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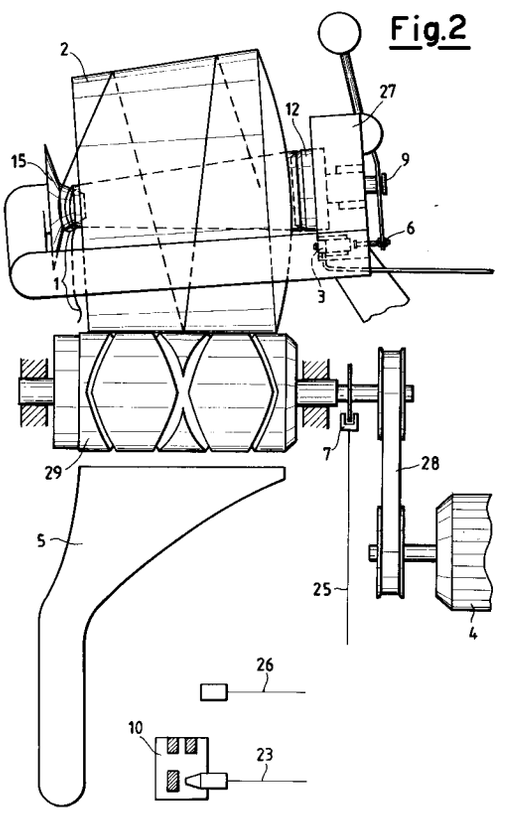
(54) Method for removing the wound thread end falling from the side of the bobbin in formation.

(57) The present invention relates to a method for removing the end of coils of wound thread (1), in particular for linen yarns, which are deposited and cling tightly to the area around the clamping line between the fixed counter-pin (15) of the arm (27) of the bobbin-holder and the end of the smallest diameter of the small tube, and said coils are formed each time the thread being wound comes out of the smaller side of the basically flat-tapered bobbin in formation owing to an interruption in the winding.

Fig.2



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The present invention relates to a method for removing the end of coils externally wound onto the side of a basically flat-tapered bobbin in formation.

More specifically the invention relates to a method for the suction removal of the thread-end, which is deposited with continual winding in the area around the circumferential clamping line between the fixed counter-pin of the arm of the bobbin-holder and the end of the smallest diameter of the small tube, and this method can be used in rolling-machines, and particularly in automatic winders for the bobbin-collection of linen yarn.

In the present state of the art there are automatic winders equipped with bobbin-holder arms with chucks, of which there is one fixed counter-pin and one mobile counter-pin, whose function is to carry, centre and fix the small tube, but also to allow the thread to be collected to be wound onto the small tube. The shape of the bobbin of wound thread is often more or less flat-tapered to facilitate the unwinding of the thread in the subsequent stages of the productive process in a textile factory.

At each cycle of thread breaking and knotting, or at the end of each feeding-pirn, it can often happen that the last length of thread, having no tension, owing to the tapered shape of the bobbin in formation, comes out of the bobbin and is wound onto the fixed counter-pin corresponding to the smaller diameter of the tube.

Incidentally, the length of thread which slips externally at the side of the flat-tapered bobbin in formation, is wound, due to the continuing rotation, in an area near the circumferential clamping line between the fixed counter-pin of the bobbin-holder arm and the end of the smaller diameter of the tube and the winding is often so tightly anchored onto the counter-pin as to seriously impede their unwinding, that it is necessary to catch and hold the thread-end from the upper suction socket. As is well-known to technicians in the art, during the subsequent knotting cycle, it may happen that the coils of thread wound onto the fixed counter-pin are not unwound and removed from the suction socket, and consequently the winding process becomes blocked after several attempts to restart it. As a result, each time the bobbin-winding station is blocked the winding operation is interrupted thus necessitating the intervention of a service operator. This intervention, by the way, requires great attention on the part of the service personnel, who are forced to intervene at no fixed intervals of time. It is understandable that for casual interventions of this kind, there is a low performance on the part of the worker.

Various techniques have been suggested and proposed in the art for preventing or restricting the presence of coils externally wound onto the sides of the bobbin in formation.

For example: one method used is the application of suitably-shaped flat elements placed at the ends of the bobbin in formation and consequently at the ends of the ridge-shaped carrier roller. Although to a lesser extent, the problem of coils of thread wound onto the counter-pin remains, even if the above expedient reduces the phenomenum. This type of strategy, moreover, although widely used, has the great disadvantage of causing a constructive complication which impedes the whole winding operation. Another method proposed by the art, to avoid the thread coming off the sides of the bobbin, consists in using blasts of compressed air which serve to force the thread to remain on the surface of the bobbin. This latter device has also brought about an improvement in preventing the thread from leaving the bobbin, but in spite of this the thread is occasionally wound around the counter-pin of the bobbin-holder arm and consequently this method does not provide a permanent solution to the above problem. These and other methods proposed by the known art to satisfy all the demands of the practical distribution of the thread on the bobbin, have always proved to be precarious in that they cause the thread to be tightly wound around the circumference of the counter-pin, making its removal to proceed with the knotting cycle, difficult.

Upon observation of the above disadvantage, the applicants of this invention have surprisingly discovered that by using the method and device of the present invention the end of the wound thread is removed with extreme operating security every time the thread falls from the side of the bobbin in formation. The method claimed herein, which enables the removal of the end of the coils of wound thread which are tightly anchored in the area around the clamping line between the fixed counter-pin of the bobbin-holder arm and the end of the smaller diameter of the winding tube, includes in its embodiment a restricted axial opening of the anchoring end of the bobbin-holder arm and this opening occurs every time the winding is interrupted and more specifically before the suction phase is activated to remove the upper end of the thread wound onto the bobbin, in order to restart the winding process.

This axial opening of the pin and counter-pin of the bobbin-holder arm is basically half of the penetrating length of the counter-pin into the hole of the supporting tube of the wound thread and, in addition, this axial opening is generally activated at the exact moment of the start of the suction phase of the upper end of the thread wound onto the bobbin in formation.

The embodiment of the method of the present invention consists of an apparatus which has a pneumatic device, or any known device which, when activated at the beginning of each knotting cycle, moves a lever which works the axial opening of the pin and counter-pin of the bobbin-holder arm.

A preferential embodiment of the invention is hereunder described, as an illustration but not limiting thereof, with the help of the enclosed tables, wherein:

- figure 1 is an overall schematic front view of a winding unit with the upper flat-tapered bobbin in formation and the lower unwinding pirn and this view also shows several motors together with the control and piloting system of the whole winding process;
- figure 2 is an overall schematic front view of the upper part of the winding unit and this view shows the moment in which the breaking of the thread, or in any case the interruption of the thread flow, has caused the deposit of several layers of wound thread in the area around the clamping line between the fixed counter-pin of the bobbin-holder arm and the end of the smaller diameter of the winding tube;
- figure 3 is an overall schematic front view of the upper part of the winding unit, and this view shows the moment in which the device, which embodies the method of the present invention has operated a restricted axial opening of the anchoring ends of the bobbin-holder arm allowing the removal of the wound thread-end by means of the suction socket.

To provide a better illustration of the figures as a whole the unnecessary parts of the invention have been omitted, as these are already known and do not concern the functioning of the present invention.

In the enclosed tables:
1 is the thread of woollen, cotton or synthetic fibre which in the winding process is transferred and unwound from a cop 14 below a bobbin, or upper bobbin 2. This bobbin 2 is a collection of any shape of thread 1 wound into basically helical coils; 3 is a known device, preferably pneumatic, which works the axial opening between the counter-pin 15 and the pin 12 of the bobbin-holder arm 27; 4 is a three-phase motor, or similar motor source, which activates the thread-guide roller 29 through the toothed belt 28. The thread-guide roller is the driving roller which provides both the backward and forward movement of thread 1, and the rotating movement of bobbin 2 in formation, until the desired diameter of the collected thread is reached; 5 is the suction tube which is shaped at the end with a slit for sucking the thread-end wound onto the bobbin in formation 2. This suction tube 5, known in the art, is activated every time there is a controlled or accidental interruption of thread 1 and this activation consists in an angular rotation by means of starter 18 worked by the control block 20 through cable 19; 6 is a lever, which pushed by device 3, axially moves the solid pivot 9 to the centering pin 12 of the bobbin-holder arm 27; 7 is the probe which indicates, at every moment, the rotating speed of the grooved roller 29 and continuously transmits the rotating values to the control block 20 through cable 25; 26 is the cable of the thread (1)-presence sensor; 20 is the governing or control block, based on a mini-processor, or electronic card suitable for memorizing the operating instructions, introduced by means of the control keyboard 22 which transmits through cable 21. The control block 20 is capable of transforming said instructions coming from cable 21 into a program which can be followed from its calculating or processing centre to continuously provide the necessary signals during the winding process. The governing block 20 incidentally is basically like a micro-processor, which uses, as an inlet, the information obtained both from the disk-probe 7, through cable 25, and from cable 26, which indicates the thread-presence with its probe and also from cable 23 which transmits with its sensor, signals for controlling the thread, which is subjected to exploration through block 10, which represents the electronic thread-guide plate; 16 are clutch components for the regular tension of the run of the thread 1 being wound onto the bobbin 2; 8 is an electcrovalve, or similar device, which on obtaining a signal from the governing block 20, through cable 24 starts the activation of the fluid of motor 11 which together with driver 3 moves the axial opening of the counter-pin 15, thus providing for the embodiment of the method of the present invention.

The following functioning description, with reference to the figures mentioned above, refers to the device which embodies the method of the present invention and said functioning can be easily understood from the figures of the enclosed tables.

In a textile winding machine, for example an automatic bobbin-winder, thread 1 taken from pirn 14 which is being unwound is collected onto bobbin 2 with crossed coils called a cone, or bobbin suitable for use in the subsequent operations. As the thread is being transferred from pirn 14 to bobbin 2, thread 1 itself is explored by means of block 10, which represents the known electronic thread-guide. If during the exploration of the thread there are undesired defects, the analysis circuit of the thread-guide 10 activates an electric exit impulse and inlet into the governing block 20. This

governing block 20 by processing an electric cutting-request impulse will activate the cutting of thread 1 and at the same time also the knotting cycle which will also be activated because of the interruption of the winding at the end of the pirn, or owing to the accidental breaking of the thread. It should be noted that the accidental breaking of thread 1 in a well-regulated bobbin-winding machine is not very frequent. At each request for the cutting of the thread, or at each controlled or accidental interruption of the thread it frequently happens that thread-end 1 becomes wound in several coils onto the fixed counter-pin 15. In fact, the thread-length which slips externally at the side of the basically flat-tapered bobbin 2, owing to the continuing rotation, is wound several times in the area around the circumferential clamping line between the counter-pin 15 and the end of the small tube. Upon activation of governing block 20, the knotting cycle begins, which subsequently or contemporaneously activates electrovalve 8, which controlls device 3 which moves levers 6 and 9 activating the axial opening between pin 12 and counter-pin 15 of the bobbin-holder arm 27. The winding of thread 1 tightly deposited to the circumference of counter-pin 15 slows down and the coils are then easily and rapidly sucked by suction socket 5, and consequently the knotting cycle proceeds allowing the winding process to safely restart. As a result the bobbin in formation 2 continues to collect the wound thread without being forced to stop.

The above is a description of a preferred embodiment with some variations. There are obviously other forms of embodiment which enter into the spirit and scope of the present invention.

In this way the arrangement of the sensors can vary; it is also possible to carry out minor modifications of the device proposed herein to embody the method of the present invention without altering it in any way.

Claims

1. Method for removing the end of coils of wound thread which are tightly and circumferentially deposited in the area around the clamping line between the fixed counter-pin of the bobbin-holder arm and the end of the smaller diameter of the tube, and these coils are formed every time the thread being wound leaves the smaller side of the basically flat-tapered bobbin in formation following an interruption in the winding at the end of the pirn, or owing to breaking, or controlled cutting of the thread being collected, and this method is characterized in that it introduces an axial opening contained at the anchoring ends of the bobbin-holder arm each time the winding is interrupted and before the suction phase is activated to remove the upper end of the thread wound onto the bobbin in order to restart the winding process.

2. Method for removing the end of coils of wound thread according to claim 1, characterized in that the axial opening of the pin and counter-pin of the bobbin-holder arm is basically half of the penetrating length of the counter-pin into the hole of the supporting tube of the wound thread for the bobbin in formation.

3. Method for removing the end of coils of wound thread according to claims 1 and 2, characterized in that the axial opening of the counter-pin of the bobbin-holder arm is basically activated at the same moment of the start of the suction phase of the thread-end wound onto the bobbin in formation.

4. Apparatus for the embodiment of the method according to claim 1, characterized in that it consists of a pneumatic device which moves a lever for operating the axial opening of the pin and counter-pin of the bobbin-holder arm.

5. Apparatus for the embodiment of the method according to claim 4, characterized in that the device is any known device activated at the beginning of each knotting cycle of the ends to restart the winding process.

Fig.1

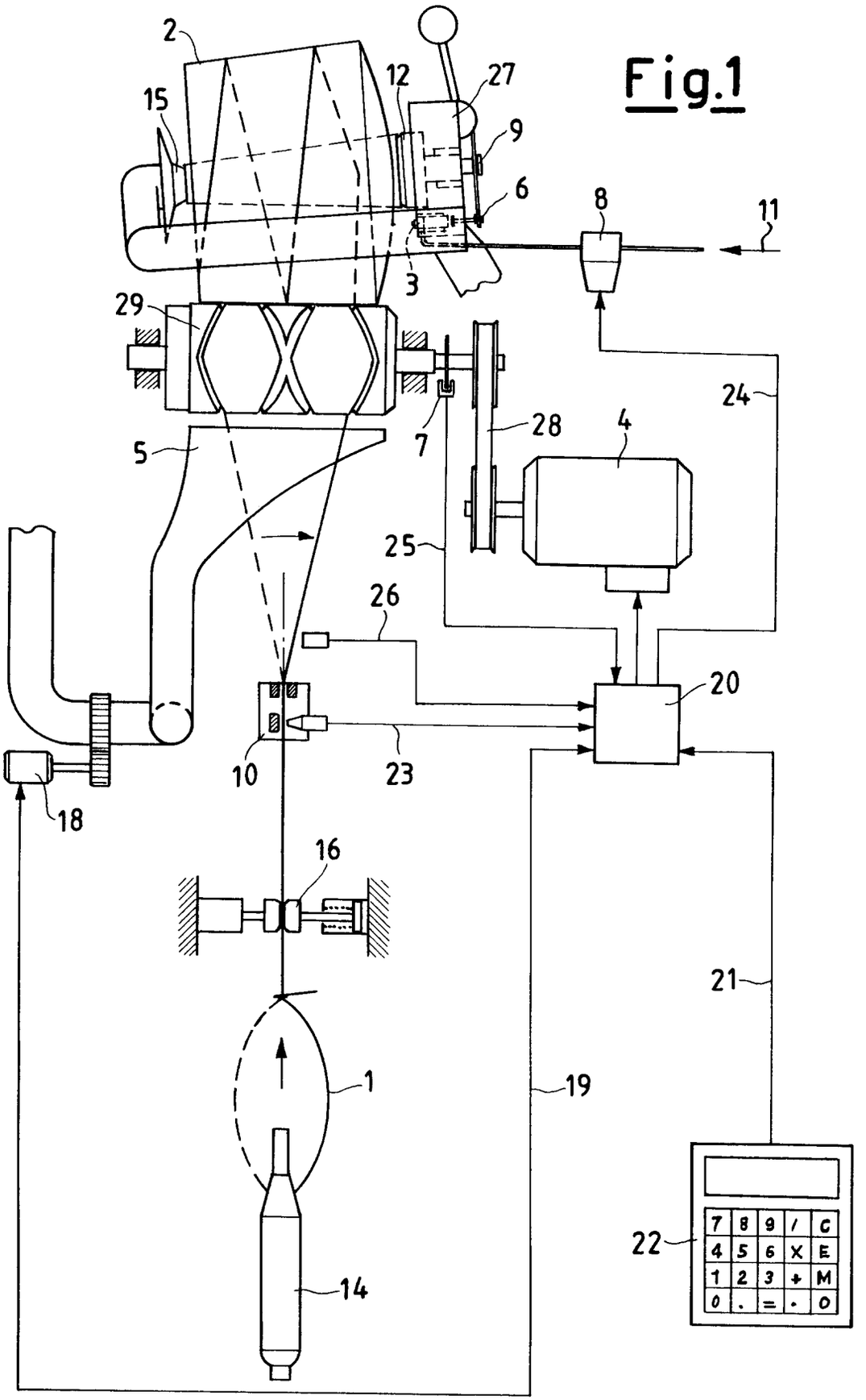
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Fig.2

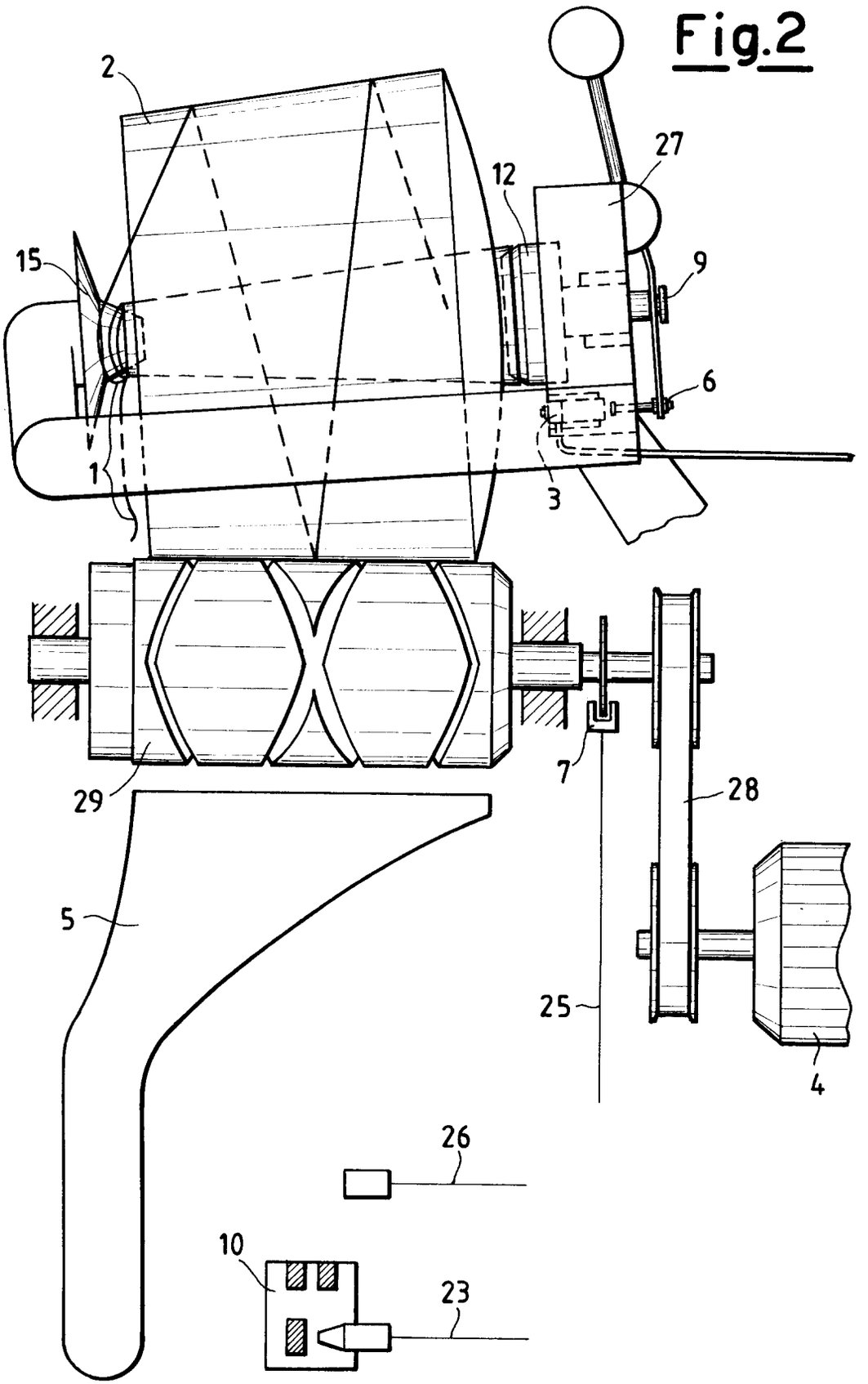
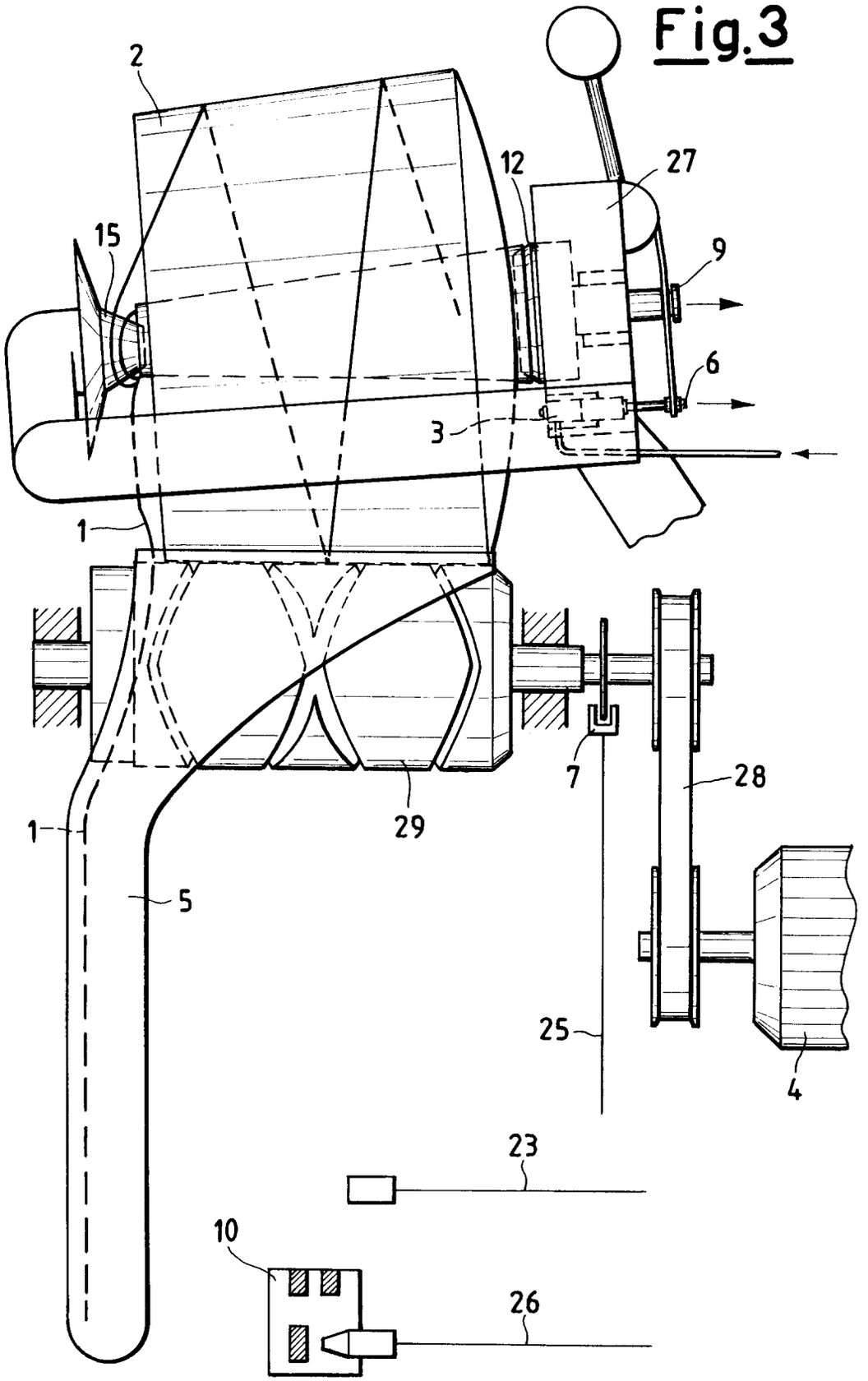


Fig.3



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EUROPEAN SEARCH REPORT

Application Number
EP 95 20 0740

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.6)
A	FR-A-2 552 746 (SAUER-ALLMA GMBH) ---		B65H67/08
A	DE-A-33 34 186 (ELITEX KONCERN TEXTILNIHO STROJIRENSTVI) ---		
A	DE-A-39 37 731 (VYZKUMNY STAV BAVLNÁRSKY) ---		
A	EP-A-0 317 733 (E. SCAGLIA) -----		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65H
D01H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 July 1995	D Hulster, E

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