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(54) **Reels preassembling.**

(57) The invention relates to the operation of preassembling reels in cooperation with a winding machine (21).

Such preassembling serving the subsequent doubling and eventual twisting phases in machines suitable for working simultaneously two filaments (11 - 111) being wound off by two substantially coaxial reels (10 - 110), such preassembling being executable (Fig. 1a) by inserting a terminal portion (16) of the spool (14) of a reel (10) into the terminal portion (17) of the spool (114) of the other reel (110) or by threading the spools (19 - 119) on an auxiliary tube (18) in such preassembling, a winding machine (21) is so prearranged that one part of the winding heads (20) produces reels (10) suitable for the upper position and the other part of the winding heads (120) produces reels (110) suitable for the lower position, the reels (10 - 110) being prepositioned in pairs (Figs. 1a and 1b) as they leave the said winding heads (20 - 120), there being a device (29 - 41) for such preassembling.

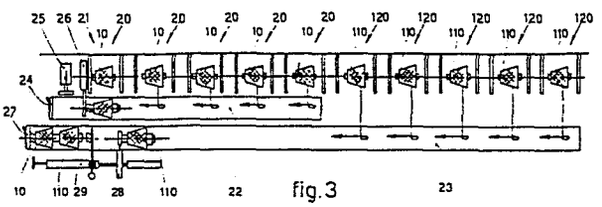

fig.3

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Classe Int n. [illegible] rif. SIP 2-2181

Description of the invention entitled:
"REELS PREASSEMBLING"
in the name of OFFICINE SAVIO Spa of PORDENONE
filed on No.

The present invention relates to preassembling reels just formed and are already in the evacuation phase from the winding machine.

To be specific, the object of the present invention is the preassembling of at least two reels just formed and ready to be avacuated from the winding machine, the two spools being wound differently.

It is knownthat in preparing the reels for the yarn doubling operation, the reels must be preassembled at a great loss of time, space and doubling of effort, etc.

It is also known that in the doubling phase during double-twisting operation or during another operation the two reels forming the origin of the yarn to be doubled do not behave in the same manner.

It is also common knowledge that during the doubling phase, the yarn, which rises from the reel positioned underneath , is put under slightly higher tension.

It is further known that during the phase of doubling executed essentially simultaneously with the doubletwisting phase, that if the reels have the same length of yarn wound thereon,

the upper reel finishes first thus creating recovery and discarding problems which adversely effect the production cycle.

The scope of the present invention therefore is to provide a preassembling of the reels still to be evacuated from the winding machine so as to avoid subsequent manipulation and handling of the reels themselves, such manipulation and handling result in a loss of time breakage, degradation of the product, delays and more waste of space, etc.

It is also a scope of the present invention to form and arrange the two reels in such a way that the length or quantity of the yarn wound on the would be upper reel is equivalent to the length or quantity of yarn wound on the would-be lower reel.

It is also an advantage of the present invention to obtain, by the same winding machine, reels suitable for being placed on top and reels suitable for being placed underneath.

One further scope of the invention is that of executing all the operations in a manner obviating the intervention of the operator.

It is to be pointed out that the state of the art as summed up by the European Search Report RS 61794 IT does not include a single invention that has such scopes.

The forgoing report cites DE 804. 173 and DE 2.455.553 the first of which provides conveyor transport means, which are given as known in the present invention and hence are not claimed

The second patent envisages instead the obtention of different reels on the same winding machine.

The present invention instead envisages the obtention on the same winding machine, simultaneously, reels whose sizes are proportioned in function of the difference in the yarn quantity required in a doubling a simultaneous double-twist-

ing operation.

The invention is advantageously realized and the scopes are achieved allowing thus the exploitation of the numerous advantages, by providing a winding machine which is regulated in such a way that the reels are produced on some heads in a manner that renders these reels suitable for the upper position and on other heads the reels produced are suitable for the lower position.

According to the present invention, the formation heads of the winding machine can be arranged alternately.

Accordance to an alternative embodiment of the invention, the formation heads are preset so that one half for producing reels for the upper position and one half for producing reels for the lower position.

According to the invention the reels, formed in a differential manner, are then mechanically paired as soon as they leave the the winding heads and before their removal from the winding machine.

If the winding heads are preset alternately, there will be a mechanism that independently, for istance, for each pair of heads, takes the two reels and combines them by axially inserting them around an auxiliary support, for example, of the type described in DE AS 1.560.271.

Such a mechanism or a device, may be arranged one for each pair or more winding heads, or otherwise one for each machine.

The doubling mechanism or device may be stationary or may be mounted to travel along the side of the machine in such a a way as to serve all the winding heads.

If on the other hand the winding heads are so arranged that one part thereof produces the would-be upper reels and the other part produces the would-be lower reels, the preassembling device can be predisposed at the front of the winding machines and serves all the winding heads, nevertheless such a preassembl-

ing device may be arranged to travel.

As said before, the preassembling may be achieved by the axial insertion of the extremity of one reel spool into the extremity of the other reel spool when, for example, the spools used are of the type described in IT OS 60.370. B/79.

Nevertheless it can also be achieved by the insertion on an auxiliary tube, for example, of the type described in DE AS 1.560.271.

The invention can thus be summed by a reels preassembling device in cooperation with a winding machine, said preassembling serving to combine reels for the subsequent phases of doubling and eventual double-twisting in machines suitable for working two filaments drawn off two substantially coaxial spools, such preassembling being achievable by either inseting the terminal part of one reel spool into the terminal part of the other reel spool or by insertion on an auxiliary tube, characterrised by the fact that the winding machine is preset in such a way that one part of the winding heads is arranged for producing reels suitable for the upper position and the other part of the winding heads arranged for producing reels suitable for the lawer position, the reels being preassembled in pairs as they leave said winding heads, therebeing a device for said prepositioning cooperating with the said winding machine.

Now , we describe, with the help of the attached tables provided by way of example only, an embodiment of the invention.

The drawing tables include the following figures:

Fig. 1a shows two reel spools inserted into each other;

Fig. 1b shows two reel spools inserted on an auxiliary tube;

Fig. 2 schematically shows the use of two reels, for example in a double-twisting spindle;

Fig. 3 shows the case of a winding machine preset,half for one type of reels and the other half for another type

of reel;

Fig. 4 shows a schematic side elevation view of a device placed in front of the winding machine and in the example serves to insert the reels into each other;

Fig. 5 shows an alternative embodiment of the invention with an auxiliary tubes transfer and prepositioning device;

Fig. 6 illustrates a detail of the auxiliary tubes pick-up means shown in Fig. 5.

With reference to the figures: 10 is the upper reel which is in a winding-off stage, reeling off a filament 11 at a lower tension; 110 is the lower reel whose filament 111 is being withdrawn at a higher tension which induces in the filament 111 itself an elongation which results in the possibility that the reel 11 has less filament than the reel 10; 12 is, in the example of Fig. 2, the yarn being double-twisted and formed of the filaments 11 and 111; 13 is, for example, a schematic and generic representation of a double twist spindle within which are arranged the reels 10 and 110; 14 is the spool of reel 10 and 114 is the spool of reel 110; 15 is the insertion and coupling zone of the spools 14, obtained, for example, by the cooperation of the portion 16 with the portion 17 of the spool as taught for example in IT OS 60.370. B/79; 18 indicates the auxiliary tubes as taught, for example, in DE AS 1.560.271; 19 - 119 are the spools of reels 10 and 110 respectively in case of insertion with the help of auxiliary tube 18; 20 are schematically the winding heads of the winding machine generically and schematically indicated by 21, such winding heads 20 produce the reels 10; 120 are schematically the winding heads of the winding machine 21 that produce the reels 110.

In the example of Fig. 3, the machine 21 is substantially

divided into two halves, one half equiped with heads 20 which produce reels 10 and the other half heads 120 which produce reels 110.

According to the invention, however, the heads 20 and 120 may be disposed alternately or in alternate groups.

Then 21 schematically indicates the winding machine which in the example has the discharge on the backside; the evacuation conveyer belt 22 serves the winding heads 20 which in turn produce the reels 10; the evacuation conveyer belt 23 serves the winding heads 120 that produce the reels 110.

A microswitch 24 for sensing the end of travel of the conveyor belt 22 is actuated when a reel 10 arrives at the end of the conveyor belt 22.

A transfer device 25, in the example, transfers the reel 10 into the evacuation conveyor belt 23 or into another conveyor or auxiliary means.

An eventual intercepter barrier 26 acting on the belt 22 is actuated once a reel approaches the microswitch 24 and is raised when the said reel 10 has been transferred.

A microswitch 27 may be provided at the end of conveyer belt 23, or an auxiliary or other means of aggregation.

An eventual interceptor barrier 28 acting on belt 23 is actuated when a reel 110 approaches the prepositioning zone.

A device 29, in the example, serves for the forced insertion of the terminal portion 16 of the spool 14 of reel 10 into the terminal part 17 of the spool 114 of reel 110.

A head 30 provided in device 24 exerts the pressure for inserting the ends 16 and 17 having as an abutment the microswitch 27 which in the example temporarily and occasionally raises said head, once the spools are preassembled, in the example, rises to free the preassembling zone in order to permit the arrival of the subsequent spool 110.

The means 3, for example, consisting of a jack which in

the example lowers the microswitch 27 once the spools 14-114 are positioned, that is to permit the evacuation of the combined reels 10 and 110, by the same device 29, in the example.

The rotation centre of the microswitch 27 is shown as 32.

The means 33 in the example consisting of a jack which temporarily positions the head 30 in the preassembling and eventually the vacuation phase; in the example, the jack 34 moves the device 30.

The trolley of the device 30 is indicated by 35.

As already said, one device 30 can be provided for each pair of winding heads 20 - 120 in the case where said heads are prearranged in the alternate order.

The device 30 can be on the other hand prearranged to travel along the side of the winding machine 21 at the reels 10 - 110 outlet end.

Further according to the invention and with the suitable adaptation and additions, for example, precluding an auxiliary spool store, the device 30 can be equally suitable for threading two reels (one 10 and the other 110) on an auxiliary tube 18.

According to an alternative embodiment of the invention, illustrated in Fig. 5 a device 41 is provided for picking-up, transferring and prepositioning the auxiliary tubes 18.

The said tube transfer and prepositioning device 41 substitutes also the group 27 - 31 - 32 acting as abutment and travel limiting means for the preassembled reels 10 - 110.

The said transfer and prepositioning device 41 for auxiliary tubes 18 consists in the present example of a carriage 42 slidingly running on suitable vertical guide means 43.

Said vertical guide means 43 are mounted on a support 44, the carriage 42 being vertically displacable by means of a belt 45 connected thereto and coacting with an upper pulley

46 rotatingly anchored to said support 44 and a lower driving pulley 46 integral to the driving shaft of motor means 47.

The above-said transfer and prepositioning device 41 includes a pick-up device 48 for the auxiliary tubes.

Said pick-up device 48 consists in the example of a jack 49 horizontally anchored to the said carriage 42.

An auxiliary tubes pick-up expansible head 51 is arranged terminally on the piston rod 50 of the jack 49.

In the illustrated embodiment, the head 51 is shown to consist of a chamber 52 on which a rigid bowl 53 is axially mounted having an external diameter slightly smaller than the internal diameter of the auxiliary tube 18.

The said bowl 53 is provided with a circumferential slots 54 and internally lined with an inflatable rubber diaphragm 55.

The said chamber 52 is connected to a source of fluid under pressure (not shown) by means of flexible tube 56.

Being mounted terminally on the piston 50 of jack 49 said pick-up head 51 is capable of being displaced both horizontally and vertically.

According to a possible alternative embodiment, the reels preassembling device can be provided with a device of known type capable of recovering and positioning the end of the yarn on the package.

The functioning is simple and already adequately described.

The reels 10 and 110 are produced on winding heads 20 -120 and are then combined by the preassembling device 30.

The preassembling can obviously be achieved by either a reciprocal insertion (example of Fig. 1a) or by threading on an auxiliary tube (example of Fig. 1b - 5 - 6).

In this upper position of carriage 42 the jack 49 is actuated to extend the rod 50 and insert the pick-up head 51 into an auxiliary tube 18.

At this point, fluid under pressure is fed into chamber 52

through the flexible tube 56, this causes the bowl diaphragm 55 to swell across the circumferential slots 54 and clamp the auxiliary tube 18 to the bowl 53 provided on the pick-up head 51.

Withdrawing the piston rod 50 of jack 49 causes the withdrawal of the auxiliary tube 18.

At this point and due to the action of the driving motor means 47, the carriage 42 is lowered in order to bring the picked up auxiliary tube to a predetermined position coaxial to the reels 10 - 110 which are to be inserted as they arrive on the conveyor means 23.

By actuating the jack 49, the rod 50 carrying the pick-up head 51, on which the auxiliary tube 18 is now clamped, is extended towards the reels 10 - 110, whereby due to a coordinated movement of the device 30, the auxiliary tube 18 successively receives the two reels 10 - 110.

Once the reels 10 - 110 are threaded on the auxiliary tube, the fluid under pressure is removed from the chamber 52 and the pick-up head 51 is withdrawn.

The auxiliary tube 18 is freed and thus falls, with the reels thereon, into a store or in a collection carriage (not illustrated).

In order to repeat the cycle the carriage 42 is raised again to pick-up and position a new auxiliary tube 18 and subsequently preposition the coming reels 10 - 110 on the same by insertion.

We have here described the invention but variants are possible for an expert in the art.

It is thus possible to vary proportions and dimentions, it is possible that each winding heads produce first the reel 10 and then reel 110 to restert again producing 10 - 110 and so on; it is possible to use any type of spool or auxiliary tube, it is possible to apply the invention to winding machines with withdrawal arranged at the back but also on winding

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machines with withdrawal at the front; it is possible to substitute the evacuation conveyer belts 22 and 23 by other means, for example a chute, a plate, a transporter removal arms, etc...., it is possible to arrange for the preassembling group 30 to work horizontally, vertically, semivertically and in any other way desired; it is possible to arrange for the preassembling group to include a group for orientating the reel; etc....; it is possible to provide motor means 47 in the form of a jack; it is possible to provide a store 40 positioned at the same height of the reels 10 - 110; it is possible to arrange for the reels 10 - 110 to move with respect to the auxiliary tube 18; etc....

These and other variants are possible for an expert in the art, being within the ambit of the inventive concept.

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CLAIMS

1 - Reels preassembling in cooperation with a winding machine which serves for the subsequent doubling and eventual twisting phases in machines suitable for simultaneously working two filaments (11 - 111) reeled off substantially by coaxial reels (10 - 110) said preassembling being achievable either by inserting (Fig. 1a) a terminal portion (16) of the spool (14) of one reel (10) in the terminal portion (17) of the spool (114) of the other reel (110) or by threading the spools (19 - 119) on an auxiliary tube (18) characterised by the fact that the winding machine (21) is preset in such a way that one part of the winding heads (20) produces reels (10) suitable for the upper position and another part of the winding heads (120) produces reels (110) suitable for the lower position the reels (10 - 110) being paired (Figs. 1a and 1b) in a set order as they leave the said winding heads (20 - 120), there being provide a device (29) for said preassembling.

2 - Reels preassembling as in claim 1 characterised by the fact that the reels (10) suitable for the upper position have a length or quantity of filament (11) wound thereon superior to the wound on the reels (110) suitable for the lower position, the two types of reels (10 - 110) being formed by the same winding machine (21) and being preassembled in sequence.

3 - Reels preassembled as in claims 1 and 2 characterised by the fact that the device for preassembling the reels (10 - 110) cooperates with at least two winding heads (20 - 120) each of which producing a reel (10) different from the other (110) and in sequence with the other.

4 - Reels preassembling as in claims 1, 2 and 3 characterised by the fact that the device (29) for preassembling the reels (10 - 110) is placed substantially at one end of the winding machine (21) where the reels (10 - 110) to be preassembled are wound.

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5 - Reels preassembling as in claim 1 and one or another of the preceding claims up to and including claim 3, characterised by the fact that the device (29) for preassembling the reels (10 - 110) is stationary.

6 - Reels preassembling as in claim 1 and one or another of the preceding claims up to and including claim 3, charcterised by the fact that the device (29) for preassembling the reels (10 - 110) is mobile.

7 - Reels preassembling as in claims 1, 2 and one or another of the preceding claims, characterised by the fact that the device (29) for preassembling the reels (10 - 110) acts on the reels (10 - 110) to be preassembled by means of at least a thrust substantially coaxial with the axis of the said reels (10 - 110).

8 -Reels preassembling in accordance with any of the preceding claims characterised by the fact that the device (29) for preassembling reels (10 - 110) on an auxiliary tube (18), there being advantageously provided a storage (40) for the said auxiliary tubes (18) and a device (41) for their transfer and prepositioning.

9 - Reels preassembling as in claims 1 and 8 characterised by the fact that the device (41) for transferring and prepositioning the auxiliary tubes (18) consists of means (42 - - 45 - 47) for transferring and prepositioning said tubes carrying pick-up means (49 - 50 - 51).

10 - Reels preassembling as in claim 1 and 9, characterised by the fact that the transfer and prepositioning device (41) of tubes (18) includes a mobile carriage (42) driven by motor means (47).

11 - Reels preassembling as in claims 1 and 9, characterised by t fact that the tubes transfer and prepositioning device (41) includes a jack (49) carrying a terminally on its piston rod (50) pick-up means actuatable at will.

12 - Reels preassembling as in claim 1 and 11, characterised by the fact that the said pick-up means (51) consists of a chamber (52) having an external bowl cover (53) provided with circumferential slots (54), the said bowl being internally provided with an inflatable rubber diaphragm (55) expansible across the said slots (54), there being means (56) for supplying fluid under pressure to said chamber (52).

13 - Reels preassembling as in anyone of the preceding claims up to and including 8, characterised by the fact that the device (29) for the preassembing of the reels (10 - 110) includes means for controlling the orientation of the reels.

14 - Reels preassembling as described and illustrated and for the given scopes.

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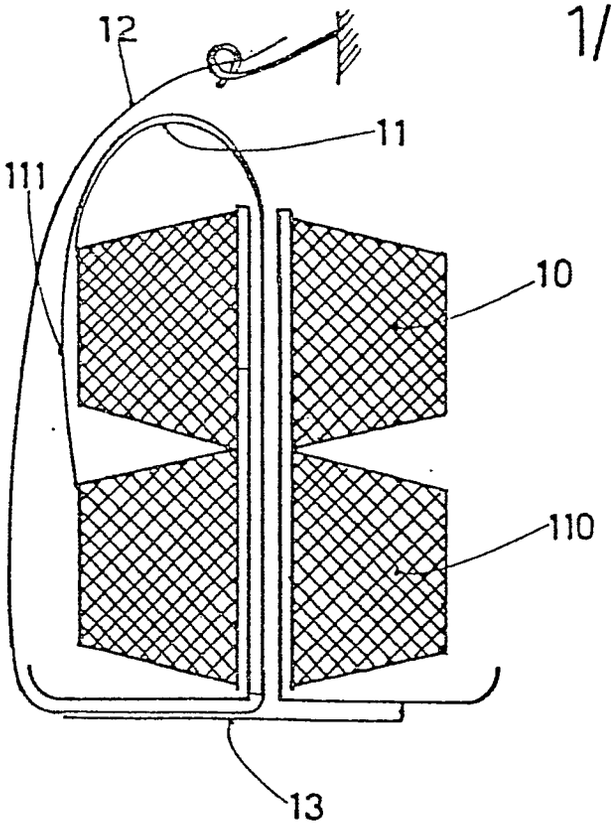

fig.2

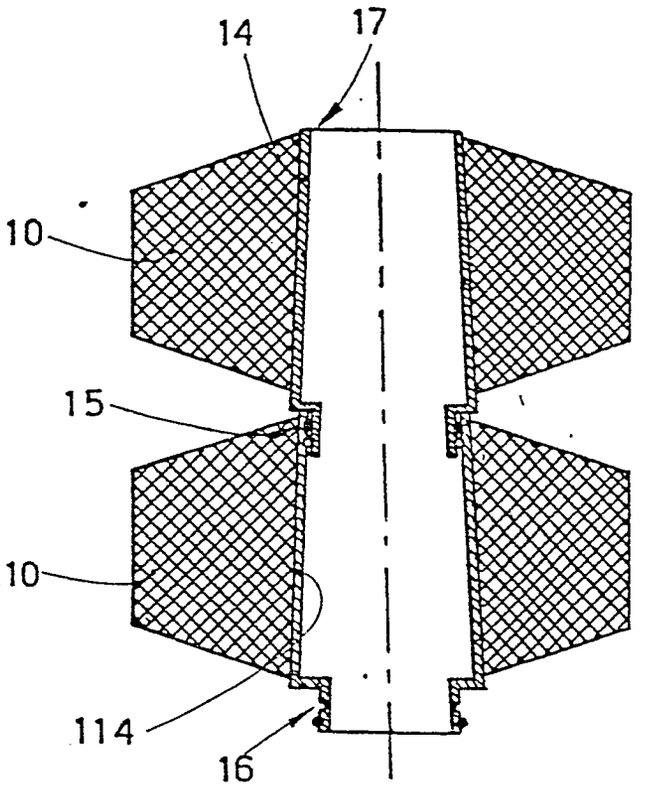

fig.1a

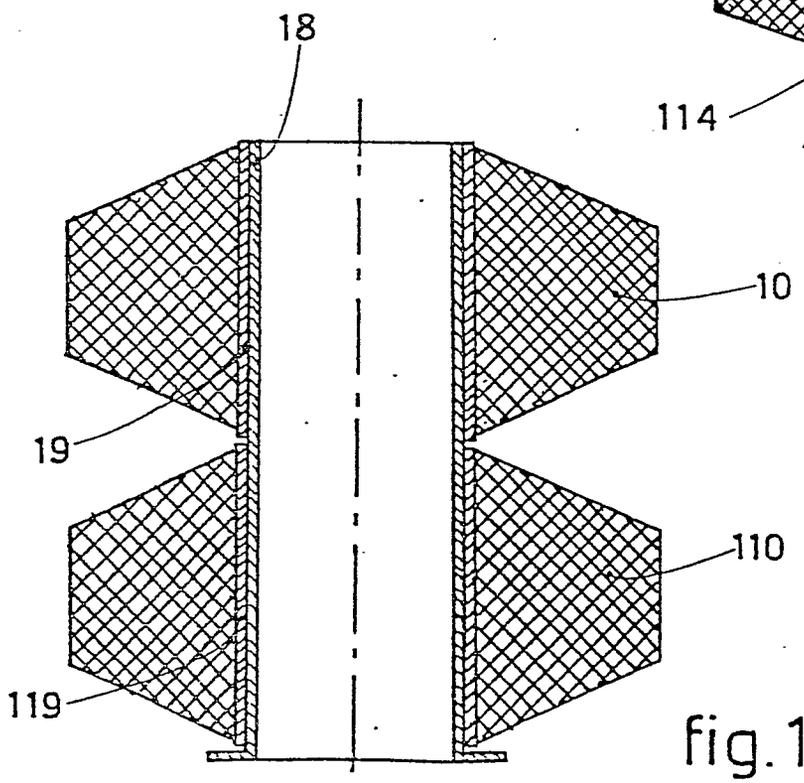

fig.1b

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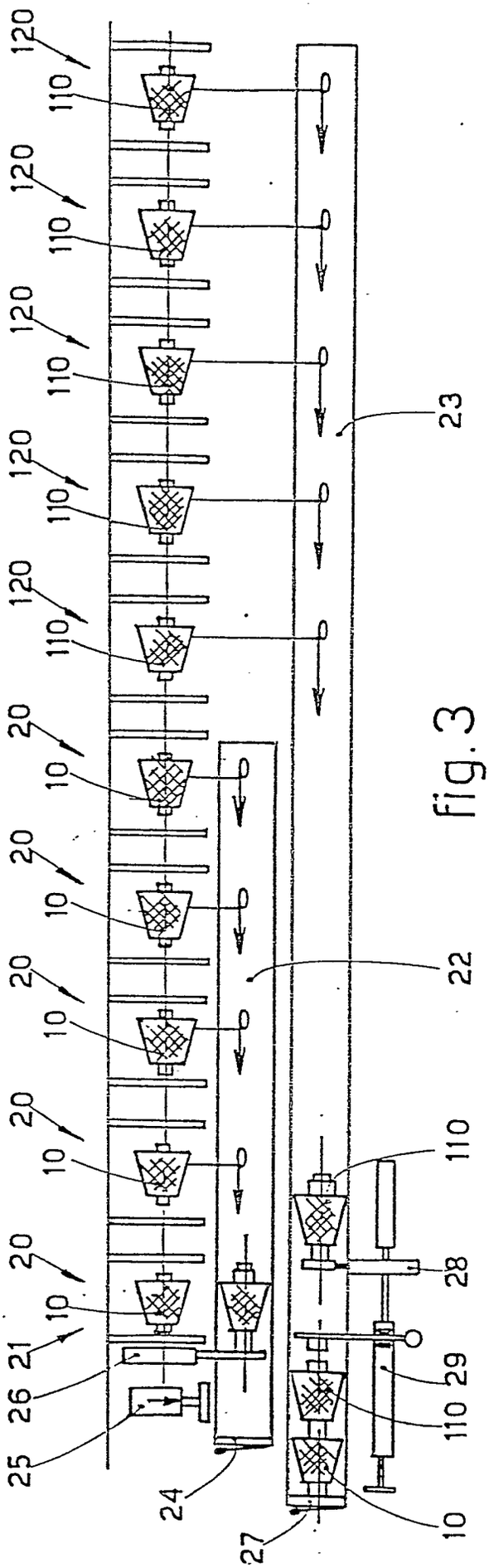

Fig. 3

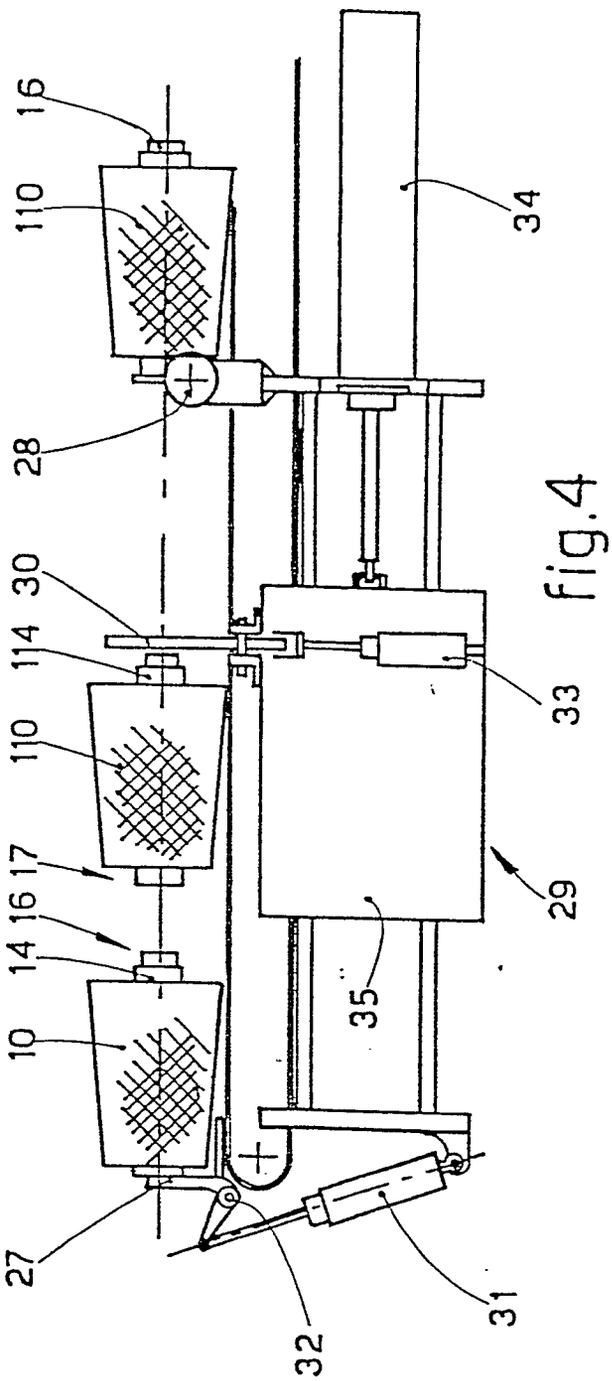

Fig. 4

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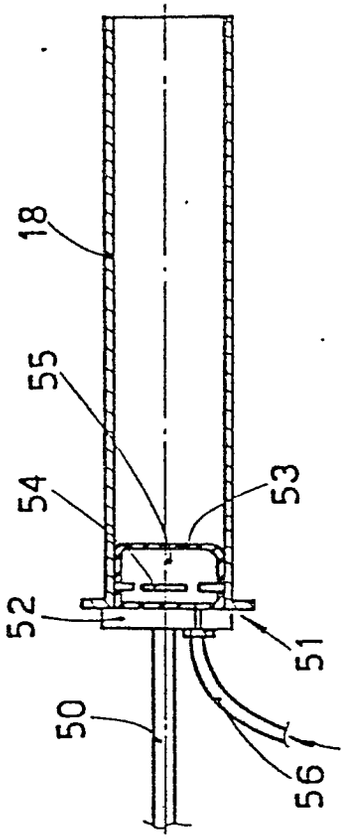

fig.6

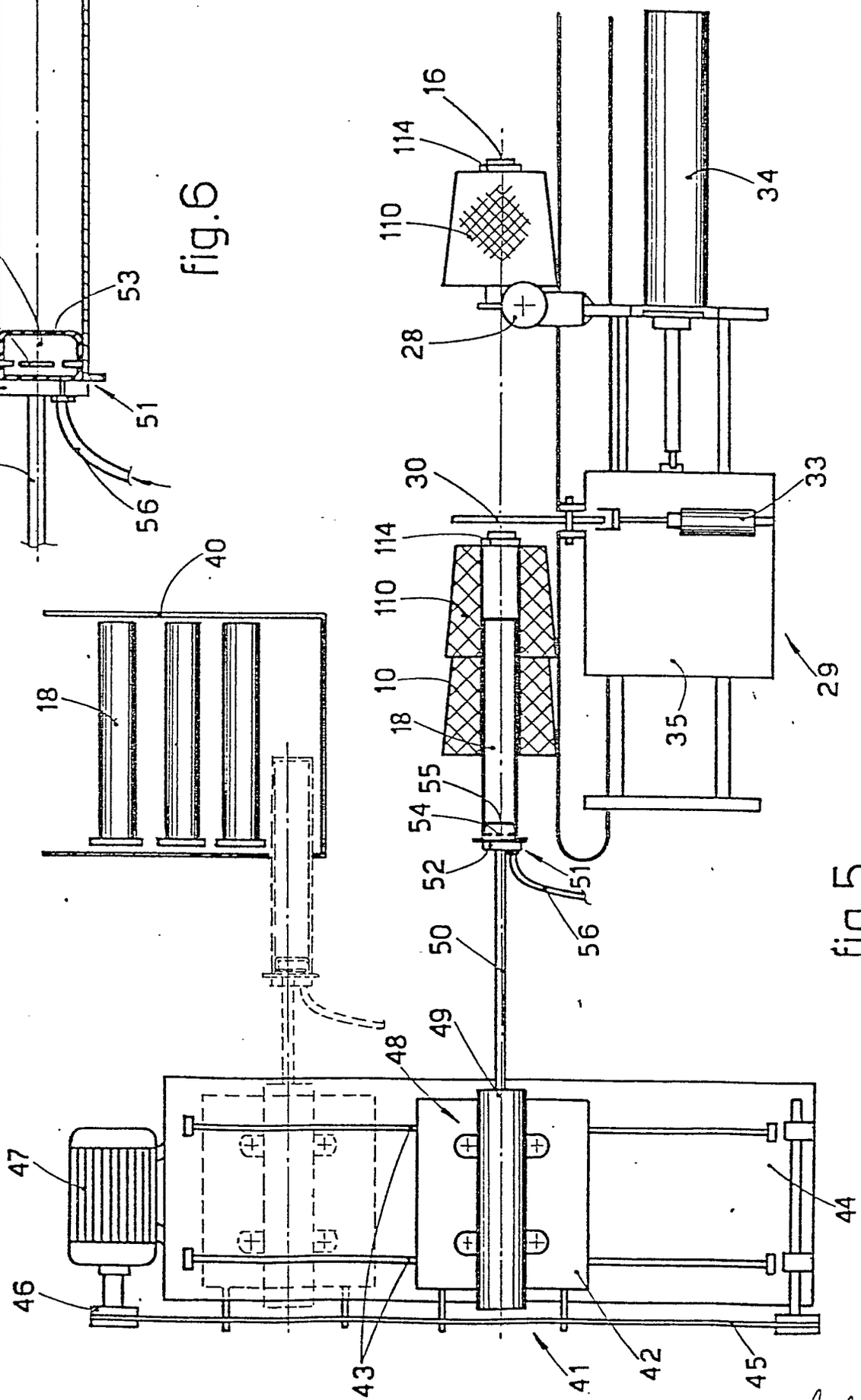

fig.5

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EUROPEAN SEARCH REPORT

Application number
EP 80 83 0071

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int Cl.³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	B 65 H 67/06
	No relevant documents have been disclosed. ----		TECHNICAL FIELDS SEARCHED (Int. Cl.³) B 65 H D 01 H

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28-11-1980	DEPRUN

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