or arcuate cross section defined by line E—E, E'—E', as shown in the drawing of FIG. 14D and 14E. The outer diameter of the core cylinder 31 is the same diameter as that of a base cylinder 1 of the combing cylinder. Therefore, the setting of the combing segment 3 on the base cylinder 1 is easily performed by simple mechanical means, such as using the usual fasteners, that is, bolts or screws, etc. In the drawing of combing cylinder in FIG. 14F, a plain cylindrical part 32 is also secured to the base cylinder 1.

Another embodiment for manufacturing a combing cylinder according to the invention is described as follows.

In the drawings of FIGS. 15A, 15B, 15C, 15D, 15E and 15F in which the combing segment is defined by lines Q—Q and Q'—Q', a metallic wire 19 having the same basic construction as that of metallic wire shown in FIG. 9 is wound spirally around a cylinder 33 in such way that the bases of the adjacent wire contact each other as shown in the drawing of the above-mentioned first embodiment in FIG. 14B. However, when it is necessary to have a low density of saw-teeth in the lateral direction of the segment, an intervening flat wire 35 is wound around the cylinder 33 so as to intervene between adjacent spirals of the metallic wire as shown in the drawing of FIG. 15B. The axial length of the cylinder 33 wound by the metallic wire 19 corresponds exactly to that of combing segment secured to a desired combing cylinder. The cylindrical metallic wire 19 with cylinder 33 is supported coaxially by a circular shell comprising two elements 36 and 37 which are pivoted by a pin 38 so that element 36 can be opened around the pin 38, and are clamped by bolt 39 and nut 40 at the other side 41, as shown in FIG. 15C. Therefore, a cylindrical space 34 is formed coaxially between the inner surface of the circular shell and the outer surface of the above-mentioned metallic wire 19. A substance which melts at a comparative low temperature, such as wax, or some metallic alloy such as solder which melts at a comparative low temperature is poured in a melted condition into the space 34 while both sides of the cylindrical space 34 are covered by a suitable mechanical means. After solidification of the substance, the shell is removed from the product, which forms a rigid cylindrical metallic wire at normal temperature. And then the product is supported coaxially by a core cylinder 42 as shown in FIG. 15E, so as to form a coaxial space 43 between the inner surface of the cylindrical metallic wire 19 and the core cylinder 42. A thermosetting resin in a melted condition containing a hardener is poured into the space 43 while both sides of the coaxial space 43 are covered by a suitable mechanical means and the thermosetting resin is subjected to hardening by conventional means, as described in the first embodiment of the invention. After the thermosetting resin has hardened completely the substance covering the outer surface of the metallic wire is removed by suitable thermal means which melts the substance. Then the cylindrical metallic wire secured to the cylindrical thermosetting resin 45 is cut into a suitable size, for example, cut into a segment 44 having a fan-shaped section. The outer diameter of the core cylinder 42 is the same diameter as that of a base cylinder of the combing cylinder, therefore, the setting of the combing segment on the base cylinder can be performed in the same manner as explained in the first embodiment of the invention.

When using combing needles as shown in FIGS. 5, 12 and 13, as a material for the combing segment, the combing needles imbedded in a fabric base is wound around the

cylinder 29 as a substitute of the metallic wire. The same successive processes in which metallic wire is used are applied to the manufacture of a combing segment having combing needles.

In FIGS. 16A, 16B and 16C, a method for manufacturing a combing segment for a combing cylinder is shown. The combing segment in this case comprises a plurality of fan-shaped metallic plates in which a plurality of saw-teeth are disposed at the outer portion of it. A circular ring-shaped metallic plate 46 is produced by a suitable mechanical means such as press machine. The plate 46 is provided with a plurality of saw-teeth having a sharp point disposed on the outer edge portion and a plurality of recesses 47 having a wedge shape disposed on the inner edge portion of it. The plate 46 is cut into a fan-shaped form defined by line P—P, P'—P' as shown in FIG. 16A so as to correspond to the size of the combing segment. The fan-shaped plate 48 are disposed on the curved bottom surface of a recess 49 of a support member 50 which is provided with the recess 45 having the same shape as that of bottom surface of the combing segment of the desired combing cylinder. The curvature of the bottom surface of the recess 49 is the same as that of the outer surface of the base cylinder of the combing cylinder. The manner of disposing the fan-shaped plates 44 on the recess 49 is clearly shown in the drawing of FIG. 16C, that is the plates 44 are disposed vertically on the bottom surface of the recess in such a manner that the adjacent plates closely contact each other at their base portion. Therefore, lateral grooves having a wedge-shaped cross section are formed between the plates and the bottom surface of the recess 49 of the support member 50. The setting angle of the plates to the imaginary axis of the curved bottom surface of the recess 49 can be chosen in accordance with both side walls of the recess 49 in such a manner that the side walls (not shown) are set with a certain setting angle to the imaginary axis of the curved bottom surface of the recess 49 which may be explained as an axis perpendicular to the paper surface of the drawing in FIG. 16B. The support member 50 is provided with supporting cover 51 which is pivoted by a pin 52 at one side and provided with a clamp jaw 53 at the other side, as shown in the drawing. The clamping of the jaw 53 to the support member 50 is performed by a bolt 54 and nut 55. After disposing a plurality of plates 48 in the recess 49 in a condition as explained above and closely contacting plates positioned at both sides of the plurality of plates with side walls of the recess 49 respectively, a thermosetting resin in a liquid condition containing a hardener is poured into the groove 47 by suitable means as described in the first embodiment of the invention, and after the thermosetting resin has hardened completely, the rigid product of the metallic plates bonded by the thermosetting resin is taken from the support member 50 and secured on a base cylinder in the same manner as that of the first embodiment of the invention, but the fastening position of the combing segment to the base cylinder should be chosen so that it is at the portion of the hardened thermosetting resin.

In the above-mentioned embodiments for manufacturing combing cylinder, a suitable thermosetting resin is used for forming a base member of the combing segment, however, the other materials for forming the base member of the combing segment, such as some metallic alloy which melts at a comparatively low temperature can be used as a substitute for the above-mentioned thermosetting resin. In case of using solder for making the base member of the combing cylinder according to the method of the above-mentioned first embodiment by FIGS. 14A, 14B, 14C, 14D and 14F, the core cylinder 31 covered by some releasing agent should be used for making easy separation of the core cylinder from a base cylindrical member 30 made of solder. In case of using solder for making the base member of the combing cylinder according to the second embodiment, it is necessary to use a substance

for filling the cylindrical space 34 having a lower melting point than that of the substance for filling the cylindrical space 43. In case of using solder for making the base member of the combing cylinder according to the third embodiment, the support member 50 covered the surface of the recess 49 by some releasing agent should be used for making easy separation of the base of the segment from the recess 49 of the supporting member 50.

As described above, in the three embodiments for manufacturing combing cylinder, the setting of the combing segment on the base cylinder can be carried out simply in a short time and precisely. Therefore, the maintenance of the combing cylinder, which is an important part of the machine, can be carried out effectively at a lower cost than that of the conventional machine.

There is quite few chance of deposit waste on the combing segment, therefore, the cleaning of the combing segment for taking off the waste is not necessary for the combing cylinder of the invention for long time of operation, while the cleaning of the combing segment of the cylinder of the conventional combing machine is one of the key points of maintenance of the machine for obtaining good combing action.

While preferred embodiments of the invention have been shown in the drawings and described in detail above, it should be understood that various modification may be had which would be equally within the spirit and scope of the invention, and that the true measure of the invention is as defined in hereinafter set forth claims.

What is claimed is:

1. A combing cylinder for a combing machine, comprising a base cylinder, a plain cylindrical part secured to a portion of the cylindrical surface of said base cylinder, a combing segment secured detachably to a part of a remainder portion of the cylindrical surface of said base cylinder, said portions covered by said plain cylinder and combing segment having constant width along the axis of said base cylinder respectively, said combing segment comprising a base member having an arcuate cross section, a plurality of metallic wires having saw-teeth disposed rigidly on said base member with same lateral intervals such that longitudinal arrangement of said metallic wire are disposed spirally to the rotational axis of said combing cylinder and each of said saw-teeth being perpendicular to the axis of rotation of said combing cylinder and each having a point facing toward the rotational direction of said combing cylinder.

2. A combing cylinder of combing machine according to claim 1, wherein each tooth is provided with a top portion inclined towards the rotational direction of said combing cylinder, and a base portion inclined towards a direction opposite to the rotational direction of said combing cylinder.

3. A combing cylinder of combing machine according

to claim 2, in which said teeth have a varying density disposed in such way that the density of saw-teeth decrease in the rotational direction of said combing cylinder.

4. A combing cylinder of combing machine according to claim 1, in which said combing segment has saw-teeth disposed substantially with uniform density per unit area of the surface of said combing segment.

5. A combing cylinder of combing machine according to claim 1, in which said base member made of thermosetting resin covers a part of said remainder portion of said cylinder surface of said base cylinder and the covered remainder portion having a constant width along axis of said base cylinder.

6. A combing cylinder of combing machine according to claim 1, in which said base member is made of metallic alloy and covers a part of said remainder portion of said cylindrical surface of said base cylinder, and the covered remainder portion having a constant width along the axis of said base cylinder.

7. A combing cylinder of combing machine according to claim 5, in which said metallic wires are disposed with same lateral intervals and said saw-teeth are each disposed with an inclination relative to a respective tangent to said cylinder a maximum of 45 degrees toward the rotational axis of said combing cylinder.

8. A combing cylinder of combing machine, comprising a base cylinder, a plain cylindrical part secured to a portion of the cylindrical surface of said base cylinder, a combing segment secured detachably to a part of a remainder portion of the cylindrical surface of said base cylinder, said portions covered by said plain cylinder and combing segment each having a constant width along the axis of said base cylinder respectively, said combing segment comprising a plurality of curved metallic plates, each of said metallic plates provided with a saw-teeth portion and a base portion having a plurality of wedge shaped recesses opened toward an inward direction, each saw-tooth having a point facing toward the rotational direction of said combing cylinder, and thermosetting resin filled spaces between said wedge shaped recess and said base cylinder.

References Cited

UNITED STATES PATENTS

1,778,873	10/1930	Sundberg	19—234	XR
1,892,317	12/1932	Nasmith	19—234	XR
1,943,707	1/1934	Walker	19—234	

FOREIGN PATENTS

144,425	6/1920	Great Britain.
---------	--------	----------------

MERVIN STEIN, *Primary Examiner.*

DORSEY NEWTON, *Assistant Examiner.*