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(54) System to feed yarn packages to winding machines.

(57) System to feed yarn packages to winding machines (29), whereby the feed takes place by direct connection to a spinning machine (10), the winding machines (29) being equipped with a feeder (22) of yarn packages, at least one yarn package storage container (21-25) fed directly with yarn packages coming from the spinning machine (10) being included in cooperation with the feeder (22).

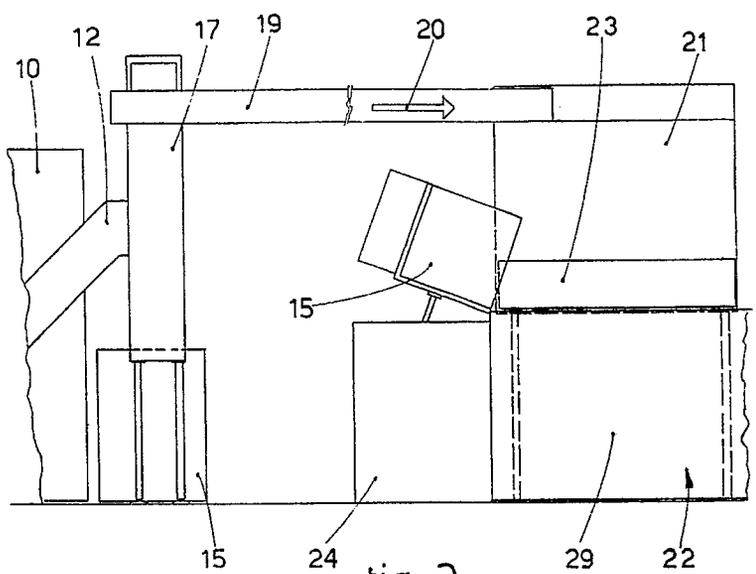

fig. 2

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This invention concerns a system, particularly of a fully automated type, to feed yarn packages to winding machines. To be more exact, the invention concerns a system suitable to connect spinning machines continuously to winding machines so as to feed the winding machines with yarn packages coming from the spinning machines.

The yarn packages may be steamed during their transfer from the spinning machines to the winding machines.

The invention concerns plants to spin fibres having a staple length for wool or for cotton, wherein there is an automatic connection between the spinning machines and the winding machines and wherein the yarn packages, owing to the properties of the wound yarn, may require their yarn to be steamed.

It is known that in textile mills the yarn packages wound in the spinning department have to be taken to a winding department in which the packages are produced which are suitable for use in weaving or other required usages.

The spinning departments themselves are normally provided for this purpose with a winding department positioned immediately downstream of the spinning department. There is therefore a continuous transfer of yarn packages, normally still almost fully carried out by hand, between these two departments.

Owing to automation of doffing of the yarn packages at the spinning machines and automation of donning of the yarn packages on the winding machine an ever greater need is felt to overcome this problem of handling and transferring the yarn packages.

Various solutions have been disclosed which provide for overhead movement of the yarn packages between the spinning and winding operations. These solutions entail great constructional and organizing complexity and generally have the purpose of linking departments situated far from each other.

Such lay-outs envisage the ability to send the yarn packages, when necessary, to departments carrying out auxiliary processes, this involving further structural and organizing complications in the whole system of transferring the yarn packages.

Proposals have also been disclosed for lay-outs which provide for full integration of the spinning machines with the winding machines, namely the so-called "spin winders". These machines entail connection of the package doffing system of the spinning machine to a number of winding units able to process continuously the number of yarn packages produced by the corresponding spinning machine.

The spin winders overcome the problem of the transfer of yarn packages suitably but offer an embodiment which is not very flexible and is particularly intended for standardized processes.

Moreover, the spin winders do not enable any auxiliary process, such as the often necessary steaming of the yarn packages, to be effected between the spinning and winding operations where the yarn so requires.

Steaming is normally carried out in appropriate equipment such as autoclaves, which work under vacuum to stabilise the yarn and fix the twists.

Steaming is especially useful with yarns having a staple length for wool, or high twist yarns such as sewing threads, or in yet other cases.

The yarn packages coming from the spinning operation, therefore, cannot be sent directly to the winding operation but have to go beforehand to the steaming department, whither they are conveyed in appropriate trolleys or bins.

The winding machines too, in turn, have to be equipped with devices able to handle the trolleys or bins coming from the steaming operation.

A lay-out which provides means able to connect the spinning machines and winding machines and to permit the yarn packages to be transferred either directly between the two machines or into temporary collection means for steaming should therefore be deemed structurally and technologically worthwhile; but such a lay-out entails not only extra costs for auxiliary equipment which may be only seldom employed but also extra costs for the greater space taken up, for transport, for the labour force employed and for the general running of an additional processing station for the material to be processed.

Proposal have also been disclosed for lay-outs which provide full integration of the spinning operation with the winding operation, that is to say, machines called "spin winders" forming one single whole have been proposed, but such lay-outs do not and cannot provide for a steaming step between the spinning unit and winding unit, since the flows of yarn packages produced and their feed to the connected winding unit are almost continuous.

The present applicant has designed, tested and embodied the system of this invention, which is able to overcome all the problems of the state of the art.

The invention is set forth in the main claim, while the dependent claims describe various features of the invention.

The system according to the invention provides a means to engage and remove yarn packages coming from doffing devices of a spinning machine. This engagement and removal means may cooperate with means that convey the yarn packages directly to the winding area or with means that hold temporarily the yarn packages which are to undergo auxiliary processing.

As we said above, this auxiliary processing may be, for instance, a steaming process and therefore the holding means according to the invention are suitable to enable this process and the subsequent feed to the winding machine to be carried out.

The means that convey the yarn packages, instead, convey them directly along a straight, simple path to the feed of the connected winding machine, this feed being advantageously of an automatic type.

According of a variant of the embodiment the yarn packages are taken to a buffer store cooperating directly with the feed to the winding machine.

In this way a system is provided which is simple to construct, easy to operate and therefore economical and able to link the spinning machine to the winding machine while retaining a required flexibility of the connection.

According to a variant the invention arranges also that the buffer store means employed in connection with an automatic loading means is a multipurpose means. In other words the buffer store can be used alternatively either as a transient store to hold and convey yarn packages or as a unit to steam yarn packages.

For this purpose the buffer store is equipped with conduits for connection to steam delivery units and to vacuum generating units. These connecting conduits can be actuated when required.

According to a variant the buffer store is divided into two halves to receive successively the yarn packages doffed on one side of the spinning machine and thereafter those doffed on the other side.

According to the invention the doffings of the yarn packages on the two sides of the spinning machine are suitably staggered in time so as to allow time for the steaming first of one doffing and thereafter of the other doffing.

By means of the system according to the invention all the types of yarns in the yarn packages follow the same unchanged path without passing to auxiliary processing stations, thus achieving all the proposed purposes.

The attached fiures, which are given as a non-restrictive example, show the following:-

Fig.1 is a front diagram of a system to remove and convey yarn packages from spinning machines to winding machines;

Fig.2 is a side diagrammatic view of the connection between a spinning machine and winding machine of Fig.1;

Fig.3 is a side diagrammatic view of the connection between a spinning machine and winding machine according to the invention;

Fig.4 is a partial diagrammatic plan view of the connection of Fig.3.

In the figures a device 11 to remove yarn packages is arranged at the terminal part of a spinning machine 10 coinciding with the zone of doffing of yarn packages by yarn package doffing devices 12 of the spinning machine 10.

In the example the removal device 11 is positioned at a right angle to the direction of doffing by the doffing devices 12 and consists of a normal conveyor belt or other like means.

The doffing devices 12 discharge the yarn packages onto the removal device 11, which can be driven in two directions according to the arrows 13 and 16.

If the removal device 11 is driven according to the arrow 13, the yarn packages are conveyed by a switch means 14 into a holding bin 15.

The holding bin 15 may be suitable, for instance, for steaming operations to be carried out in an appropriate department, to which the bin will be sent when full of yarn packages.

After the steaming process the bin 15 is taken directly to a device 22 that feeds yarn packages to a winding machine 29. The yarn packages are discharged from the bin 15 into the feeder device 22 by a suitable overturning means 24.

If the yarn packages do not require auxiliary processes such as steaming, the removal device 11 is driven according to the arrow 16 and thus conveys the yarn packages onto an elevator 17.

The elevator 17 transfer the yarn packages onto a conveyor device 19 consisting, for instance, of a normal conveyor belt arranged at an overhead position parallel to the lengthwise axis of the spinning machine 10 and of the winding machine 29 to be connected.

The conveyor device 19 may have a limited length, that is to say, the minimum necessary length to enable any holding bins 15 to be conveyed between the two machines 10-29 and employees and supervisors to pass through an intermediate zone 30.

The overhead arrangement of the yarn package conveyor device 19 not only causes no obstruction along all the movements and displacements within the spinning department but also enables the yarn packages to be brought according to the arrow 20 to a buffer store such as a yarn package storage container 21, for instance.

The yarn packages drop freely into the storage container 21 when they have reached the end of the conveyor device 19.

According to a variant, the yarn packages at that end of the conveyor device 19 can also be compelled to drop by accompanying means which are known.

The storage container 21 is positioned advantageously, but not necessarily, above the yarn package feeder device 22 of the winding machine 29;

the yarn packages may be sent into the feeder device 22 by means of a vibratory hopper 23 of a known type, for instance.

The yarn packages may be delivered into the storage container 21 haphazard or in an ordered manner.

The storage container 21 itself may be divided into two halves so as to receive in a differentiated manner the yarn packages coming from one or the other of the two sides of the spinning machine 10, namely from one or the other of the doffing devices 12. In this case suitable means for selective discharge of yarn packages will be provided at the end portion of the conveyor device 19.

For instance, the container 21 to store the yarn packages may be able to move so as to cooperate by means of its displacement alternatively according to requirements with yarn package feeder devices 22 of several winding machines 29, or else one yarn package storage container 21 can receive yarn packages coming from several spinning machines 10.

Turning next to the diagrams of Figs.3 and 4, which show an evolutionary variant, the system of the invention includes a storage container 25, which in this case too is positioned above a feeder device 22 but can also be placed at the side of the feeder device 22, its positioning depending on design choices or plant requirements.

The storage container 25 is suitably insulated and can be shut momentarily with a cover 31 and with a movable bottom 18, both the cover 31 and bottom 18 providing an airtight seal engagement.

The storage container 25 includes connection means 26 and 27 for simultaneous connection, when required, to known vacuum generating means, an aspiration pump for instance, and to known steam delivery means, an appropriate boiler for instance.

These means to generate a vacuum and steam may also be fitted to a movable unit which can be moved in the department so as to tend a plurality of connections of spinning machines to winding machines.

In this case the connection means 26-27 will include advantageously quick connection/release means.

By means of the invention it is possible to carry out within the storage container 25 the operation of steam treatment of yarn packages coming from the spinning machine 10 before they are transferred to the feeder device 22 of the winding machine.

If the cover 31 and movable bottom 18 are removed from the storage container 25, the latter 25 can work in the same way as the storage container 21 of the embodiment of Figs.1 and 2.

According to a further variant, the storage container 25 of the invention is divided into two halves 125 and 225 respectively. In this way the yarn packages coming from at least one doffing of one side of the spinning machine 10 can be loaded by a momentarily actuatable switch 28 into one half, 125 for instance, whereas the yarn packages coming from at least one doffing at the other side of the spinning machine 10 can be loaded into the other half 225 of the container 25.

The loading of each half 125-225 is advantageously staggered momentarily in a pre-set manner. This staggering may correspond to the staggering of the doffings of the spinning machine 10 and may be equal to a desired time of steaming of the yarn packages.

The loading of the two halves 125-225 of the storage container 25 may be effected, for instance, by actuating the switches 28 located on the conveyor belt 19.

It should be noted that in this variant the inclusion of the overturning means 24 to overturn the bins 15 coming from the steaming station is no longer strictly necessary.

As provided for in the case of the storage container 21, the storage containers 25 or 125-225 too can be able to move so as to tend a plurality of winding machines 29.

It is obvious that many variants are possible for a person skilled in this field, especially as regards the geometric configuration for adaptation and suitability for the manifold types of plants available on the market. Such variants should be deemed to be included in the scope of the invention as claimed hereafter.

Claims

1. System to feed yarn packages to winding machines (29), whereby the feed takes place by direct connection to a spinning machine (10), the winding machines (29) being equipped with a feeder (22) of yarn packages, the system being characterized in that at least one yarn package storage container (21-25) fed directly with yarn packages coming from the spinning machine (10) is included in cooperation with the feeder (22).

2. System as claimed in Claim 1, in which the storage container (25) comprises a movable cover (31) and a movable bottom (18) which can be momentarily included, and is advantageously insulated.

3. System as claimed in Claim 1 or 2, in which the storage container (25) is connected (26-27) at least momentarily to means which can generate a vacuum and/or steam.

4. System as claimed in any claim hereinbefore, in which a yarn package conveyor device (19) is included in direct cooperation with and substantially above the storage container (21-25).

5. System as claimed in any claim hereinbefore, in which a device (11) to remove yarn packages is comprised between the spinning machine (10) and the yarn package conveyor device (19) and cooperates with the two sides of the spinning machine (10), a possible elevator (17) to elevate yarn packages being also comprised.

6. System as claimed in any claim hereinbefore, in which the yarn package removal device (11) has a first direction of feed (13) connected to a collection bin (15) and a second inverted direction of feed (16) connected to the yarn package conveyor device (19).

7. System as claimed in any claim hereinbefore, in which there are included two storage containers (21-25) that cooperate with at least one momentarily actuatable switch (28) that switches yarn packages.

8. System as claimed in any claim hereinbefore, in which each storage container (21-25) is associated with one side of the spinning machine (10).

9. System as claimed in any claim hereinbefore, in which the storage container (21-25) is movable.

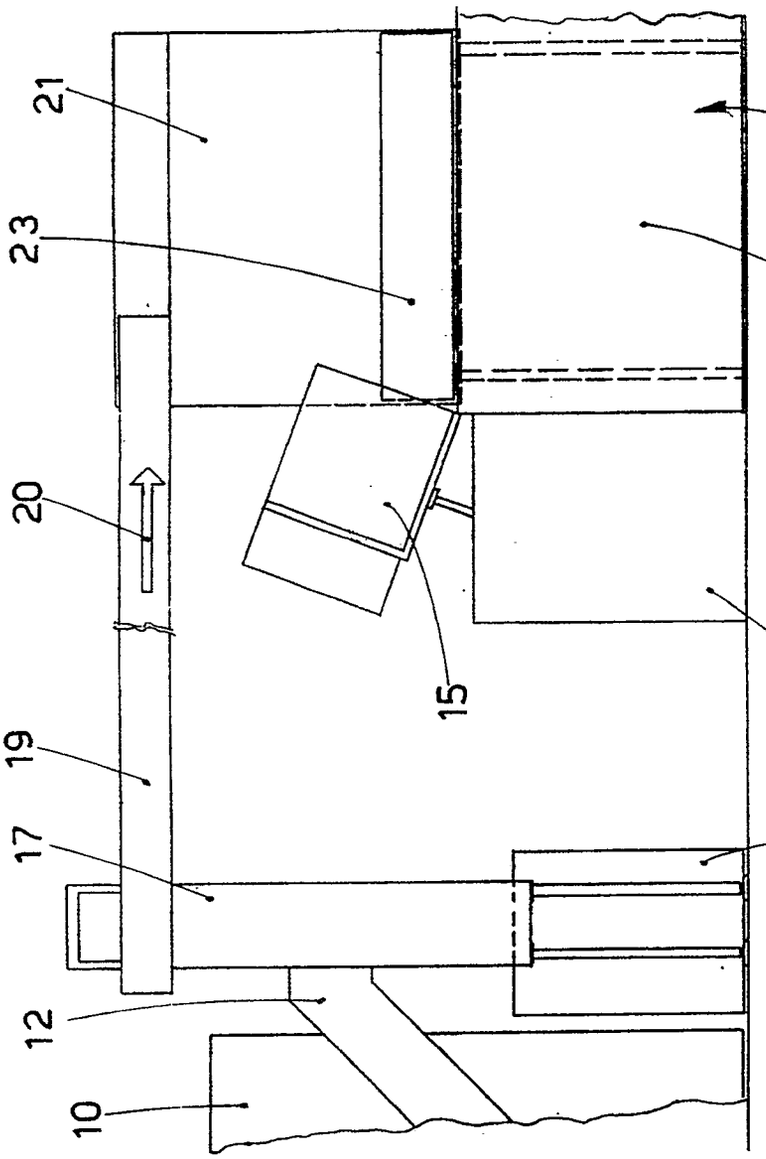

fig.2

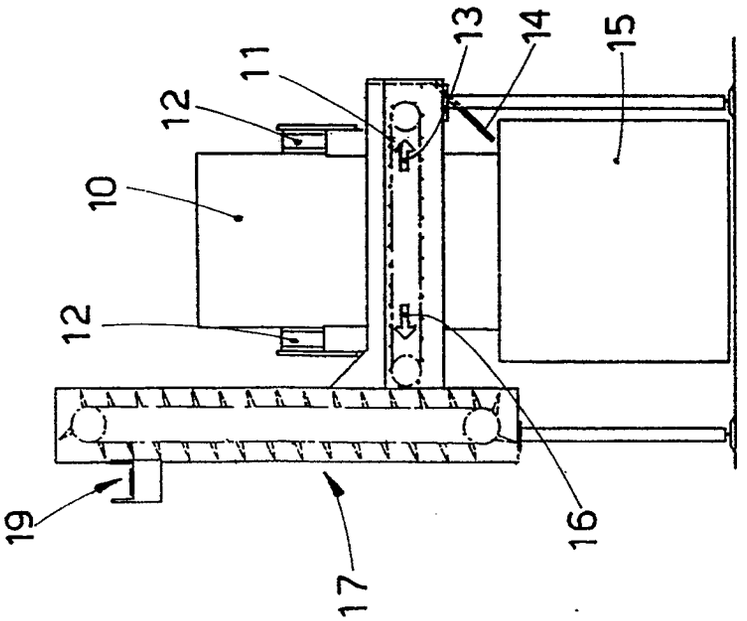

fig.1

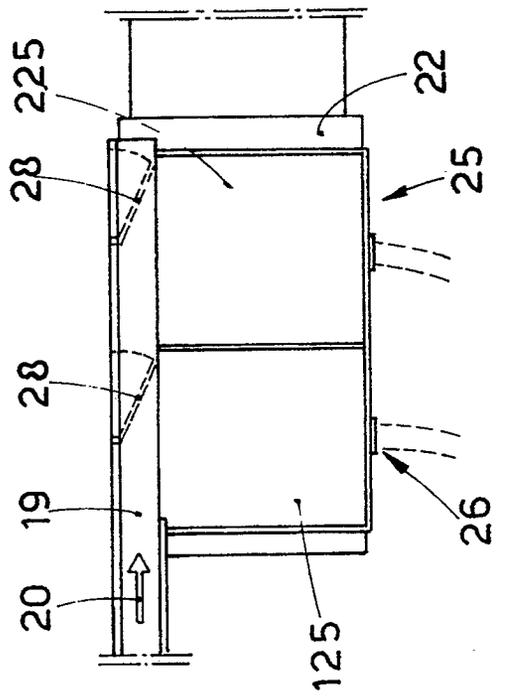
225
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fig.4

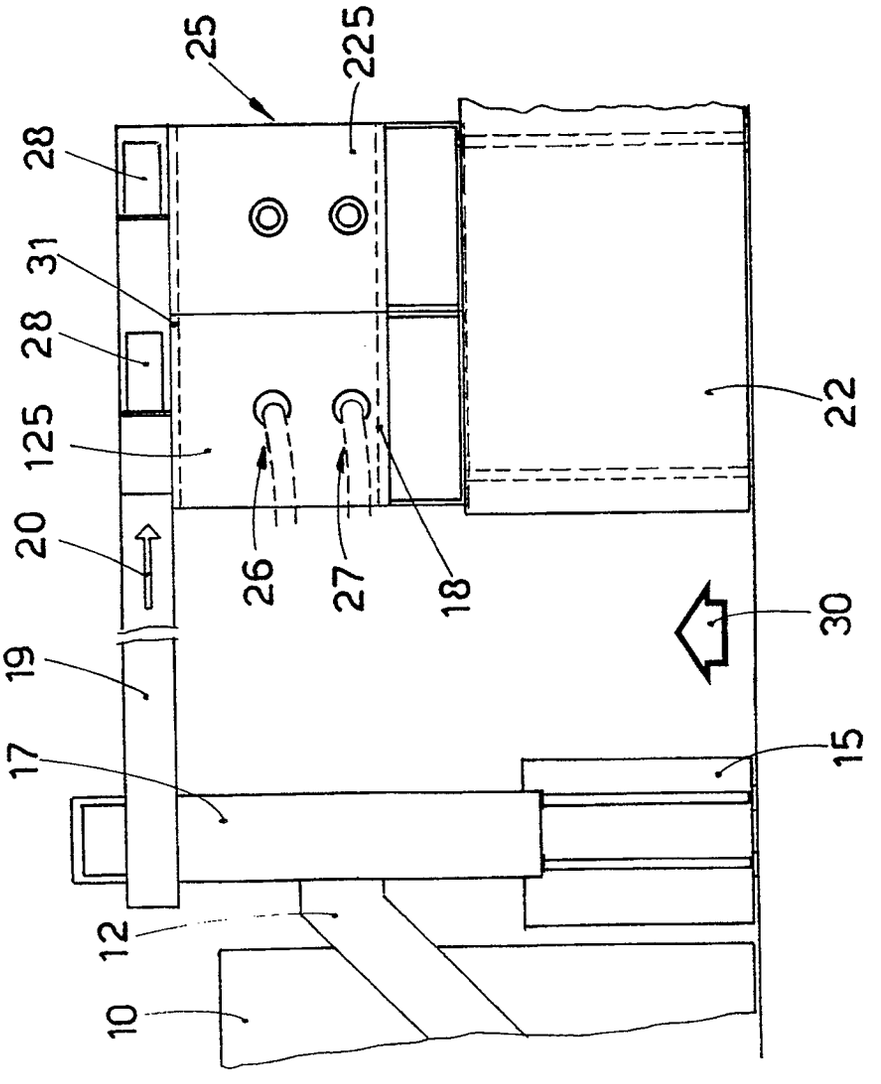
25
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fig.3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 10 4963

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.5)
X	DE-A-3 714 440 (GEBALD, GREGOR) * column 4, line 39 - line 56; claim 1; figure *	1	D 01 H 13/30 D 01 H 9/18 D 06 B 23/04
A	DE-A-3 835 633 (MURATA KIKAI K.K.) * column 3, line 3 - column 4, line 23; claims 2,3; figures 1-10 *	1-5	B 65 H 67/06
A	DE-A-3 508 942 (W. SCHLAFHORST & CO) * page 12, line 21 - line 27 * * page 14, line 16 - line 19 @ claim 10; figure 1 *	1	
A	DE-A-3 341 895 (W. SCHLAFHORST & CO) * claim 1; figures 1-3 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
B 65 H D 01 H D 06 B

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	01 July 91	TAMME H.-M.N.

CATEGORY OF CITED DOCUMENTS

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