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(54) Device for transporting packages of lap and empty tubes.

(57) Device to transport packages of lap (13) and empty tubes (16) between a lap producing machine (10) and combing machines (17), a plurality of lap packages (13) being taken simultaneously and automatically in a systematic manner from lap production machines (10) so as to be conveyed automatically to the combing machines (17), where the packages (13) are discharged systematically and automatically at positions suitable to feed the heads of the combing machines (17).

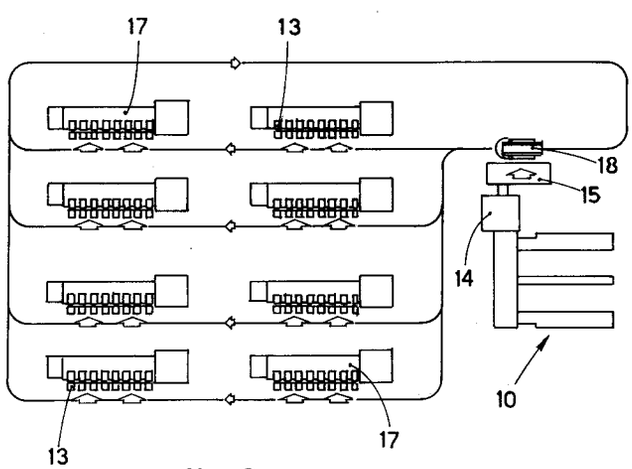

fig.3

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This invention concerns a device for the automatic feed of textile machines and, in particular, of combing machines. To be more exact, the invention concerns a device for the automatic withdrawal of a plurality of lap packages packaged on lap production machines, the conveying of the lap packages to the neighbourhood of the combing machines and the discharge of such packages in the zone of feed of the combing heads.

The device provides also for the automatic withdrawal of the empty tubes for the lap from the combing machines and the conveying and automatic discharge of the tubes at the required positions.

The device is suitable to feed a plurality of combing machines and also to serve one or more lap production machines.

The problems linked to the feed of combing machines with packages of lap are known in the textile industry. These packages of lap are produced on appropriate machines and, after being packaged, are discharged from those machines automatically in a storage zone forming part of the machines themselves and are withdrawn thence one by one or in groups.

These lap packages cannot be moved by hand by the machine operators or by the operators of the transport means as they may weigh more than 20 kilos each.

In the state of the art the withdrawal of the lap packages from their production machines and their transport to the combing machines are normally carried out by trolleys able to run on the floor and moved by their operator by hand, the trolleys generally holding a plurality of lap packages.

Some lay-outs of an overhead type able to convey one lap package at a time and actuated by hand or automatically have been proposed.

All these lay-outs entail a plurality of drawbacks as regards finance where manpower has to be employed (manual systems), or as regards the space taken up (overhead systems), or as regards safety since considerable weights may have to be suspended (overhead systems), or as regards product quality since there is a risk of dirtying or ruining the packages being conveyed (overhead systems).

The present applicant has studied, tested and obtained a device 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 device provides for the automatic withdrawal of a plurality of lap packages from a lap production machine by means of a trolley, which is advantageously of a type operated by a magnetic guide wire and comprises a container to collect the lap packages.

The packages are positioned in an orderly manner in the container according to the arrangement whereby they will feed the combing heads.

The collection container may hold a required number of lap packages, which is generally equal to, or a multiple or submultiple of, the number of combing heads.

It is known that a trolley of the type operated by a magnetic guide wire is operated by a magnetic field generated by a wire sunk at a small depth in the floor and traversed by a weak current.

Other wires enable instructions to be given to the trolley through a suitable combination of frequencies, while a broad freedom of combining plants and interfaces can be achieved at the same time.

The employment of a trolley operated by a magnetic guide wire according to the invention enables the lap packages thus taken to be conveyed to the combing machines requiring a supply of lap along required routes.

The lap packages are discharged automatically in an orderly manner from the collection container of the trolley at a storage zone corresponding to the combing heads. They will be put thereafter by the machine operator in a position to feed the heads.

The trolley can follow pre-set routes or can travel to the combing machines which require it; it can also serve one or more lap production machines.

According to a variant the trolley can take empty tubes for lap automatically from an appropriate collection zone on the combing machine and can convey them to a storage zone served by the trolley or corresponding to the lap production machines.

This automatic withdrawal of empty tubes can be carried out at the same time as the discharge of lap packages on the combing machine.

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

Fig.1 shows a diagram of a front of a lap production machine;

Fig.2 shows a three-dimensional diagram of a trolley employed in the device of the invention;

Fig.3 shows a possible lay-out according to the invention;

Fig.4 shows another lay-out according to the invention.

Fig.1 shows a diagram of a lap drawing frame 10 of the state of the art, in which fibres 11 coming from feeder creels converge on three drawing heads 12 and are then combined and collected on lap packages 13 in a collection unit 14.

The collection unit 14 packages one lap package 13 at a time and then discharges it automati-

cally into a discharge unit 15 forming part of the lap drawing frame 10.

When the lap package 13 has been discharged, the process starts again automatically and may have available an incorporated feed of empty tubes 16 for lap packages 13.

The lap packages 13 are discharged by the collection unit 14 one after another in series into the discharge unit 15, whence they may be removed in turn by hand or automatically.

A number of lap packages 13 equal to, or a multiple or submultiple of, the number of the heads of the combing machines 17 positioned downstream can be normally held in the discharge unit 15.

The device according to the invention provides for the use of a trolley 18, advantageously of a type guided by a magnetic guide wire, which is suitable to take the lap packages 13 held in the discharge unit 15 automatically and to convey them to the combing zone.

The trolley 18 possesses a body 19 suitable to bear a collection container 20 in which the lap packages 13 are arranged in an orderly manner in a number equal to, or a multiple or submultiple of, the number of heads of a combing machine 17.

A base 21 of the trolley 18 normally holds the control units of the trolley, the batteries, the drive motors and motors to steer the motive wheels.

The collection container 20 has a movable sidewall 22 which can be moved by jacks 23 for the loading or unloading of lap packages 13.

When the lap packages 13 have been loaded at the discharge unit 15 of the lap drawing frame 10 being served, the trolley 18 is sent to the department of the combining machines along preset routes or as called for by the combing machines 17.

The operations of the trolley 18 can be centralized, whereby a central unit is informed by a communication system concerning everything taking place in the network and determines the movement of the trolley according to the information received.

The operation of the trolleys 18 can also be decentralized, whereby the trolleys by themselves are able to perform the majority of the typical functions of the central unit described above.

When the trolley 18 has reached the pre-selected combing machine 17, it discharges the lap packages 17 in an orderly manner by means of its movable sidewall 22 and the jacks 23 in a storage zone on the combing machine 17 in a position corresponding exactly with the loading of the lap packages 13 on the combing heads.

Before starting its return travel to the lap drawing frame 10, the trolley 18 may collect the empty tubes 16 of the lap packages 13 automatically in an appropriate container on the trolley in cooperation with a collection point on the combing machine 17 and may discharge those tubes 16 thereafter in an appropriate storage station or in correspondence with the lap drawing frame 10.

Fig.3 shows a diagram of a possible lay-out whereby a trolley 18 serves a lap drawing frame 10 and eight combing machines 17 arranged two by two in parallel. In this case the trolley 18 serves the combing machines 17 by carrying out an endless circuit.

Fig.4 shows a case in which the trolley 18 can serve two lap drawing frames 10 and twelve combing machines 17, the latter being arranged in parallel. In the case of Fig.4 the trolley 18 will follow straight routes in serving the combing machines 17.

Claims

1. Device for transporting packages of lap (13) and empty tubes (16) between a lap producing machine (10) and combing machines (17) characterized by
   - a lap production machine with a discharge unit (15) for discharge the produced packages of lap and with a storage unit for receiving returned empty tubes
   - a trolley (18) having a control and a drive unit for automatically guiding the trolley on the floor and a collecting container for receiving a plurality of packages of laps and an another collecting container for automatically collecting empty tubes (16)
   - combing machines (17) with storage zones for receiving packages of laps (13) and collecting units for empty tubes (16).

2. Device for transporting packages of lap (13) and empty tubes (16) between a lap producing machine (10) and combing machines (17) characterized by a trolley (18) with a control and a drive unit for automatically guiding the trolley on the floor and for exactly moving to a predeterminated position for loading and unloading packages or tubes (13, 16), said trolley being equipped with a collecting container (20) for receiving a plurality of packages (13) in a sytematic manner and further equipped with an appropriate container adapted for automatically collecting empty tubes (16) from each of the combing machines (17) and for automatically discharging the collected tubes to the lap production machine.

3. Device as claimed in claim 1 or 2, in which the control unit of the trolley (18) is connected with

a central data processing unit conversing with the trolley (18) and receiving information as to everything taking place in the network connecting the devices by a communication system.

4. Device according to claim 1 or 2, in which the guide system between the combing machines (17) and the lap producing machine (10) comprises a magnetic guide wire.

5. Device according to claim 2, comprising a body (19) bearing a collection container (20) for the packages of lap (13).

6. Device according to claim 5, wherein the container (20) has a movable sidewall (22).

7. Device according to claim 5 or 6, wherein the body (19) is mounted on a base (21).

8. Device according to claim 7, wherein the base (21) contains at least one of the following - control units, batteries, drive motors and stearing motors.

9. A trolley for transporting packages of lap comprising a base (21) provided with control units, batteries and motors, a body (19) on the base (21) and a container (20) for packages (13) on the body (19).

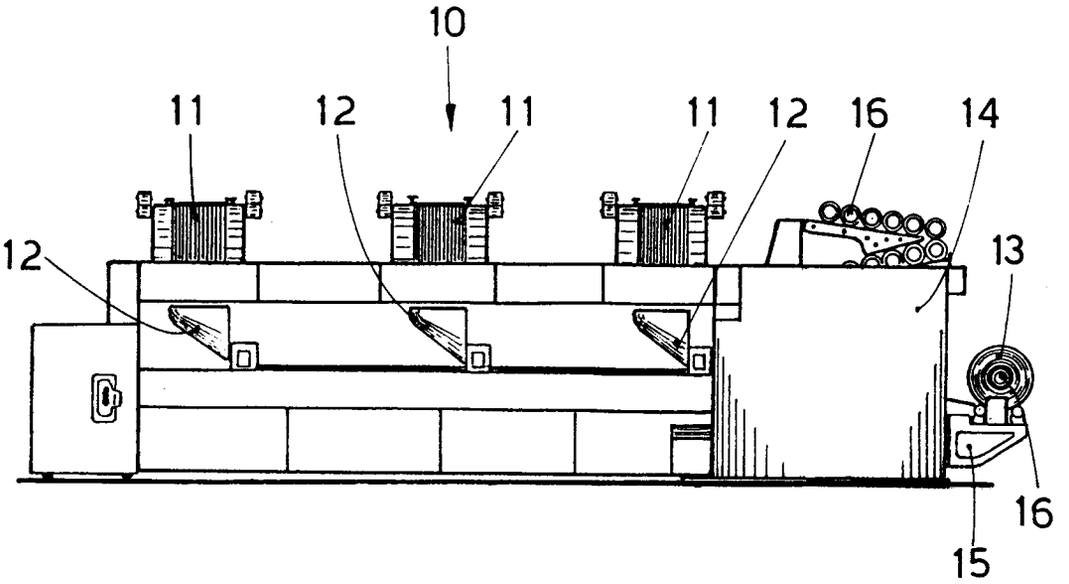

fig. 1

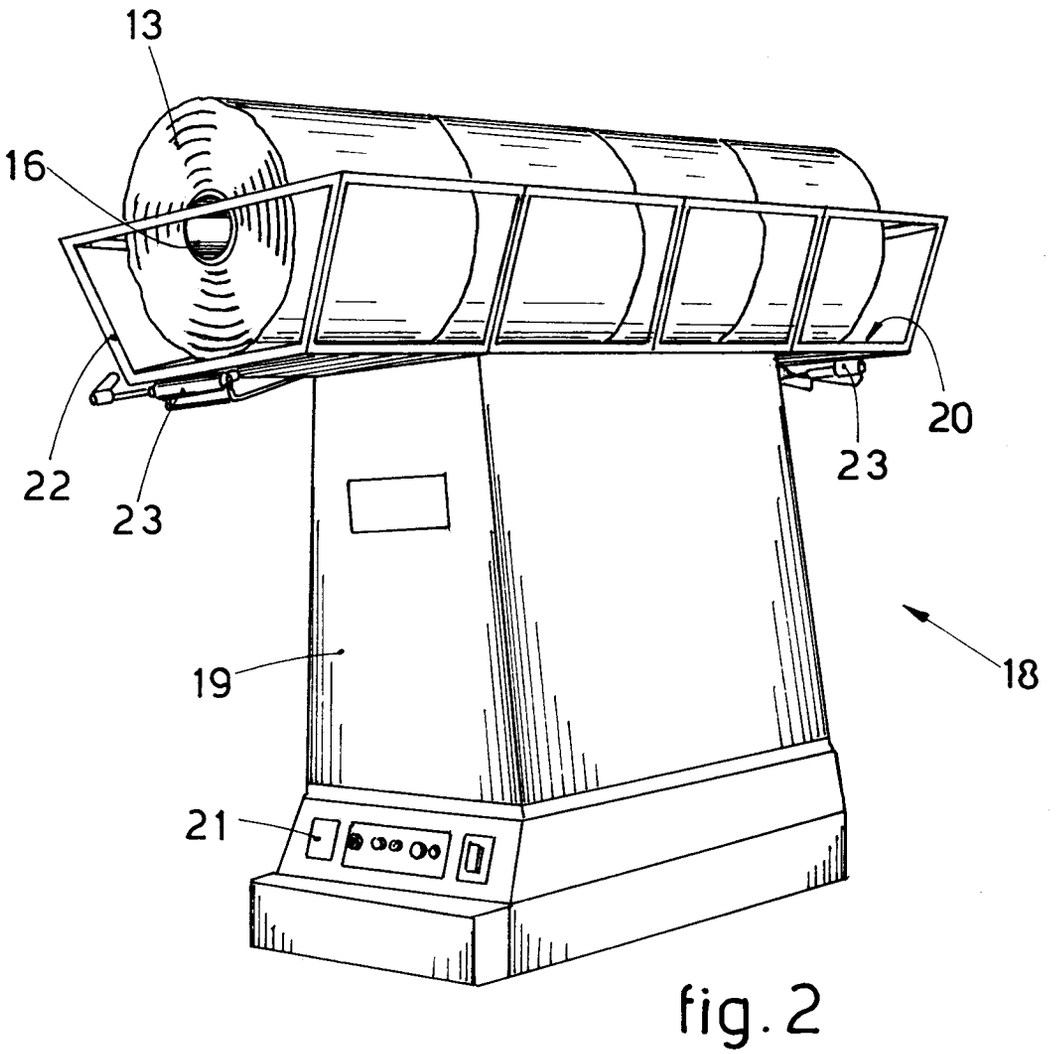

fig. 2

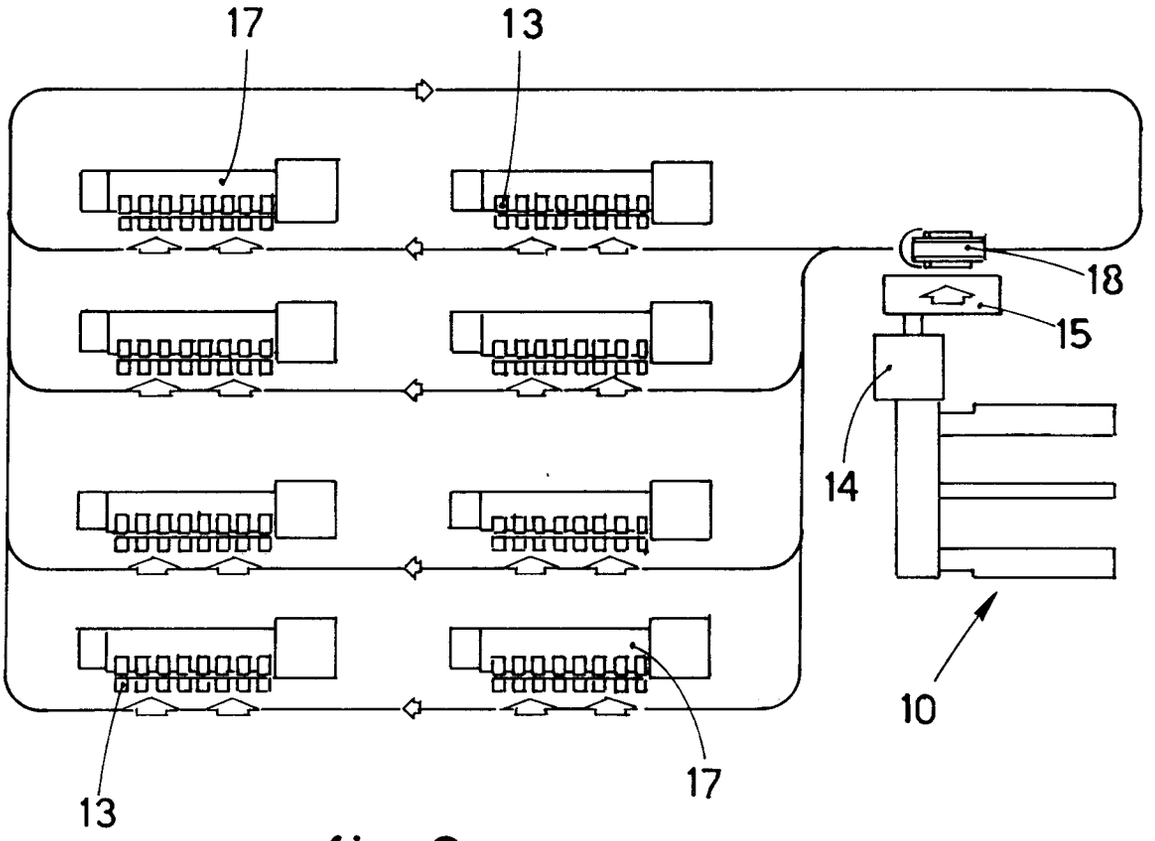

fig.3

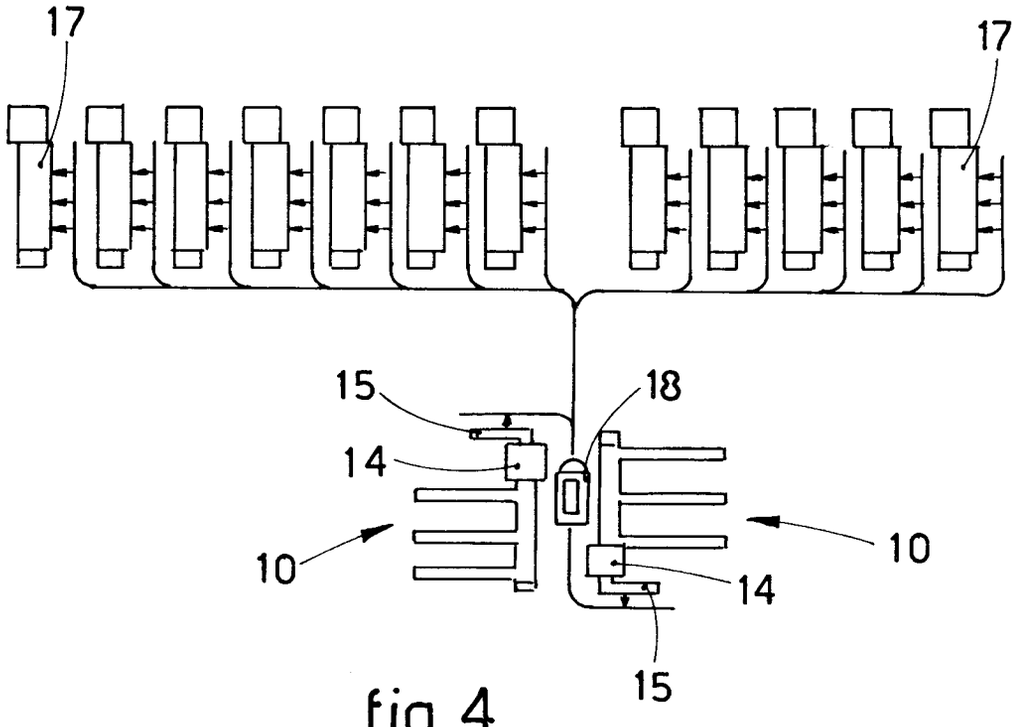

fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 95 10 1599

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)
P,Y	EP-A-0 312 503 (FRATELLI MARZOLI & C.S.P.A.) * the whole document *	1-3	D01G27/00 D01G19/08
Y	EP-A-0 176 158 (ALFA ROMEO AUTO S.P.A.) * page 1; figures 1-3 *	1-3	
A		7-9	
Y	DE-B-12 88 490 (KUREHA SPINNING CO.LTD. ET AL) * column 4, line 8-52; figures 1,3,4,12 *	1-3	
A		5,7	
A	GB-A-1 208 871 (FAMATEX GMBH) * page 4, line 12 - page 5, line 53; figures 1,2,4 *	1,2,5,7	
A	EP-A-0 118 600 (MASCHINENFABRIK RIETER A.G.) * page 1-5; figure 3 *	1	
A	CH-A-518 383 (HERGETH KG MASCHINENFABRIK UND APPARATEBAU)		

TECHNICAL FIELDS SEARCHED (Int.Cl.5)
D01G B23Q B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 May 1995	Munzer, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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