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[54] **APPARATUS FOR MANUFACTURING COMPOSITE ROVINGS**

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[58] **Field of Search** 19/151–153; 57/38.3, 91

[56] **References Cited**

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Primary Examiner—Dorsey Newton

[57] **ABSTRACT**

The apparatus consists of two endless sleeves having semi-rigid runs which bear against each other and are driven by means imparting thereto a dual movement that includes a continuous rotary movement and a lateral reciprocating movement; in both cases, the two sleeves are moving in opposite direction. Drive means feeding a plurality of single rovings to the sleeves are provided together with means for winding the formed composite rovings at the outlet of the sleeves. Intermittent drive means are associated with at least one single roving for the purpose of producing a clouded composite roving.

2 Claims, 2 Drawing Figures

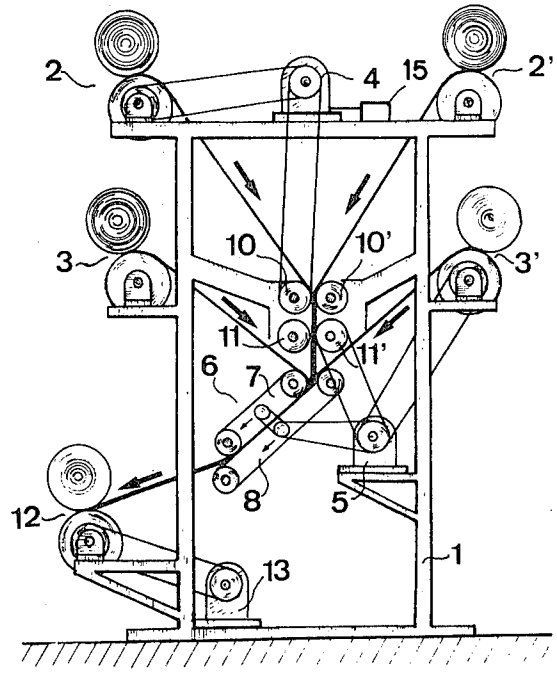


FIG. 1

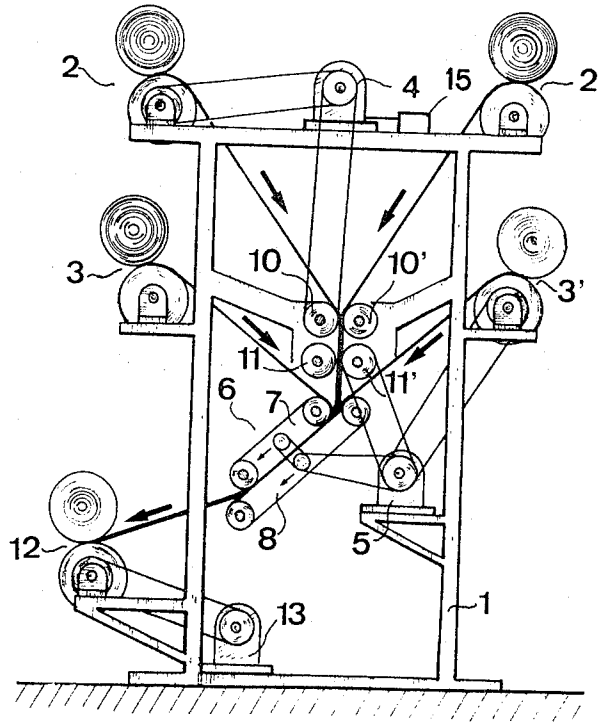
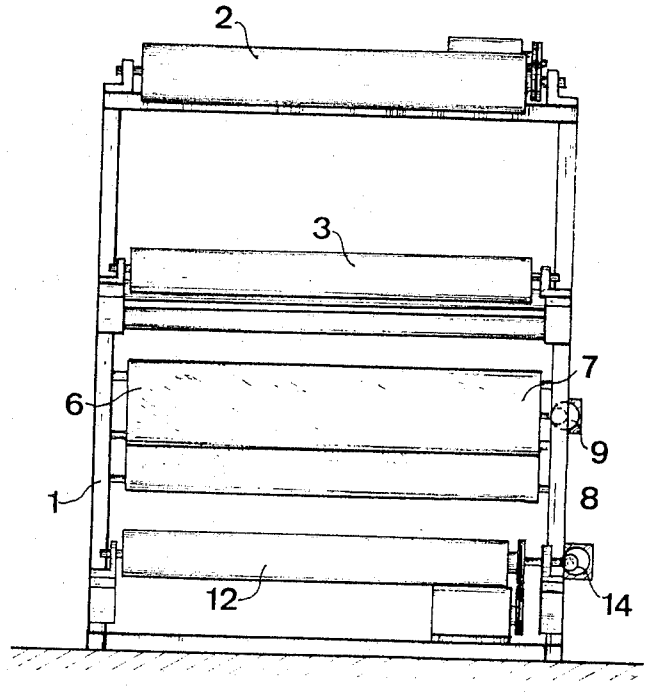


FIG. 2



APPARATUS FOR MANUFACTURING COMPOSITE ROVINGS

The invention relates to a method of manufacturing composite textile rovings comprising a plurality of fibres which may be of different natures, colours, and sizes, one of them at least being continuous; these composite rovings are intended to produce, by fine-spinning operations, fancy threads of non-uniform aspect, such as multi-coloured threads, clouded threads exhibiting local areas of different colours, lumped threads of different sizes, etc. The invention also covers a machine for the execution of this method, and the rovings thus obtained.

It is known that textile rovings — also known as "spiral threads," twisted threads, or even carded spirals — from which threads are manufactured are produced by a variety of carding machines, the machines being arranged in series to convert the raw material into a continuous web, a sort of very fine cloth of textile material. As it emerges from the final carding machine, this web enters a slitting machine which cuts it into a certain number of strips which are rolled together by friction between friction rollers, in order to produce the rovings.

According to the methods hitherto known, the multi-fibre composite rovings are produced either by bringing together, at the inlet to the slitting machine, a plurality of webs arriving from several varieties of carding machines, or by incorporating into the web, again at the inlet to the slitting machine, portions of webs or single rovings in continuous or discontinuous form.

The method of combining a plurality of webs, or of incorporating portions of webs, into a web, has several disadvantages, the most serious of which is that it requires extremely bulky and expensive installations, mainly because each web requires a variety of carding machines to produce it; moreover, this fact, in conjunction with the difficulties in transferring the webs, limits the number of webs, or portions of webs, that can be combined to three or four in actual practice, thus reducing the variety of fancy threads possible.

The method, which consists of incorporating into a main web continuous or discontinuous rovings, produces a roving consisting of a main fibre to which separate parts are grafted to impart a certain fancy character thereto. However, apart from the fact that incorporating rovings into the web at the inlet to the slitting machine is a delicate operation, the results produced by this method are disappointing: the resulting composite roving is almost uniform and lacks contrast, since the rovings incorporated into the web are mostly integrated into the material and therefore do not stand out. For example, it is extremely difficult to obtain, with this method, multi-coloured threads in which the various shades are distinct from each other.

It is the purpose of the present invention to overcome the disadvantages of known methods, and to provide a method of manufacturing composite rovings with simple and inexpensive equipment which will multiply the variety of fancy threads available. To this end, the method according to the invention consists in bringing together longitudinally, and continuously, a plurality of single rovings, at least one of which is continuous, and in rolling this product on to itself, for the purpose of connecting the various filaments thereof intimately together, and of converting it into a single composite roving which may then be subjected to fine-spinning operations, in order to obtain a fancy thread of non-uniform appearance. This method does not use webs; it uses rovings which are easy to transfer and are manufactured by conventional methods. Such rovings may be stored on bobbins and may be unwound when the method is put into operation. In the case of plants equipped with several varieties of carding machines, the rovings may also come directly from the slitting machine outlets — but there is no need for these to be specially arranged in relation to each other — and may be brought by guide means to the area where they are joined together. It is also possible to combine the two methods, for example to bring the rovings together in the vicinity of the outlet from a slitting machine which delivers a single roving directly, the other rovings being fed from bobbins close to the slitting machine.

The use of the method according to the invention therefore requires no bulky equipment and the method is easily adapted to existing varieties of carding machines, regardless of how they are arranged in relation to each other. More particularly, a plant equipped with a single set of carding machines may use this method, merely by producing the single rovings it requires consecutively, storing them on bobbins as they are produced, and then using the method according to the invention to obtain the desired composite roving.

It may be seen that an unlimited number of single rovings may be obtained in this way, and that the different fibres of the composite roving obtained — which may be arranged in relation to each other without favouring any particular fibre — may stand out in relation to each other, for example for the purpose of providing a multi-coloured whole having distinct and balanced shades.

Moreover, some of the single rovings brought together may be discontinuous, being obtained from a continuous roving brought intermittently to the area in which the rovings are placed together and cut off immediately upstream of this area at each stop. In this case, the composite roving obtained exhibits local "clouds" arranged at regular intervals along its length. These clouds, which are not submerged in the material but are connected thereto in a manner such that they are visible, may be in colours which stand out from the other fibres, thus imparting to the composite roving, and to the thread obtained after spinning, a remarkable appearance of contrast, as compared with the dull appearance of the rovings or clouded threads produced by conventional methods.

The invention covers a low-cost device designed for the execution of the method described hereinbefore and comprising the following, mounted in a frame:

a friction-sleeve machine consisting of two endless sleeves having semi-rigid runs, which bear against each other and are driven by means imparting thereto a dual movement, on the one hand a continuous rotary movement serving to convey the stretched rovings, the sleeves rotating in opposite directions and, on the other hand, a lateral reciprocating movement, the two sleeves again moving in opposite directions;

conveying and guide means to deliver a plurality of single rovings to the inlet of the friction-sleeve machine;

an element for guiding the composite roving obtained at the outlet of the friction-sleeve machine and winding it onto bobbins.

This apparatus makes use, in a novel manner, of a friction-sleeve machine of the type used with conventional web slitting machines, in which the friction-sleeves roll strips of web onto each other in order to produce rovings strong enough to withstand subsequent spooling and unspooling without breaking; in the device according to the invention, however, the sleeves have an assembling function and they act, not on flat strips, but on single, already-constituted rovings for the purpose of connecting them to each other.

Since this apparatus acts upon rovings and not webs, the runs of the sleeves may be at an angle to the horizontal, or even vertical; this makes it possible to reduce the space occupied by the device, the latter being preferably provided with storage bobbins, from which one or more single rovings are unwound.

Moreover, the drive means associated with some of the single rovings may be intermittent; in this case, at least two pairs of pressure rolls are arranged at the inlet to the friction-sleeve machine along the path of the rovings, the latter being caused to pass between the rolls in each pair under a certain amount of pressure; an intermittent motion, synchronized with the movement of the rovings, is imparted to one pair of rolls, while a continuous motion, synchronized with the continuous rotary movement of the sleeves of the friction-sleeve machine, is imparted to the other pair of pressure rolls located upstream of the first (as seen in the direction of travel of the rovings).

At each stop, therefore, the rovings will be broken between these pairs of rolls, after which they are introduced, piece by piece, into the friction-sleeve machine, for the purpose of producing a clouded composite roving.

The invention having been set forth in a general manner, the following description, in conjunction with the attached drawing, is given as a non-restrictive example of an embodiment of the device mentioned above.

IN THIS DRAWING:

FIG. 1 is a cross-section of a device according to the invention;

FIG. 2 is a front elevation of the device.

The device described by way of example consists of a stand 1 comprising two lateral frames joined together at their bases by a base which may, if necessary, be mounted on rollers to allow the device to be moved with ease and to locate it, again if necessary, in front of a particular variety of carding machines.

Mounted on the stand are means 2 and 2' and 3 and 3' for feeding the rovings, the means comprising, in a conventional manner, bobbins on which the rovings are wound and driving rolls therefor. Elements 3 and 3' carry single rovings which will appear in the final composite roving in the form of continuous fibres, whereas elements 2 and 2' carry single rovings which will appear in the final composite roving in the form of discontinuous fibres. To this end, these latter elements 2, 2' are driven by belts and pulleys from an electric motor 4 associated with a control device 15 capable of imparting thereto an intermittent rotary motion consisting of a sequence of times during which the motor is stopped and times during which the motor is running. Elements 3 and 3' are driven by an electric motor 5 which causes them to rotate continuously.

The device is also equipped with an apparatus 6 known as "rota-rubber" consisting of two endless sleeves 7 and 8 having semi-rigid runs made of leather, rubber, or synthetic material, etc.; these sleeves are pressed together as shown in FIG. 1, and a motor 5 imparts thereto a dual motion, on the one hand a continuous rotary motion synchronized with that of elements 3, 3' and, on the other hand, a lateral reciprocating movement produced by eccentrics such as those shown at 9; the lateral reciprocating motion imparted to sleeve 7 is opposite to the motion imparted to sleeve 8 at any given moment. This rota-rubber machine, and the transmission elements with which it is equipped, will not be described in detail, since they are well known in the art. It should be noted, however, that the runs of sleeves 7 and 8 may be at a large angle to the horizontal, in order to make the device more compact.

Furthermore, two pressure rolls 10 and 10', on the one hand, and 11 and 11' on the other hand, are arranged at the inlet to rota-rubber 6, and these assist in passing onwards the rovings coming from feed elements 2 and 2', the rovings passing between rolls 10 and 10' and 11 and 11' of each pair. It should be noted that the number of pairs of rolls may be increased, depending upon the application contemplated. Rolls 10 and 10' are caused to rotate intermittently by motor 4, this rotation being synchronized with that of elements 2, 2' in a manner such that the tangential velocity of the rolls is at all times equal to the displacement velocity imparted to the rovings.

Rolls 11, 11', on the contrary, are caused to rotate continuously by motor 5 and are synchronized with rota-rubber 6.

The device is also equipped with a winding device 12 driven by a motor 13 which causes it to rotate continuously and a cam 14 which produces horizontal reciprocation.

The device described operates as follows: elements 3, 3' deliver appropriate single rovings, feeding them continuously between sleeves 7, 8, whereas the rovings arriving from elements 2, 2' are cut, whenever these elements and rolls 10, 10' stop, by reason of the sudden tension applied to the rovings between stationary rolls 10, 10' and moving rolls 11, 11'. The rovings delivered by elements 2, 2' therefore reach rota-rubber 6 intermittently and piece by piece. The rota-rubber gathers the various rovings or pieces of rovings together and rolls them together.

A composite roving consisting of a cohering array of various rovings or pieces of rovings, the fibres of which have been intimately joined together, is taken up at the outlet from rota-rubber 6 on winding device 12. The roving thus obtained exhibits fibres, or pieces of fibre locally, which may be of different natures, colours, and sizes; after fine-spinning (stretching, twisting, etc.), it will be possible to obtain fancy threads of non-uniform aspect, such as multi-coloured threads, clouded threads, lumped threads, etc.

The invention having now been set forth, it is understood that it is not limited in interpretation except by the terms of the following claims.

I claim is:

1. An apparatus for making composite rovings having a plurality of fibres differing from each other in nature, colour and size, comprising: at least one friction-sleeve means including a pair of sleeves bearing against each other, said sleeves each having semi-rigid runs and being rotatable in opposite directions; first drive means imparting a continuous rotary motion to said sleeves

and second drive means imparting a lateral reciprocating motion to said sleeves whereby said sleeves are imparted with a dual rotary and lateral reciprocating motion; first feed means actuated by driving means in synchronism with the rotary motion of said sleeves for continuously feeding at least a first roving to said friction-sleeve means; second feed means for intermittently feeding at least a second roving to said friction-sleeve means through at least two pairs of pressure rolls arranged at the inlet of said friction-sleeve means; the pressure rolls of a first pair being pressed together and driven intermittently by further driving means; the pressure rolls of the other pair, located downstream of said first pair, being pressed together and being driven in synchronism with the rotary motion of the sleeves of said friction-sleeve means; and means for winding composite rovings delivered at the outlet of said friction-sleeve means.

2. An apparatus for manufacturing composite rovings according to claim **1**, wherein the sleeves of said friction-sleeve means are arranged with their runs at an angle to the horizontal plane.

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