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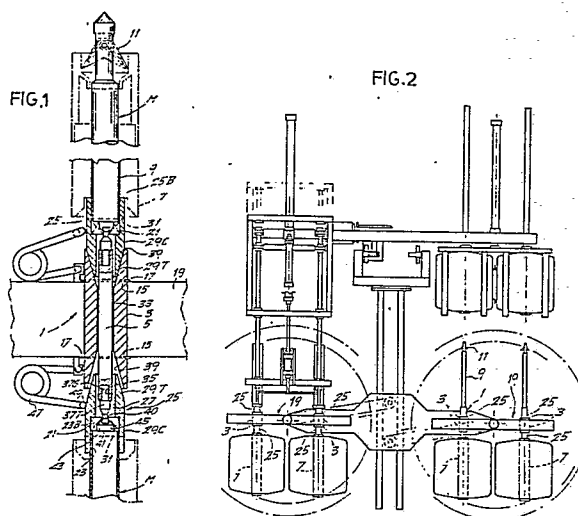
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54 Supporting and reversing device for supplying spinning machines, comprising at least one double-spindle assembly.

57 The device for supporting and reversing spindles for supporting and holding bobbins supplying sliver to a spinning machine comprises pairs of opposing and substantially coaxial spindles (M), each designed to be arranged alternately in a first position for distribution of the sliver to be spun and in a second position for removal of the used tubes (7) and/or insertion of a new bobbin of sliver to be spun; each pair of spindles is supported by a supporting element (19) which is intended to cause the reversing movement of said spindles (M). The spindles (M) of each pair are connected to said supporting element (19) in such a way that the spindle which is held in the position for distribution of the sliver is able to oscillate, while the opposing spindle is kept in a fixed position with respect to the supporting element (19).



Description

SUPPORTING AND REVERSING DEVICE FOR SUPPLYING SPINNING MACHINES, COMPRISING AT LEAST ONE DOUBLE-SPINDLE ASSEMBLY.

The invention refers to a device for supporting and reversing spindles for supporting and holding bobbins supplying sliver to a spinning machine, comprising at least one pair of opposing and substantially coaxial spindles each designed to be arranged alternately in a first position for distribution of the sliver to be spun and in a second position for removal of the used tubes and/or insertion of a new bobbin of sliver to be spun, said at least one pair of spindles being supported by a supporting element which is intended to cause the reversing movement of said spindles.

A device of this type is known, for example, from EP-A-0 240 473. In this known device, several pairs of spindles are rigidly supported by a supporting element and extend upwardly and downwardly from said supporting element. The downwardly oriented spindles support bobbins of sliver to be spun which is supplied to the spinning units of the spinner placed below said spindles. The upwardly oriented spindles are positioned in such a way that the empty tubes inserted thereon can be automatically replaced by new sliver bobbins. The spindles must be rigidly connected to the supporting element, in order to allow such automatic replacement operation. On the other hand, the rigidity of the spindles causes drawbacks during supply of the sliver to the spinning machine. In fact, being the spindles held in a rigid position, the tension on the sliver during drawing from the bobbin changes, thus leading to irregularities in the spun thread or even causing the breaking of the sliver.

The object of the present invention is to provide a supporting and reversing device of the abovementioned type which holds the spindles during replacement of the bobbins and during supplying of the sliver always in the condition which allows best operation of the whole spinning machine.

This and other objects, which will become apparent to those skilled in the art by reading the following description, are obtained with a device of the abovementioned type which is further characterized in that said spindles are connected to said supporting element in such a way that the spindle which is held in a position for distribution of the sliver is free to oscillate with respect to said supporting element, while the spindle which is held in a position for removal of the used tube and/or insertion of a new bobbin is kept in a fixed position with respect to said supporting element.

In a possible embodiment of the device, the supporting element is provided with means which, for each spindle, define a seat for engaging corresponding means connected to the respective spindles and designed to cooperate with said seat to keep the axis of the relevant spindle in a temporary fixed position with respect to said supporting element while the spindle is in the position for removal of the used tubes and/or insertion of a new bobbin of sliver, said means being disengaged from

said seat in the distribution position.

According to a particularly advantageous way of carrying out the invention, the spindles of each pair of spindles are connected to each other by a rod which extends through a hole of said means defining said seats, the length of said rod being such that one of the two spindles connected by said rod is disengaged from the relevant seat, while the other spindle is engaged in the relevant seat.

Each of said means for cooperating with said seat may be provided with a frustoconical surface able to be inserted in said seat which has a corresponding frustoconical shape. The frustoconical seat engages the frustoconical surface during replacement of the bobbin.

In order to support each spindle in such a way as to allow the rotation thereof around its axis, inside said means for cooperating with said seat there may be provided a bearing, the internal race of which has a seat for articulating a head connecting said rod to the relevant spindle, while the external race of said bearing is integral with the relevant spindle. The seat of the internal race of the bearing may have a frustoconical or a spherical shape.

The drawing shows a possible embodiment of the invention, and in particular:

Fig. 1 shows a cross-section along a diametral plane of the double spindle assembly for replenishing spinning machines according to the invention;

Fig. 2 shows, in diagrammatic form, reversing systems forming part of equipment for replenishing continuous spinning machines, which comprise double spindle assemblies according to the invention;

Figs. 3 and 4 show, respectively, a side view and a view of the expansion fins articulated with the ends of each spindle of said assembly, in the retracted position; and

Fig. 5 shows an enlarged view of the articulation of the bearing integral with each spindle, with the extension of the rod linking the two spindles of the assembly.

As can be seen from the accompanying drawing, the double spindle assembly according to the invention, indicated generally by 1, comprises substantially a central fixing and sliding sleeve 3, to which are fixed, by means of a common connecting rod 5, two identical and opposite rod spindles M designed such that over each of them there may be fitted bobbins of textile material for supplying a spinning machine, this material being wound onto tubes 7. In a known manner, each spindle M is designed as a relatively thin cylindrical rod 9 which has at its end a pair of expanding and retracting fins 11 arranged in the form of an upturned V. These fins have the function of holding, preventing removal thereof, the bobbins which supply the spinning machine and which are supported by one of the spindles M pointing downwards, while they retract

easily when the tube of a full bobbin for replenishing the spinning machine is inserted onto one of the spindles M. The fins 11 may also be made to retract, in a known manner, by means of a tubular rod 13 (Fig. 4) when it is required to remove an empty tube 7 from the spindle M in the direction of the arrow f7, so as to be able to replace it with that of a full bobbin. The central sleeve 3 has a pair of annular grooves 15 which serve to fix it, by means of Seger rings 17 inserted in said grooves (in the drawing), to a plate forming part of the systems for reversing the bobbins for supplying the spinning machines, for which systems the double spindle assemblies are intended. Each rod spindle M is supported so as to be able to rotate about its own axis, at the rotational speed dictated by the requirements of the spinning group and integrally with a member 25 described below, by a bearing 21 which performs the two functions of an axial guide and thrust bearing. Each bearing 21 is accommodated and clamped by means of friction inside a cylindrical cavity 23 of a bell-and-spigot member 25, said cavity having an abutment 23B against which the bearing 21 bears. The abutment 23B determines a reduction in diameter, so that the cavity 23 extends into an axial hole 27 which emerges at the end of the member 25 opposite the mouth of the cavity 23. Externally the bell-and-spigot member 25 has a portion 29C with a cylindrical surface which is adjacent to a portion 29T with a frustoconical surface, the conical part of which faces the sleeve 3 and, as will become clear below, is totally or partially inserted therein. The internal diameter of the cavity 23 is such that the end of the rod 9 of each spindle H, opposite to that where the fins 11 are located, is inserted with a slight amount of force inside the cavity 23 until it rests against the shoulder of the bearing 21. A pin 31 rigidly fixes the cylindrical portion of the member 25 to the rod 9, so that each spindle M is able to rotate together with said portion and said member; the abutment 25B resulting from the difference between the diameters of the surface 29C and of the rod 9 performs the function of a support means for a tube 7, when a spindle M, during use, is pointing upwards. Internally the sleeve 3 has an axial hole 33 with a diameter slightly greater than that of the rod 5 - which is therefore able to slide inside it with a limited amount of play - as well as two identical and symmetrically opposite frustoconical cavities 39, coaxial with the sleeve and with the hole 33, the conicity of which is equal to that of each frustoconical surface 29T. The ends of the rod 5 each have a threaded hole 35 inside which there is screwed the shank 37G of an intermediate member 37 which in turn has a head 37T with a threaded hole inside which the stem 40 of an articulation head 41 is screwed. The articulation head 41 may have a half-sphere configuration but, more simply, as in the example of the drawing, may be a frustoconical head with a groove for screwing by means of a screwdriver or a hexagonal head for tightening using an Allen key. The articulation head 41 is articulated with a frustoconical seat 43 of the internal race 45 of each bearing 21, the main based of the head 41 and of the seat 43 facing the rod 9. As can be seen clearly in

Figs. 1 to 5, the rod 5 has a length such that, taking into account the lengths of the intermediate members 37 and the shanks 40 of the articulation heads 41, the two bell-and-spigot members 25, which said rod 5 connects together by means of the articulations 41, 43, can assume, during use, the following positions: in the position of the reversing system or systems (to which the plate 19 belongs) in which a first spindle M is pointing upwards and the second spindle M is pointing downwards, the member 25 integral with the upper spindle has its own frustoconical surface 29T inserted inside the cavity 39 and its own surface in contact with the corresponding surface of the cavity, so that said upper spindle is located with its own axis vertical, i.e. ready to receive the tube of a full bobbin or to have the empty tube of a used bobbin removed from it. On the other hand, the member 25 integral with the spindle pointing downwards has its own surface 29T partially disengaged and separated from the wall of the corresponding cavity 39 and therefore, owing to the presence of the articulation 41, 43, is able to oscillate by a limited amount with respect to the (fixed) axis of the sleeve 3, the lower spindle M and a bobbin of textile material supported by said spindle also oscillating together with the said member. The result is thus obtained of providing the bobbin being unwound with the possibility of oscillating, thereby facilitating unwinding of the material to be spun, reducing to a maximum degree the possibility of breakage or lack of uniformity in the thickness of the yarn; while the spindle M pointing upwards to receive a new bobbin of material to be spun is held with its own axis in a rigidly vertical position, thus allowing the full bobbins to be supplied automatically by means of a carriage running along the spinning machine or other suitable means. It is clear that, in the intermediate rotational positions of the reversing systems, the bell-and-spigot members 25 may assume intermediate positions where the respective surfaces 29T are partially separated from the corresponding seats 39 of the sleeve 3. But this does not involve drawbacks since in these positions the two mutually opposite spindles M are not performing a function and may assume a position slightly inclined downwards, while each waits to resume the position illustrated diagrammatically in Fig. 1.

During use, the spindles M, when they are pointing downwards and rotate as a result of unwinding of the material which supplies the underlying working units of the spinning machine, must be subjected to a limited braking action. For this purpose, there are provided, in a known manner forked springs 47, the free end 49 of which is pressed by the external surface of the member 25, while the other end is fixed to the plate 19.

Claims

1. Device for supporting and reversing spindles for supporting and holding bobbins supplying sliver to a spinning machine, comprising at least one pair of opposing and substantially

coaxial spindles (M) each designed to be arranged alternately in a first position for distribution of the sliver to be spun and in a second position for removal of the used tubes (7) and/or insertion of a new bobbin of sliver to be spun, said at least one pair of spindles being supported by a supporting element (19) which is intended to cause the reversing movement of said spindles, characterized in that said spindles (M) are connected to said supporting element (19) in such a way that the spindle which is held in a position for distribution of the sliver is free to oscillate with respect to said supporting element (19), while the spindle which is held in a position for removal of the used tube and/or insertion of a new bobbin is kept in a fixed position with respect to said supporting element (19).

2. Device according to claim 1, characterized in that said supporting element (19) is provided with means (3) which, for each spindle (M), define a seat (39) for engaging corresponding means (25) connected to the respective spindles (M) and designed to cooperate with said seat (39) to keep the axis of the relevant spindle (M) in a temporary fixed position with respect to said supporting element (19), while the spindle (M) is in the position for removal of the used tubes and/or insertion of a new bobbin of sliver, said means (25) being disengaged from said seat (39) in the distribution position.

3. Device according to claim 2, characterized

in that the spindles (M) of each pair of spindles are connected to each other by a rod (5) which extends through a hole (33) of said means (3) defining said seats (39), the length of said rod (5) being such that one of the two spindles (M) connected by said rod (5) is disengaged from the relevant seat (39), while the other spindle (M) is engaged in the relevant seat (39).

4. Device according to claim 2 or 3, characterized in that each of said means (25) for cooperating with said seat (39) is provided with a frustoconical surface (29T) able to be inserted in said seat (39) which has a corresponding frustoconical shape.

5. Device according to any of claims 2 to 4, characterized in that inside said means (25) for cooperating with said seat (39) there is provided a bearing (21), the internal race of which has a seat (43) for articulating a head (41) connecting said rod (5) to the relevant spindle (M), while the external race of said bearing (21) is integral with the relevant spindle (M).

6. Device according to claim 5, characterized in that the seat (43) of the internal race of the bearing (21) has a frustoconical shape.

7. Device according to claim 5, characterized in that the seat (43) on the internal race of the bearing (21) is frustoconical and in that the head (41) of the articulation member is an approximately hemispherical seat, and in that the said head (41) has a spherical surface.

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FIG.1

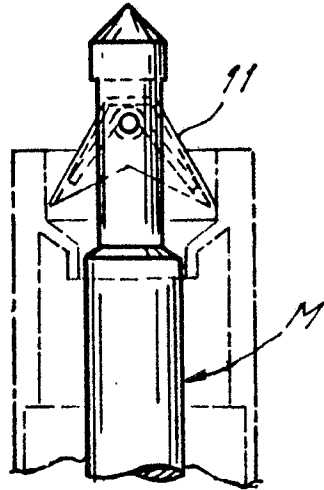


FIG. 3

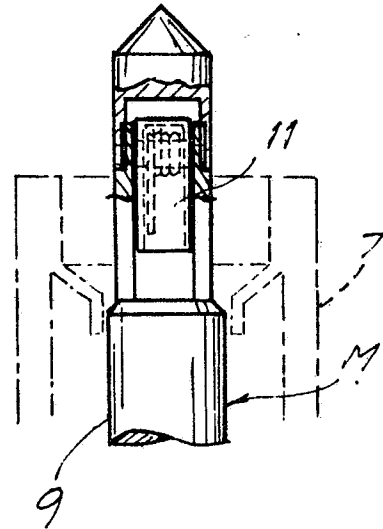


FIG.4

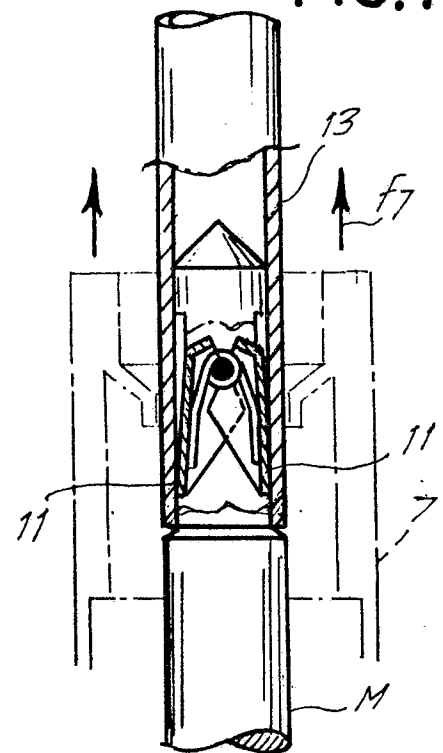
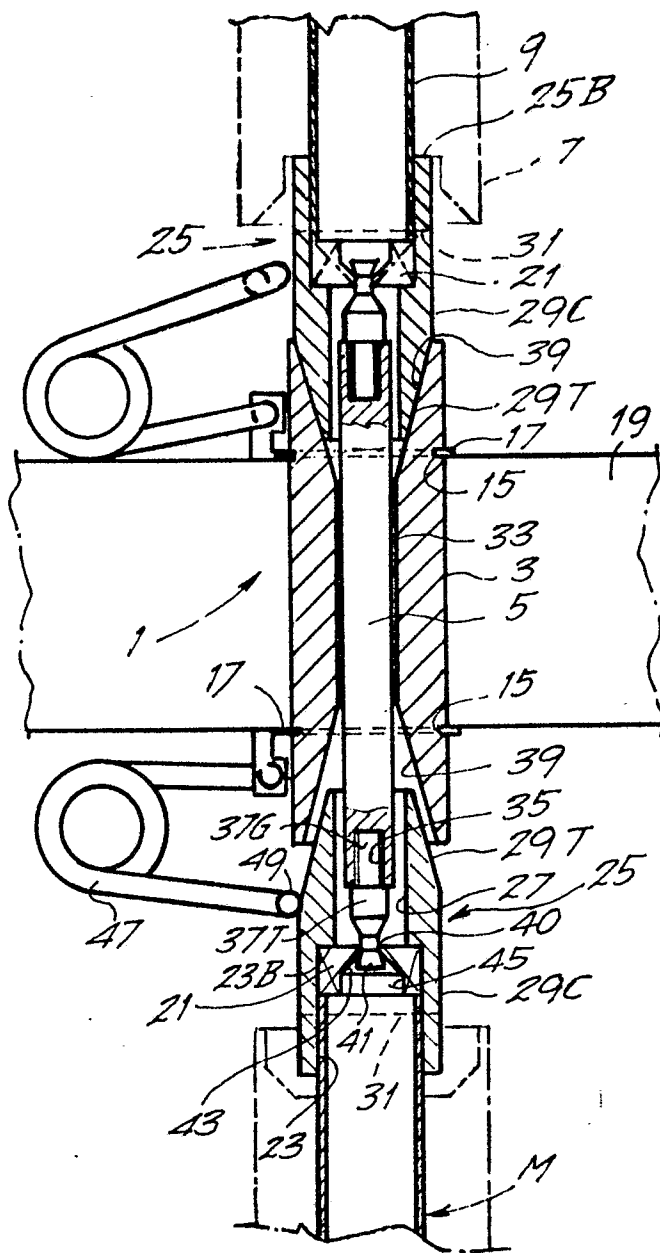
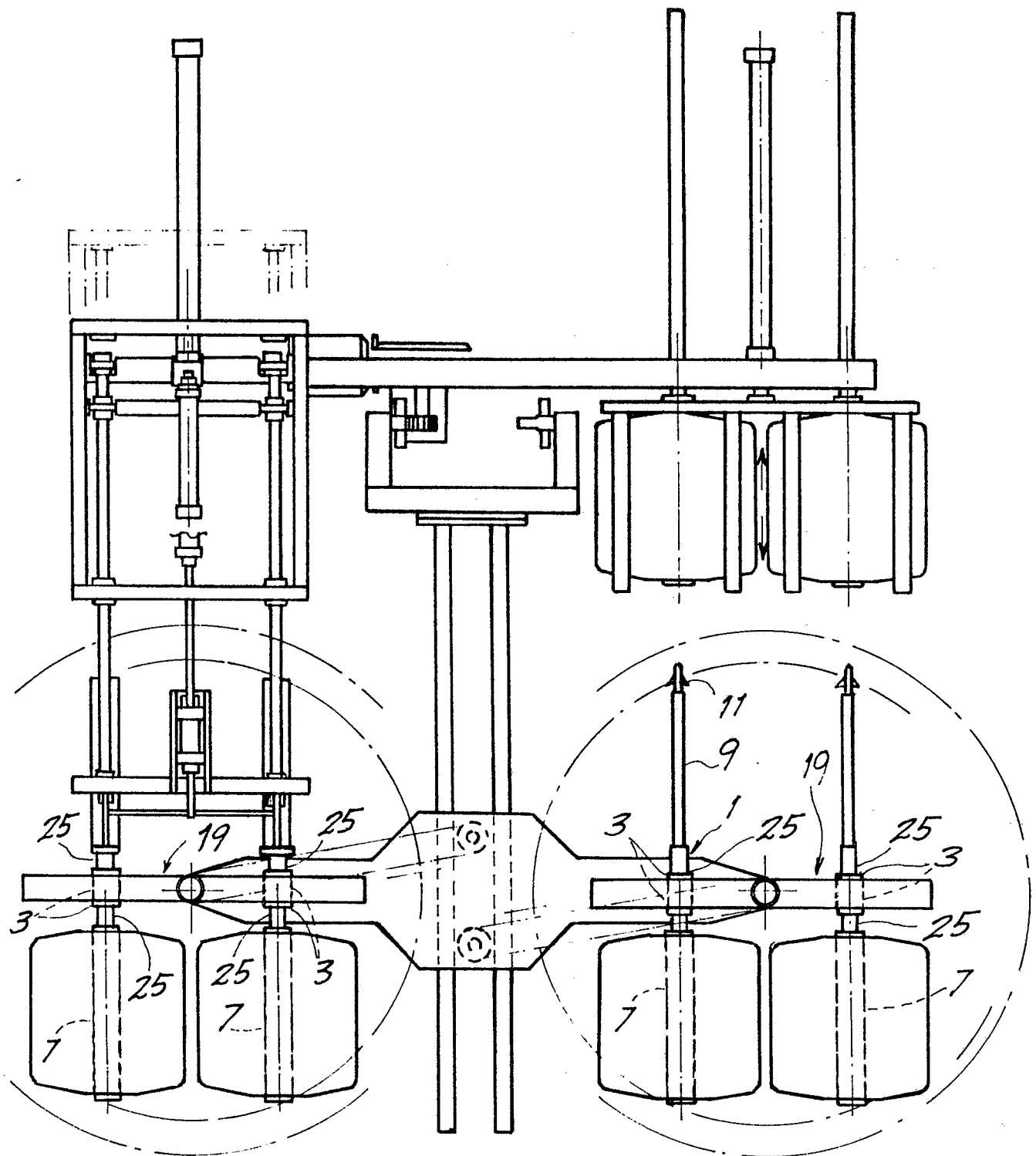


FIG.2





EP 89 83 0209

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	CH-A-609643 (SHINZO KITAMURA) ---		D01H9/00 D01H1/18
A	GB-A-1125596 (R.K.WHITEHEAD ET.AL.) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			D01H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04 AUGUST 1989	Examiner HOEFER W. D.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			