United States Patent

Herubel

[15] **3,636,591**

[45] **Jan. 25, 1972**

[54] DRAFTING DEVICE FOR TEXTILE MACHINES

[72] Inventor: **Jean Frederic Herubel,** Guebwiller, France

[73] Assignee: **N. Schlumberger & Cie,** Guebwiller, France

[22] Filed: **Nov. 5, 1969**

[21] Appl. No.: **874,136**

[30] **Foreign Application Priority Data**

Nov. 28, 1968 France 175735

[52] **U.S. Cl.** **19/236,** 19/248, 19/249

[51] **Int. Cl.** **D01h 5/00**

[58] **Field of Search** 19/244–257, 129, 19/127, 258, 236

[56] **References Cited**

UNITED STATES PATENTS

2,175,107 10/1939 Casablancas 19/249

FOREIGN PATENTS OR APPLICATIONS

810	0/1860	Great Britain	19/129
826,902	1/1960	Great Britain	19/244
964,957	7/1964	Great Britain	19/248

Primary Examiner—Dorsey Newton

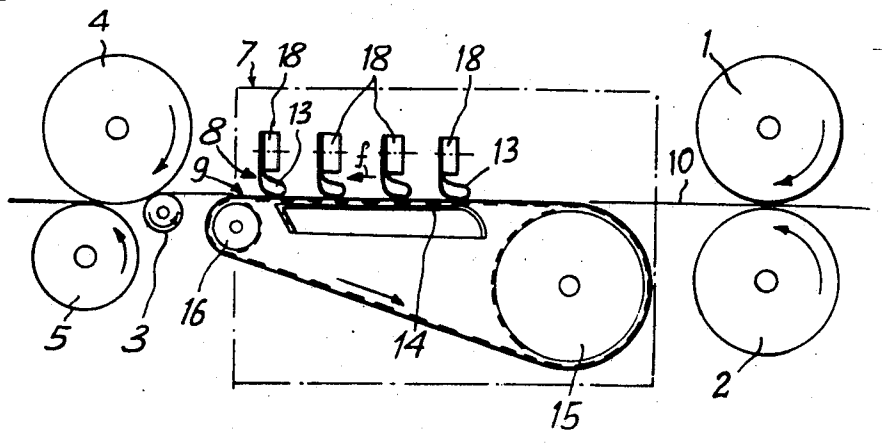
Attorney—McGlew and Toren

[57] **ABSTRACT**

The present invention relates to a drafting machine for the preparation and spinning of natural or manmade textile fibers and more particularly to the devices for controlling said fibers.

A device according to the invention comprises, between feed cylinders and drafting cylinders, two fields of control elements movable in the sense of forward movement of the fibrous material to be drafted between the two fields. A least one of said fields is constituted by bars with flexible lips each formed from a transverse strip of material presenting a degree of flexibility such as rubber, leather or an elastomer folded back on itself in the form of a loop called upon to exert a degree of pressure against the said fibrous material.

13 Claims, 23 Drawing Figures



PATENTED JAN 25 1972

3,636,591

SHEET 1 OF 5

Fig: 1

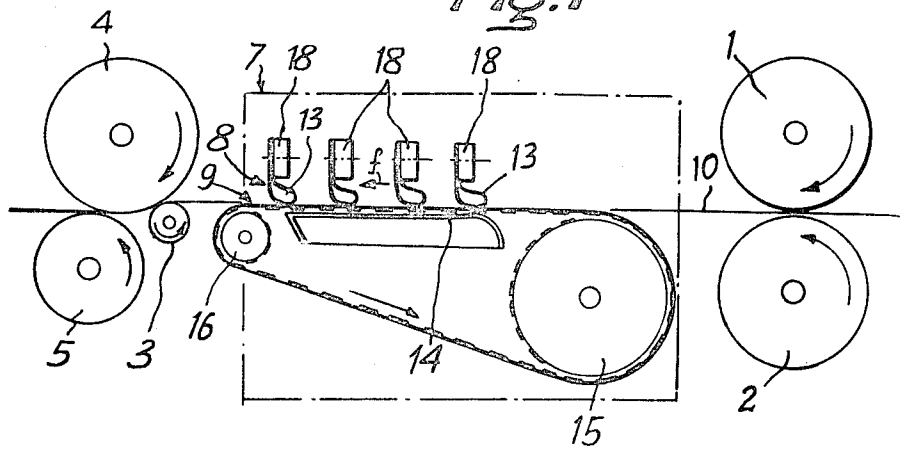


Fig: 2

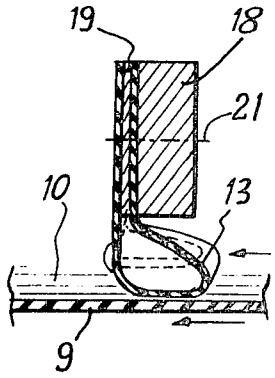


Fig: 3

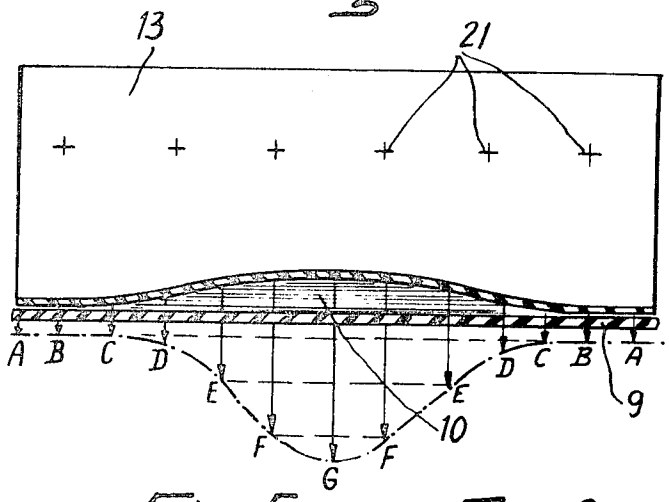


Fig: 4

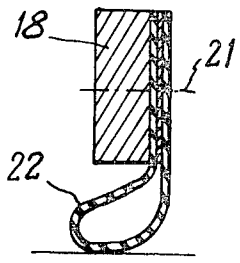


Fig: 5

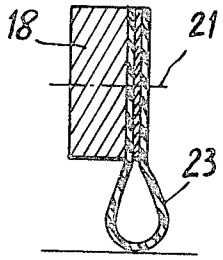
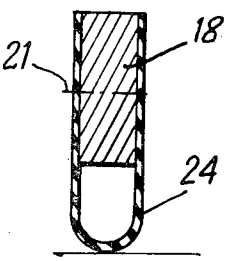


Fig: 6



INVENTOR
JEAN-FREDERIC HERUBEL
BY McGlew & Toren
ATTORNEYS

Fig: 7

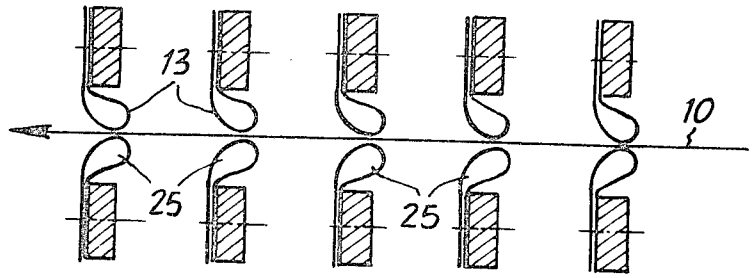


Fig: 8

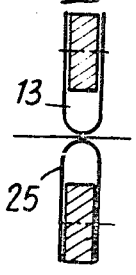


Fig: 9

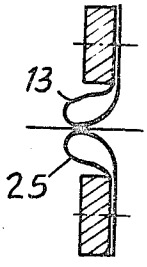


Fig: 10

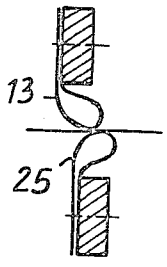


Fig: 11

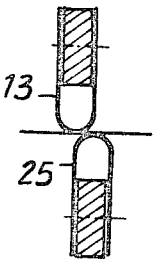


Fig: 12

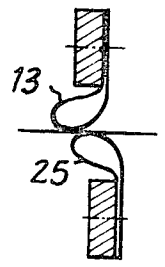


Fig: 13

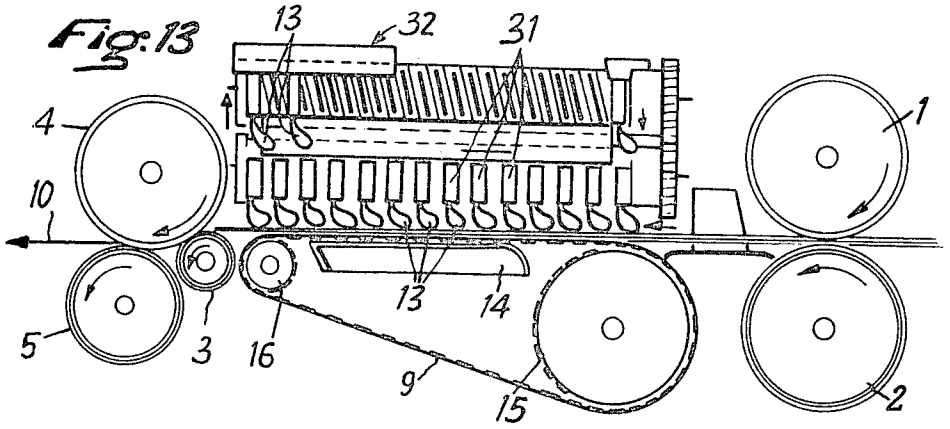
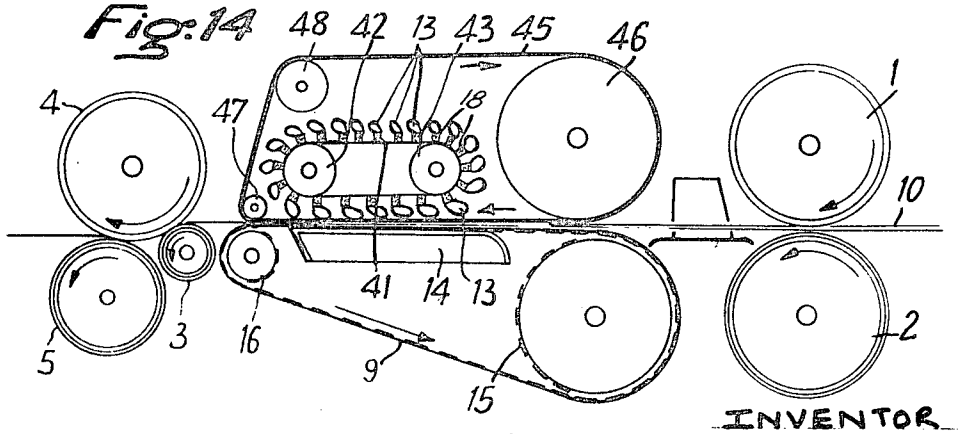


Fig: 14



INVENTOR
JEAN-FREDERIC HERUBEL
BY McGlew & Torek
ATTORNEYS

Fig: 15

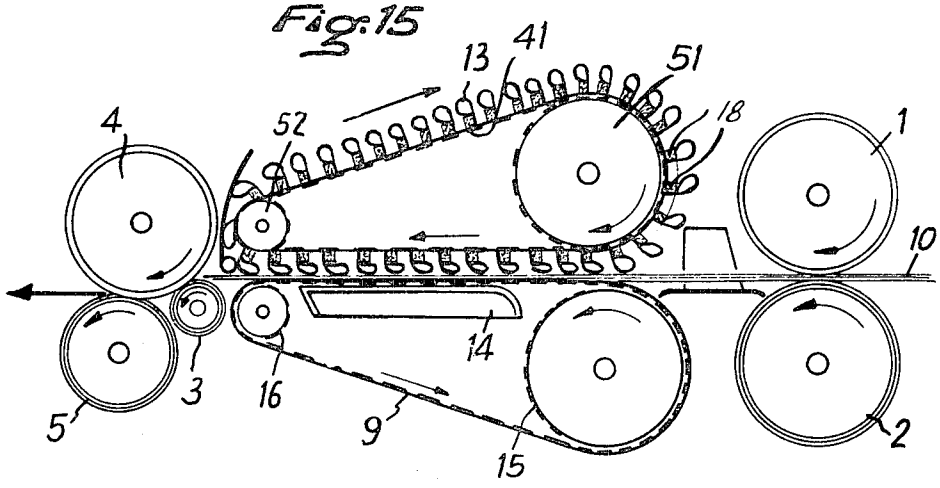


Fig: 16

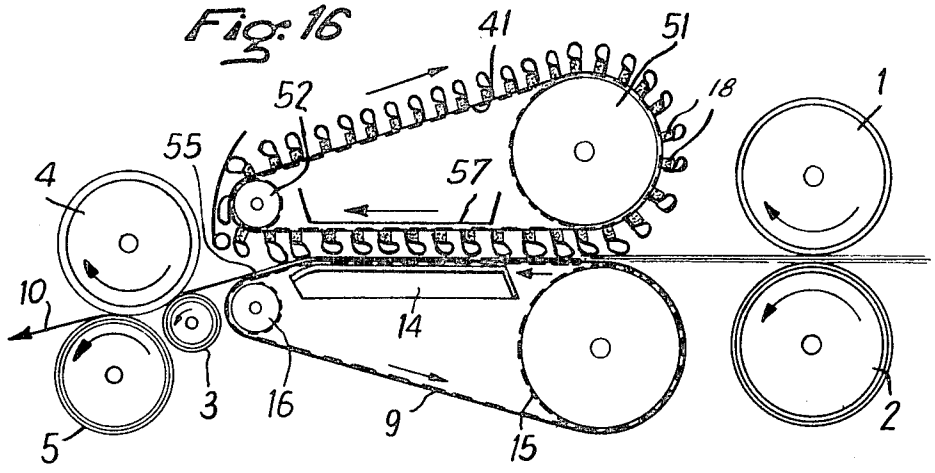
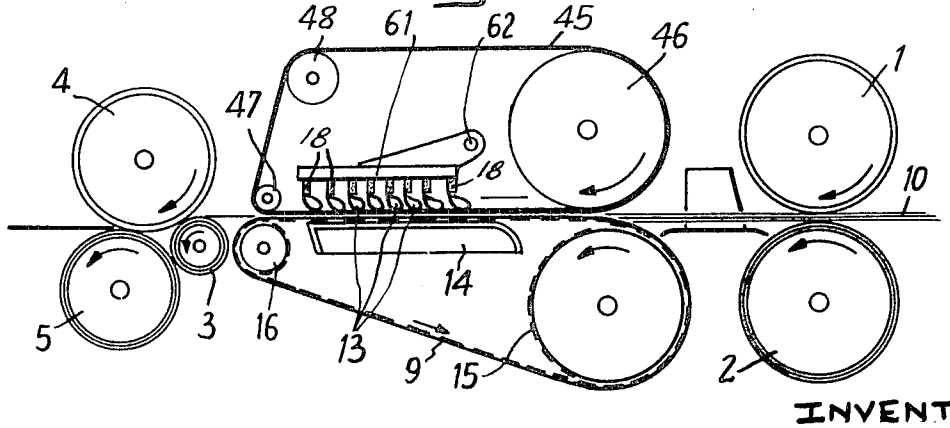


Fig: 17



INVENTOR
JEAN-FREDERIC HERUBEL
BY McGlew & Tores
ATTORNEYS

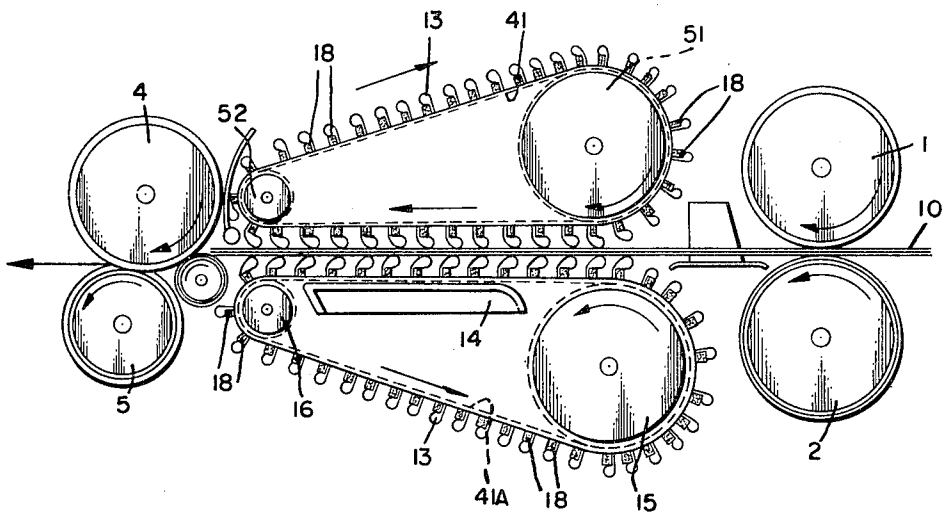


Fig. 15A

INVENTOR.
JEAN FREDERIC HERUBEL

Fig: 18

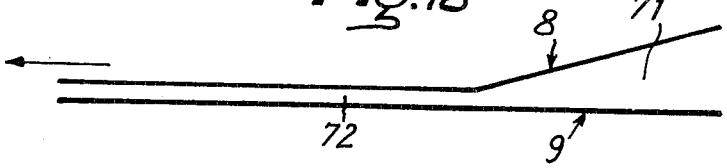


Fig: 19

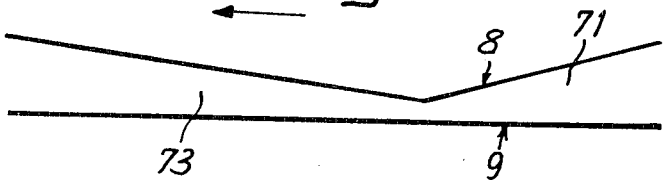


Fig: 20

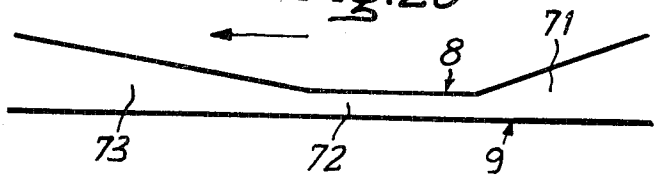


Fig: 21

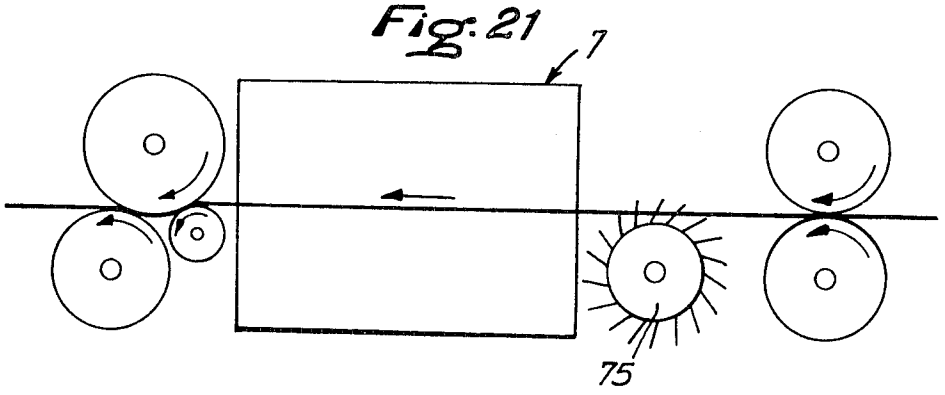
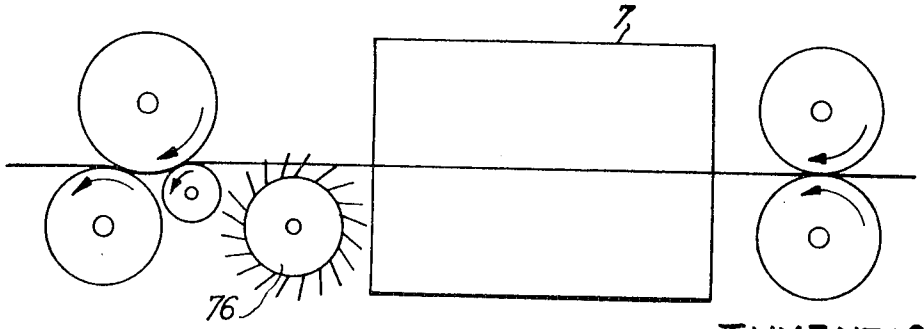


Fig: 22



INVENTOR
JEAN-FREDERIC HERUBEL
BY McGlew & Torres
ATTORNEYS

DRAFTING DEVICE FOR TEXTILE MACHINES

DRAFT TRANSLATION

The present invention relates to high-draft drafting systems for the preparation and spinning of natural or manmade textile fibers.

Every preparing or spinning machine for textile fibers comprises a device serving to arrange the fibers parallel to each other and to draw the slivers or rovings. Such a device is composed of feed cylinders, a control device, and drafting rollers.

The present invention concerns more particularly the device for controlling the fibers.

The many drafting devices used up to the present for drawing slivers or rovings comprise varied control parts, such as single or double fields or pinned bars or fallers, porcupine rolls, rollers with elastic covering, multiple and idler rollers, double or apron units and so on.

Some devices use a combination of several of these means.

However, known devices present a certain number of disadvantages, notably:

1. The control system using pinned bars is very slow which irreparably limits production. What is more the number of points is insufficient to treat fine slivers for preparation for the yarns to be spun, further the drafting action which the system allows is relatively weak. Also the feeding charges are limited for a given output weight. This system is also very costly.

2. The porcupine roll constitutes a field of needles over a very small active area which considerably diminishes the control of the treated fibers. The fact that the penetration of the needles into the sliver and their leaving are not made perpendicularly to the advance of the material, presents a constant risk of irregularity in the sliver or roving.

3. The system using multiple cylinders and floating cylinders presents the risk of numerous tangles and controls the material badly.

4. The system using lower and upper cylinders with elastic coverings controls the material better, but equally poses danger of tangles.

5. The system using a lower apron on convex surface limits the range of the material possibly treated, as its convexity retains the longer fibers too much.

6. The system using a double apron and a cylinder in the upper apron is better than the foregoing, because it suppresses tangles, but the control is still insufficient for above-normal inputs.

The object of the invention is to provide a drafting device which does not present the disadvantages listed above in the known devices.

To this end, a device according to the invention comprises, between feed cylinders and drafting cylinders, two fields of control elements movable in the sense of forward movement of the fibrous material to be drafted which must pass between the two fields, one of these at least being constituted by bars with flexible lips each formed from a transverse strip of a material presenting a degree of flexibility such as rubber, leather, or an elastomer, folded back on itself in the form of a loop which is called upon to exert a degree of pressure against the fibrous material.

Such a device according to the invention presents a whole series of advantages, notably:

1. The capital cost and the upkeep of a bar with a flexible lip is less than that of a bar with pins. Further, it is less fragile, which allows increase in the machine speed from which arises an increase in production.

2. The bar with a flexible member having a very good holding-back action, while being very supple, permits, on one part, drafting effects and on the other part, feeding charges greater than those of the usual devices.

3. The bar with a flexible lip not having pins, the problem of the entry and leaving of pins from the material does not arise. What is more, the bar with a flexible lip can present the flexible lip in any position, the holding back and control of the fibers being always accomplished without producing irregularities in the sliver or roving.

4. A field of bars with flexible lips no longer presents any risk of tangles, as was the case with the systems using multiple cylinders and floating cylinders.

5. The range of the materials which can be treated is no longer limited, the path and inclination of the field of lips being able to be chosen in the most favorable manner.

In one embodiment, the other field of control elements is constituted by an endless apron passing against a table and over two terminal cylinders, whereas, in another embodiment, the other field of control elements is constituted also by bars with flexible lips of the same kind.

Other characteristics and advantages of the invention will emerge from the following description and from the accompanying drawings, which show by way of example only, some embodiments of the invention. In the drawings:

FIG. **1** is a schematic side view of a first embodiment of a drafting device according to the invention;

FIG. **2** is an enlarged view of a bar with a flexible lip from the device of FIG. **1**;

FIG. **3** is a side view of the bar of FIG. **2**;

FIGS. **4**, **5** and **6** shows various forms of bars with flexible lips;

FIG. **7** is a schematic side view of the arrangement of two fields of control elements formed of bars with flexible lips;

FIGS. **8** to **12** show varied forms of the device of FIG. **7**;

FIG. **13** is a side view of another drafting device according to the invention, in which the flexible lips are carried by bars similar to intersection bars;

FIG. **14** shows another embodiment in which the flexible lips are mounted inside a drafting apron;

FIG. **15** shows a further embodiment in which the flexible lips are carried by an endless apron;

FIG. **15A** shows yet another embodiment in which the flexible lips are positioned both above and below the fibrous material;

FIG. **16** shows a modification of the embodiment in FIG. **15**;

FIG. **17** shows yet another embodiment in which the flexible lips are mounted in a support which is vertically movable inside an endless apron;

FIGS. **18**, **19** and **20** show schematically possible arrangements of fields of fiber control elements, in a drafting device according to the invention; and

FIGS. **21** and **22** represent embodiments similar to the preceding figures including a porcupine roller on the inlet and outlet sides of the machine respectively.

The drafting device for the preparation and spinning of natural or manmade textile fibers shown in FIG. **1** comprises between feed cylinders **1** and **2**, and drafting cylinders **3**, **4** and **5**, a fiber control device designated as a whole by **7**, and comprising two fields **8**, **9** of fiber control elements which are movable in the direction *f* in which the fibrous material **10** passes between the two fields.

At least one of the two fields of fiber control elements in this example the upper field is constituted by bars with flexible lips, **13** the structure of which can for example be seen in FIGS. **2** and **3**.

The lower field of control elements **9** is constituted in this example, by a belt or apron formed from canvas, or a notched endless belt which passes over a table **14** and two terminal cylinders **15**, **16**.

Such flexible lip **13** is constituted in this example by a transverse strip of a material possessing a desired degree of resilience, such as rubber, leather, or an elastomer, folded on itself to form a loop, the back of which is called on to exert pressure on the fibrous material **10**.

In this example, the two marginal portions of the folded strip are secured against a rigid support **18**, by example by means of a plate **19** and bolts shown simply by their axes **21**.

The ensemble of these bars and flexible lips forms a flexible and deformable field which exerts on the fibrous material **10**, a pressure which increases with increasing thickness of the fibrous material. In FIG. **3** there are shown by arrows A, B, C, D, E, F, and G, the values of the pressure exerted by the flexible lip **13** on the fibrous material **10** as a function of the loca-

tion of the point considered across the width of the fibrous material. In the middle of the fibrous material, that is in the region of its maximum thickness, the pressure indicated by arrow G is also the greatest, whereas on the edges where the thickness of the fibrous material is weak, the pressure indicated by arrows such as A, B is much weaker.

In FIG. 2, there is indicated in broken lines, the configuration of the bar with flexible lip towards the middle of its length, that is at the place of greatest thickness of the fibrous material 10.

FIG. 4 shows a modification in the form of the flexible lip directed downstream of the fiber feed instead of directed upstream like that in FIG. 2.

FIGS. 5 and 6 show forms of bars in which the flexible lip 23 or 24 is symmetrical with reference to a theoretical geometric plane situated between the two faces of the strip fixed to the support 18. In FIG. 5, the two marginal portions of the strip are secured to the support 18 one against the other. Whereas in FIG. 6 they are secured to the opposite sides of the support, so that the lip is wider.

In FIG. 7 there is schematically shown a modification of the main part of the fiber control system illustrated in FIG. 1 in which the lower field of control elements is also constituted by bars with flexible lips 25 similar to those 13 of the upper field.

The lower bars with flexible lips 25 can be placed exactly opposite the upper bars with flexible lips 13 as shown in FIG. 7 or else with a slight shift as shown in FIG. 10.

In FIG. 7 the bars with flexible lips have been represented directed rearwardly or upstream but they can also by way of modification be directed forwardly or downstream, either in perfect coincidence as shown in FIG. 9 or with slight shift as shown in FIG. 12. Instead of being inclined, the flexible lips can also present a symmetrical form with reference to a theoretical geometric plane, situated midway between the two sidewalls of the strip as shown in FIGS. 8 and 11 which show respectively, the bar in coincidence and shifted. The body 18 of the plate can be inclined during its working phase.

In FIG. 13, there is shown another embodiment in which the flexible lips 13 are carried by bars 31 mounted in a mechanism designated as a whole by 32, of the intersecting bar kind which bars are displaced in a rectilinear direction along the fibrous material 10 and which return to their starting point through a path located above their working path. The other elements in the device are similar to those shown in FIG. 1 and are designated by the same reference numerals. Their operation is the same.

In another embodiment shown in FIG. 14, the upper field of control elements is again constituted by flexible lips 13, secured to bars 18 carried on an endless belt 41 mounted on two terminal rollers 42, 43, at least one of which is driven to assure movement of the lips 13. What is more, the ensemble of these lips is mounted inside an endless belt 45 which passes around cylinders 46, 47, 48 driven at the same speed as that of the lips 13. The fibrous material 10 is thus submitted to the pressure of the lips 13 through the intermediary of the belt 45. The other elements are the same as shown in FIG. 1.

In FIG. 15, the lower field of control elements is the same as in FIG. 14, but the lips 13 of the upper field, which are again carried by bars 18 mounted on an endless belt 41, are in direct contact with the fibrous material 10, the belt 41 being carried by two cylinders 51, 52 at least one of which is driven at the desired speed. In a modification illustrated in FIG. 15A, the lower belt 41A carried by the cylinders 15 and 16 also carries bars 18 with lips 13 which form the lower field of fiber-controlling elements adapted to exert a pressure against the fiber material 10 in conjunction with the lips 13 of the upper field. Preferably, belts 41 and 41A are notched belts capable of being moved in perfect synchronism.

The device shown in FIG. 16 is only differentiated from that shown in FIG. 15 by the fact that the table 14 is raised relative to the downstream terminal cylinder 16, so that the drawing device presents a path with a plunging part as shown by 55, which permits control, not only of long fibers but also of short fibers, and consequently, improvement to a great extent of the regularity of the sliver or roving of emerging fibers.

In FIG. 16, there is shown, also, a fixed guide 57 against which the internal face of the flexible lip supporting belt 41 is backed, facing the table 14 against which passes the lower belt 9.

In FIG. 17, there is shown a modification of the embodiment of FIG. 14 from which it differs in that the flexible lips 13 are not subject to a translational movement, but are carried by bars 18 secured to a vertically movable support 61 inside of endless belt 45 so as to be able to exert a variable pressure against the inner face of the said belt 45 and, in consequence, on the sliver or roving of fibers 10. In the example, the support 61 is pivotally mounted on a horizontal shaft 62. There can further by provided means for regulating the pressure exerted by the lips 13 against the belt.

Generally speaking, in all the embodiments shown and described above, as well as in all those which can fall within the scope of the invention, the path of the upper fiber control elements, and the path of the lower fiber control elements can be, perhaps parallel as in the embodiments illustrated or perhaps convergent in a first part as shown by 71 in FIG. 18, then parallel in a second part 72 or even convergent in a first part 71, as shown in FIG. 19 and divergent in a second part 73 or else first convergent as shown by 71 in FIG. 20, then parallel in a second part 72 and finally divergent in a third part 73.

In FIGS. 21 and 22, the control system according to the invention, designated as a whole by 7, is preceded and/or followed by a single or double porcupine roller as shown by 75, 76, respectively. The porcupine roller can also be replaced for example by gill boxes or intersecting combs, or by drafting devices with double or single apron, or else by drafting devices with barrel rollers.

The speed of advance of the lower field of fiber control elements can be the same as the speed of the elements of the upper field, but it can also be slightly different therefrom, which can remedy insufficient pressure to hold back the fibers, notably for poor feeding charges.

The driving of the bars with resilient lips can be carried out by a screw, e.g., similar to an intersecting bar screw, by a notched belt, by a chain, or by any other appropriate means.

Of course the invention is not limited to the embodiments described and represented, which have been given by way of examples. Numerous modifications can be made thereto, according to the intended application without departing from the scope of the invention.

What is claimed is:

1. A device for drafting a fibrous material comprising feed cylinders, drafting cylinders, two fields of fiber controlling elements arranged between said feed and drafting cylinders and movable in the direction of movement of said fibrous material, at least one of said fields of fiber controlling elements being constituted by bars and flexible lips carried by said bars, said lips each being formed of a transverse thin strip of material presenting a degree of flexibility folded back on itself to form a loop called on to exert a pressure against the fibrous material.

2. A device according to claim 1, further comprising two terminal cylinders, a table between said two terminal cylinders, and wherein said other field of fiber control elements is constituted by an endless belt passing over said table and said two terminal cylinders.

3. A device according to claim 1, wherein the other field of fiber control elements is also constituted by bars with similar flexible lips.

4. A device according to claim 1, wherein each of said flexible lip carrying bars is made of a rigid material.

5. A device according to claim 4, wherein each of said bars has a strip-carrying face, said flexible strip having two marginal portions and said two marginal portions of said flexible strip being secured to said face of said bar.

6. A device according to claim 4, wherein each of said bars has two opposite strip-carrying faces, said flexible strip having

two marginal portions and said two marginal portions of said flexible strip being secured respectively to said two opposite faces of said bar.

7. A device according to claim 3, wherein each bar of one of said two fields is located opposite a bar of the other field.

8. A device according to claim 3, wherein each bar of one of said two fields is shifted with reference to a bar of the other field in their direction of motion.

9. A device according to claim 1, wherein one of said two fields of fiber control elements comprises an endless belt, said flexible lip-carrying bars being arranged inside said endless belt, said lips being in contact with one run of said belt in an active area of said field.

10. A device according to claim 9, wherein said flexible lip-carrying bars are carried on a support, said support being movable perpendicularly to the general plane of said lips on a zone where they cooperate with the other field of fiber controlling elements.

11. A device according to claim 1, wherein said field of fiber-controlling element further comprises two end cylinders, an endless belt passing over said two end cylinders, said field of flexible lip carrying bars being carried by said endless belt.

12. A device according to claim 2, wherein said table is raised with reference to the end cylinder which carries the downstream end of the endless belt passing over said table.

13. A device according to claim 1, wherein a support means is provided on which said field of flexible lip carrying bars is mounted for displacing said lip-carrying bars in a working path in the direction of movement of the fiber material and for returning said flexible lip-carrying bars through a path located above the working path.

* * * * *