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(54) **Apparatus for the production of chenille**

(57) Apparatus for producing yarn chenille (F) characterized in that it comprises:

- a chenille yarn-forming unit, the chenille yarn formed within said unit is made up of two interweaving threads, a plurality of fuzzy thread lengths and one thermoforming thread being fed along with the interweaving threads;
- a unit for heating the yarn exiting from said forming unit;
- a unit for twisting and driving the yarn exiting from said heating unit;
- a spooling unit, that is, a unit for causing the yarn exiting from said twisting unit to be collected on reels; and in that the yarn-heating unit is located downstream of the forming unit and upstream of the spooling unit.

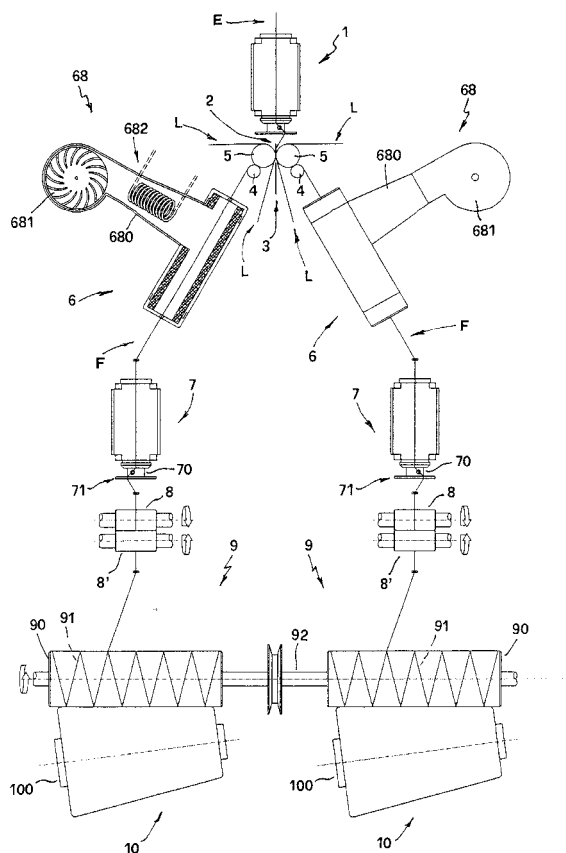


Fig. 1

Description

[0001] The present invention refers to an apparatus for the production of chenille.

[0002] Chenille yarn is known to be made up of two so-called "interweaving" threads suitably twisted to engage a plurality of lengths formed by a third, so-called "fuzzy" thread. The interweaving threads are supplied via so-called "draw" rollers placed close to a gauge over which the fuzzy thread winds up. Located below the gauge is a blade which provides for cutting the fuzzy thread into pieces of preset length.

[0003] The twisting of the interweaving threads, with the lengths of fuzzy threads interposed therebetween, is carried out by spindles located below and driven into rotation for collecting thereon the thus formed yarn.

Machines for producing chenille according to the general scheme indicated above are disclosed in documents US 3969881, EP 502828, EP 534911 and EP 674030.

[0004] Thereafter, provision is made for steaming the yarn collected on spindles and, following this, a "spooling" operation is performed by which the same yarn is wound on reels. The "steaming" and the spooling of the yarn are carried out at stations separate from those for the formation of the chenille yarn.

A discontinuity in the process does exist, therefore, between the steps for the formation of the yarn and those for the steaming and spooling of same yarn.

[0005] The object of the present invention is to overcome the drawbacks deriving from said discontinuity and to eliminate the step of steaming the yarn.

This result has been achieved, according to the invention, by providing an apparatus having the characteristics disclosed in claim 1. Further characteristics being set forth in the dependent claims.

[0006] The present invention makes it possible to produce a very wear-resistant chenille yarn, wherein the fibres are sufficiently relaxed so that they do not require any steaming. Moreover, the thus made chenille yarn is of a good quality inasmuch as it exhibits a reduced defectiveness. It also allows a direct spooling of the chenille yarn. Further advantages obtained from the present invention lie in its simple constructional and functional design as well as in its reliability.

[0007] These and other advantages and characteristics of the invention will be best understood from a reading of the following description in conjunction with the attached drawings given as a practical exemplification of the invention, but not to be considered in a limitative sense, wherein:

- Fig. 1 shows schematically an apparatus according to the present invention;
- Fig. 2 is a schematic view in diametral section of a detail relative to the threads-heating units; and
- Fig. 3 is a schematic plan view of an alternative embodiment of the threads-heating units.

[0008] Reduced to its basic structure and reference being made to the accompanying drawings, an apparatus according to the present invention comprises:

- 5 - a chenille yarn-forming unit;
- a unit for heating the yarn exiting from said forming unit;
- a unit for twisting and driving the yarn exiting from said heating unit;
- 10 - a spooling unit, that is, a unit for causing the yarn exiting from said twisting unit to be collected on reels.

[0009] The yarn-heating unit is downstream of the forming unit, the twisting and driving unit is downstream of the heating unit and the spooling unit is downstream of the twisting unit.

The thread-forming unit is of traditional type and comprises a head (1) for feeding the fuzzy thread (E) which winds up spirally over an underlying gauge (2). Positioned below the gauge (2) is a blade (3) for cutting the loops of fuzzy thread into pieces of preset length.

Positioned on both sides of the gauge are two pairs of rollers (4) and relevant counter-rollers (5) for drawing along the interweaving threads (L). The latter come from a corresponding source, not shown for the sake of clarity in the figures of the attached drawings, and are associated with one or more thermoforming threads. For example, the thermoforming threads, being thinner than the interweaving ones, may be made from polyester or nylon at 85-110 °C. The yarn-forming unit above described allows, by operating according to a scheme known per se, a double production of yarn, in the sense that by feeding the interweaving threads in correspondence of each side of gauge (2), the formation of the yarn concerns both the left and the right side of the gauge, so that two symmetrical productions of yarn take place. In the drawings, the yarns made up of two interweaving threads associated with the thermoforming ones, and with lengths of fuzzy threads interposed therebetween, are designated by the letter (F).

Each yarn (F) from said formation unit goes through a corresponding heating unit which comprises a tubular chamber (6) externally delimited by a metal tubular body (60) and being internally provided with a tubular thermoinsulating body (61) made of glass fibres, for example.

The upper and lower bases (62, 63) of said chamber (6) have a central port for the passage of a corresponding thread (F), and are provided with corresponding central ceramic eyelets (620, 630). The said bases (62, 63) are also provided with further holes (660) for communication with the outer environment. The upper base (62) supports a thread-guide spiral (64) whose opening is coaxial with the eyelet (620). Each chamber (6) is associated with means (68) able to produce a flow of hot air to be delivered to the same chamber (6). To this end, each chamber (6) has a port (69) for the introduction of the

hot air, which is connected with the outlet of said means (68) via a conduit (680).

[0010] According to the example of Fig. 1, the said means (68) comprise a fan (681) for each chamber (6), with an electric resistance (682) for each conduit (680), the said resistance (682) being associated with a corresponding electric supply (not shown in the drawings) and intended for heating the air passing into the respective conduit (680).

[0011] According to the example of Fig. 3, provision is made for using a single fan (681), a single resistance (682) and a single conduit (680), the latter exhibiting two branches each of which leads into the port (69) of a corresponding chamber (6). In correspondence of holes for the relief of hot air (660), which are provided in the upper and lower bases of chambers (6), one or more suction mouths (not shown in the drawings) are located, by means of which the hot air (660), on output from the same holes, can be aspirated. The temperature of the air introduced into the chambers (6) is such as to determine the melting of the thermoforming threads associated with the interweaving threads (L).

In practice, the thread from each heating unit (68) is made up of interweaving threads and lengths of fuzzy threads attached thereto by the thermoforming thread being made to melt inside the chamber (6).

The venting provides for an efficient heat treatment of the thread (F) by ensuring the maximum contact between the hot air and the assembly formed by the interweaving and thermoforming threads and lengths of fuzzy threads per unit of time.

As set forth above, downstream of each heating unit (6) a corresponding twisting and driving unit may be provided, able to twist the thread (F) coming out therefrom and to move it downhill.

[0012] For example, and as illustrated in Fig. 1, each thread (F)-twisting and driving unit may comprise a head (7), shaped like that indicated by (1) feeding the fuzzy thread (E), with a central hollow shaft (70) associated with an electric motor (not shown), the thread under treatment passing longitudinally through said shaft, and with the plate (71) fixed to the lower end of said shaft (70) from which it comes out eccentrically. Disposed downstream of the head (7), according to the scheme of Fig. 1, is a pair of rollers (8, 8') associated with an electric motor (not shown), the surfaces of said rollers engaging the thread (F) exiting from the head (7): the axes of same rollers (8, 8') are orthogonal to the direction of movement of the thread (F).

Provided downstream of each twist and driving unit is a corresponding spooling unit able to wind the corresponding thread (F) over a reel.

[0013] According to the schematic diagram of Fig. 1, each spooling unit (9) comprises one roller (90) on the surface of which a groove or trace (91) is formed for guiding the thread on output from rollers (8, 8') and which is associated with an electric motor (not shown). On the side opposite to that the thread (F) is made to

come out, the roller (90) drives into movement a reel (10) over which the thread (F) is collected and whose axis (100) is at an angle with respect to the axis (92) of roller (90) for the mounting thereof on a corresponding elastic support which, upon the spooling step, keeps the reel in contact with the roller (90) by which it is driven around its axis.

[0014] The present apparatus, by operating as described above, makes it possible to optimize the production of this type of chenille, while saving on the running costs and, more particularly, on the fixed and labour costs.

In practice all the construction details may vary in any equivalent way as far as the shape, dimensions, elements disposition, nature of the used materials are concerned, without nevertheless departing from the scope of the novel idea and, thereby, remaining within the limits of the protection granted.

Claims

1. Apparatus for producing yarn chenille (F) **characterized in that** it comprises:

- a chenille yarn-forming unit, the chenille yarn formed within said unit being made up of two interweaving threads, a plurality of fuzzy-thread lengths and a thermoforming thread being fed along with the interweaving threads;
- a unit for heating the yarn exiting from said forming unit;
- a unit for twisting and driving the yarn exiting from said heating unit;
- a spooling unit, that is, a unit for causing the yarn exiting from said twisting unit to be collected on reels; and **in that** the yarn-heating unit is downstream of the forming unit and upstream of the spooling unit.

2. Apparatus according to claim 1, **characterized in that** it comprises a unit for twisting and driving the yarn exiting from said heating unit: the said twisting and driving unit being located downstream of the heating unit and upstream of the spooling unit.

3. Apparatus according to one or more preceding claims, **characterized in that** the said heating unit comprises at least one tubular chamber (6) delimited by a metal tubular body (60) in the inside of which a tubular thermoinsulating body (61) is located: the said chamber being connected to corresponding means (68) able to produce a flow of hot air to be introduced into the same chamber (6).

4. Apparatus according to claims 1 and 4, **characterized in that** the said chamber (6) is provided with holes (660) in correspondence of its upper and low-

er bases (62, 63) to allow venting the hot air to the outside.

5. Apparatus according to claims 1 and 4, **characterized in that** one or more mouths are positioned in correspondence of said holes (660) for aspirating the air on output from the same holes. 5
6. Apparatus according to claims 1 and 2, **characterized in that** the said twisting and driving unit comprises at least one head for twisting the thread (F) on output from the heating unit and comprising a twisting head (7) with a hollow shaft (70) which the thread (F) goes through longitudinally, and with a dish (71) fixed to the lower end of the shaft (70) from which the thread (F) comes out eccentrically. 10 15
7. Apparatus according to claims 1 and 2, **characterized in that** the said twisting and driving unit comprises at least one pair of rollers (8, 8') whose surfaces engage the thread (F) and which are oriented orthogonally to the thread-driving direction. 20
8. Apparatus according to claim 1, **characterized in that** the said spooling unit comprises at least one roller (90) with a groove (91) for guiding the thread (F). 25

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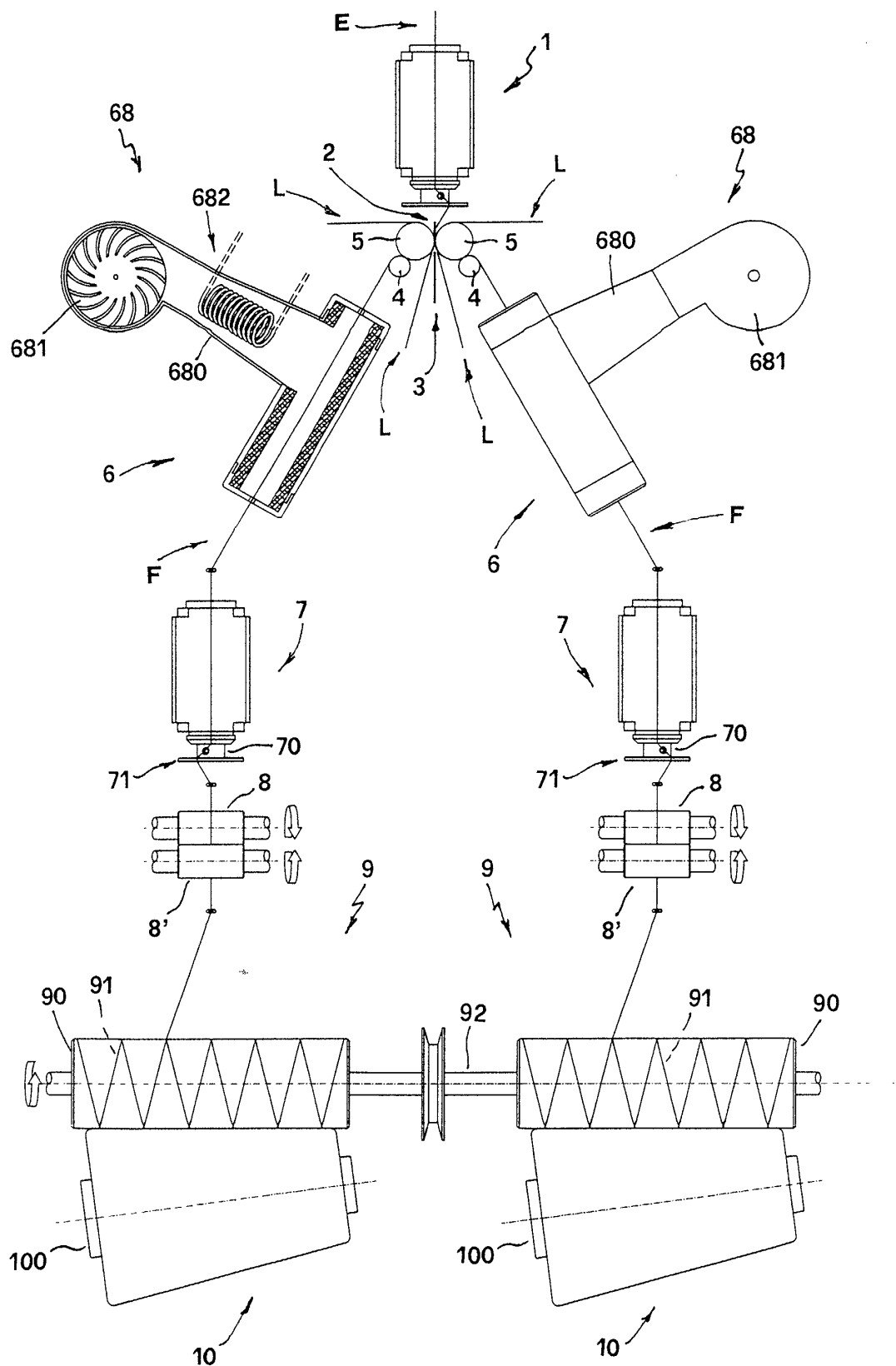


Fig. 1

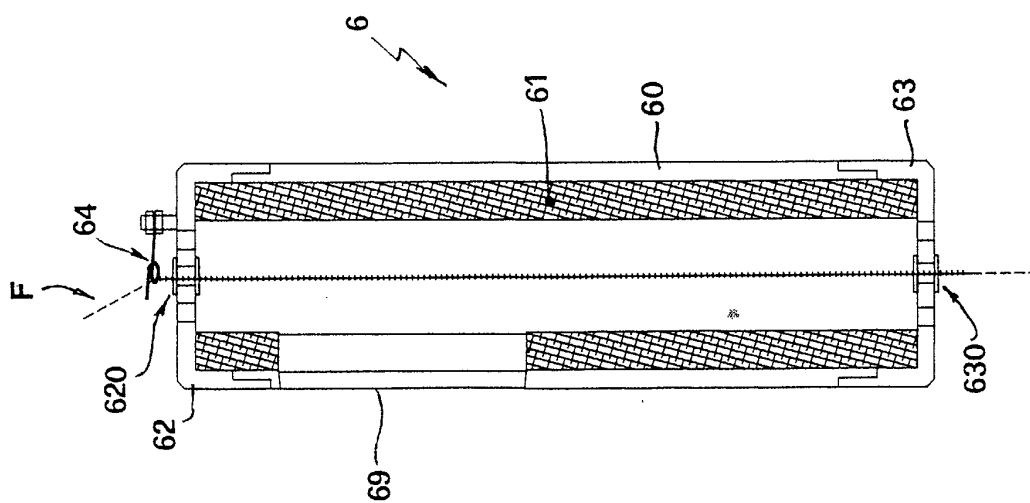


Fig. 2

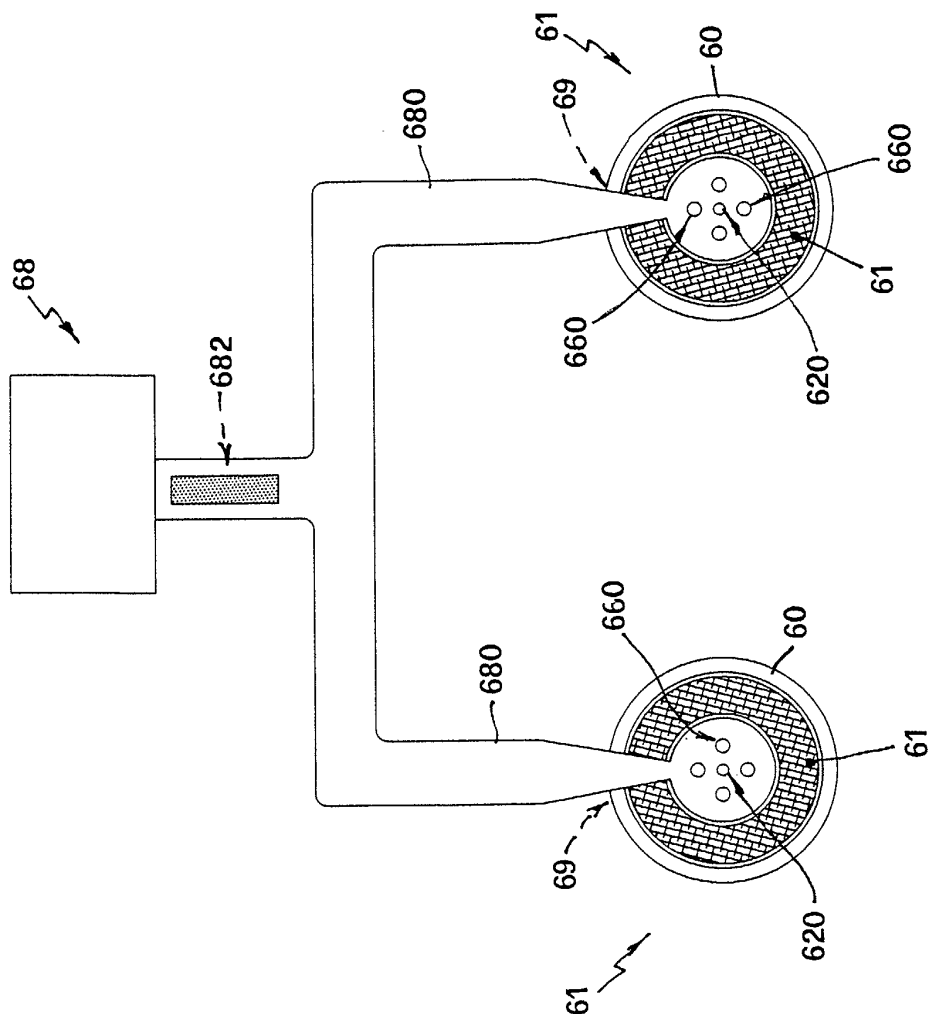


Fig. 3