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(54) Package identification arrangement

(57) An individual position automatic doffing yarn processing machine (20), having a quality monitoring arrangement (34) able to determine whether a package (15) produced on the machine (20) is of reject or acceptable quality, has a package identification arrangement for identifying the reject packages (15) and distinguishing those packages (15) from those of acceptable quality. When a package (15) has been fully wound, the yarn (16) running onto the package (15) is displaced from the traverse device (18) and is cut. In the case of a package (15) of acceptable quality, the operation of the cutting device (29) is delayed relative to that for reject quality packages (15), so that in the former case a larger central yam winding or "belly-band" (35) is wound on the package (15) than in the case of reject packages (15). The reject packages (15) with the large belly-band (35) can readily be segregated from the acceptable packages (15).

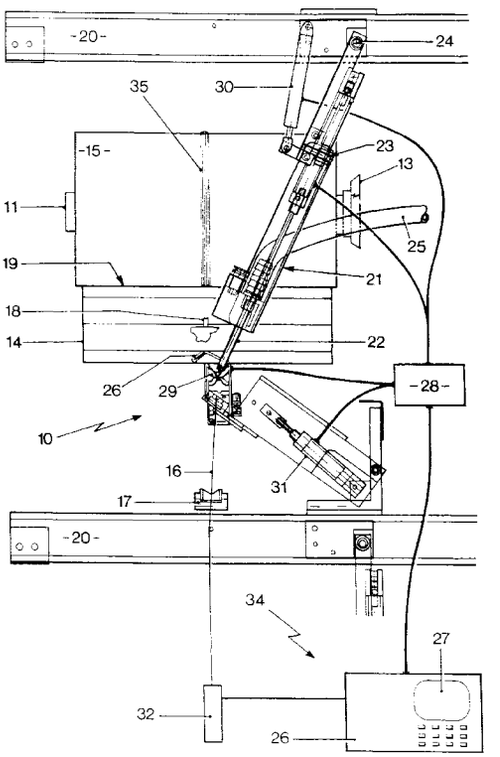

Fig.3

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Description

This invention relates to arrangements for identifying those packages of processed yarn, produced by a textile machine, which are of unacceptable quality and to distinguishing such packages from those of acceptable quality.

Conventionally, a person doffs, i.e. removes, packages of processed yarn from a textile machine in sequence from the processing positions and places them in a corresponding sequence on the pegs of a doff trolley. In this way, the position on the machine at which any particular package was produced can subsequently be established and noted if that package is determined to be of reject quality. This enables the processing conditions at that position to be investigated and possibly remedied. A textile machine may be provided with a yarn quality monitoring system which determines whether a package of processed yarn produced at any particular processing position on the machine is or is not of satisfactory quality. Such a system generally monitors the tension of the running yarn prior to winding and, dependent upon whether the monitored tension remains within a predetermined tolerance band, indicates that that package is of acceptable or reject quality. This information can be displayed on a screen adjacent the machine controls or by an indicator light at the package build location concerned. From such information, a person removing packages from the machine can place reject packages in a different location from the acceptable packages, or mark the reject packages when putting all of the packages on the pegs of the doff trolley. However such arrangements are prone to human error, by the placing of the packages out of sequence on the pegs of the doff trolley, or by incorrectly matching the actual reject packages and their machine positions with those identified as reject on the control screen. More particularly, in the case of a machine with individual position automatic doffing in which more than one full package may be present at any single position, it may not be possible to determine which of those packages is of reject quality without a complicated and costly system of screen indication or indicator lights.

It is known that, to form a package on a tube in many textile machines, a running yarn is fed to the tube by means of a yarn guide reciprocating along a path parallel to the axis of the tube to give a traversing motion to the yarn. The periphery of the tube and developing package may be driven by contact with a driving bowl. When a package wind is complete, the traversing motion transmitted to the yarn is stopped, and the yarn that is being forwarded to the package is then cut. In the brief time between the stopping of the yarn's traversing motion and the cutting of the yarn, a small band of yarn winding is formed centrally on the package. Such a band is often referred to as a "belly-band".

For a textile yarn processing machine, especially an individual position automatic doffing machine, it is an object of the present invention to provide a simple and inexpensive arrangement by means of which packages of processed yarn are identified and those which are of reject quality may be distinguished from those of acceptable quality, which arrangement is less prone to human error than the known arrangements.

The invention provides a package identification arrangement in a yarn processing machine having a package winding mechanism including a traverse device operable to transmit a traversing motion to a yarn being forwarded to a package, a cutting device, a control device operable to stop the transmission of the traversing motion to the yarn when a package wind is completed and to operate the cutting device when the traversing motion has stopped to cut the yarn as it is forwarded to the package, and a quality monitoring arrangement adapted to determine whether a package is of acceptable or reject quality; wherein the quality monitoring system is operable to give a signal to the control device when a package of a specified quality has been produced, and the control device is operable in response to that signal to delay the operation of the cutting device so as to form an enlarged band of yarn winding on the package at a predetermined location. Preferably the cutting device delaying signal is given when the package is of acceptable quality.

The yarn processing machine may be a texturing machine, and may be a false-twist crimping machine. The yarn processing machine may have a plurality of processing positions, each of which has a winding mechanism and cutting device, and may be an individual position automatic doffing machine. The signal given to the control device by the quality monitoring system may indicate that processing position at which an acceptable quality package has been produced, whereby the control device is operable to delay the operation of the cutting device at that processing position. The processing machine may be configured in a plurality of bays, with a plurality of processing positions in each bay. In this case the control device may comprise a bay processor located in each bay and operable to control the doff sequence of the processing positions in that bay, and the quality monitoring system may send the signal to the bay processor controlling the processing position at which a package of acceptable quality has been produced.

The quality monitoring arrangement may comprise a display screen, in which case the arrangement may be operable to display the quality of the packages produced at each processing position of the machine.

The winding mechanism may comprise a suction device movable between an inoperative position remote from the cutting device and an operative position adjacent the cutting device in which the suction device is operable to forward a cut yarn to waste. A point of origin yarn guide may be disposed in its normal operating position to guide the yarn to the traverse device, and the point of origin guide may be attached to the cutting de-

vice. The point of origin guide and the cutting device may be moved from their respective normal operating and operative positions so as to displace the yarn from the traverse device when the suction device moves to its operative position. After the yarn is cut, the cutting device and the point of origin guide may be moved back to their respective inoperative and normal operating positions and the suction device moved back to its inoperative position.

The invention will now be described with reference to the accompanying drawings in which:

Fig. 1. is a front view of a winding mechanism during winding and a package identifying arrangement,

Fig. 2. is a side view of the mechanism and arrangement of Fig. 1,

Fig. 3. is a front view of the mechanism and arrangement of Fig. 1 in the yarn cutting configuration, and

Fig. 4. is a front view of a textile machine with a package identifying arrangement and a plurality of winding mechanisms

Referring now to Figs 1 and 2, there is shown a package winding mechanism 10 during the winding of a package 15 on a tube 11. The tube 11 is supported in a cradle 12 (not shown in Fig 1 for clarity) by means of end caps 13 and the package 15 is driven in rotation by peripheral contact with a driving bowl 14. To build the package 15 on the tube 11, a running yarn 16 is forwarded from the yam processing section (not shown) of an individual position automatic doffing textile machine 20 in which the winding mechanism 10 is mounted, via a centrally disposed point of origin yarn guide 17 and a traverse device in the form of the reciprocating traverse guide 18, to the nip 19 between the package 15 and the driving bowl 14. A cutting device 29 is mounted in what is an inoperative position as shown in Figs. 1 and 2 with the point of origin yarn guide 17 mounted on the cutting device 29.

The winding mechanism 10 comprises a suction device 21 which is mounted substantially in alignment radially with the end cap 13. The suction device 21 has a nozzle end 22 positioned adjacent the cradle 12 in a first position spaced from but also substantially aligned radially with the end cap 13. The suction device 21 is mounted to pivot about a first axis 23 and a second axis 24 to an operative position (Fig. 3) as described fully in EP 744369A, the suction device 21 being operable when in that position to entrain the running yarn 16 into the nozzle end 22 whilst a full package 15 is doffed and exchanged for an empty tube 11. Yam 16, when drawn into the suction device 21, is passed to waste along a flexible pipe 25.

The control of the suction device 21, cutting device 29 and the motion of the cradle 12 during doffing of the package 15 and replacement by a new tube 11, is effected by a control device 28, which receives signals from a machine microprocessor 26. A quality monitoring arrangement 34 comprising a sensing device 32, which may be a tension measuring device or a velocity measuring device of the type described in GB 2200756B, sends signals to the machine microprocessor 26 from which the quality of the package 15 can be determined and displayed on the screen 27.

As shown in Fig. 4, the individual position automatic doffing machine 20 has a plurality of winding mechanisms 10 disposed in three vertically spaced rows. The machine 20 illustrated has two bays 33 in each of which are twelve winding mechanisms 10 in four columns, although a typical yarn texturing machine may have nine such bays with twelve winding mechanisms 10 in each bay 33. Associated with each bay 33 is a control device 28 or "bay processor"which controls the operation of the twelve winding mechanisms 10 in that bay 33. The screen 27 displays the quality information as determined by the quality monitoring arrangement 34 relating to all of the winding mechanisms 10 on the machine 20, identifying the quality information for each processing position by the row and column of the winding mechanism 10 concerned.

Operation of the machine 20 will now be described with reference to Figs. 1 to 4, and will be considered to start with a package 15 having been wound on a tube 11 mounted in the cradle 12 between end caps 13. The package 15 is in driving contact with the driving bowl 14, and the yarn 16 is running onto the package 15, as represented in Figs. 1 and 2. The running yarn 16 is forwarded to the package 15 via the point of origin guide 17 and the traverse guide 18. When the package 15 is fully wound, a control device 28 causes operation of cylinder 31 to lift the point of origin guide 17 to disengage the yarn 16 from the traverse guide 18. The running yarn 16 ceases its traversing motion and migrates under tension towards a predetermined location substantially in alignment with the point of origin guide 17, i.e. centrally of the package 15. Also the cutting device 29 is lifted from its inoperative position to a cutting position, and simultaneously cylinder 30 is operated to pivot the suction device 21 about the second axis 24 so that the nozzle end 22 is near to the cutting device 29 in the position shown in Fig. 3.

The quality monitoring arrangement 34 indicates that the package 15 is of acceptable or reject quality, and an appropriate signal sent via the control device 28 then causes operation of the cutting device 29 to cut the yarn 16. During the brief time that the yarn 16 running onto the package 15 is free from the traverse guide 18, and before the cutting device 29 operates, a small winding, or " belly-band" 35, is formed centrally of the package 15. After cutting, one cut end of the yarn 16 is attached to the package 15, but the other cut end coming from the yarn processing section of the textile machine 20 is entrained into the nozzle end 22 of the suction device 21 and forwarded to waste. The control device 28 then returns the cutting device 29 and point of origin guide 17 to their respective inoperative and normal op-

erating positions, and the suction device 21 back to its inoperative position shown in Figs. 1 and 2.

If the quality monitoring arrangement 34 indicates that a particular package 15 is of acceptable quality, then the signal sent via the machine microprocessor 26 and bay processor 28 causes a delay in the operation of the cutting device 29 at the processing position concerned relative to the time for that cutting device 29 to operate if the quality monitoring arrangement 34 indicates that the package 15 is of reject quality. In consequence a much larger "belly band" 35 (Fig. 3) of yarn winding centrally of the acceptable package 15 is formed than is formed in the case of a reject quality package 15. Furthermore, if the yarn 16 breaks prior to the completion of winding of a full package 15, there is no means of winding a " belly-band" on that, inherently reject, package 15. The large "belly band" 35 of a package 15 of acceptable quality is clearly distinguishable from the small central winding formed on a full package 15 of reject quality or no central winding on an incompletely wound package 15, readily enabling the person removing the packages 15 from the machine 20 to segregate the reject packages 15 from the acceptable packages 15.

By this simple means, involving very little cost penalty for a textile yarn processing machine, the reject quality packages are readily identified and distinguished from those packages of acceptable quality, with very little risk of human error.

Claims

1. A package identification arrangement in a yarn processing machine (20) having a package winding mechanism (10) including a traverse device (18) operable to transmit a traversing motion to a yarn (16) being forwarded to a package (15), a cutting device (29), a control device (28) operable to stop the transmission of the traversing motion to the yarn (16) when a package wind is completed, and to operate the cutting device (29) when the traversing motion has stopped to cut the yam (16) as it is forwarded to the package (15), and a quality monitoring arrangement (34) adapted to determine whether a package (15) is of acceptable or reject quality; characterised in that the quality monitoring arrangement (34) is operable to give a signal to the control device (28) when a package (15) of a specified quality has been produced, and the control device (28) is operable in response to that signal to delay the operation of the cutting device (29) so as to form an enlarged band (35) of yarn winding on the package (15) at a predetermined location.

2. A package identification arrangement according to claim 1, characterised in that the cutting device delaying signal is given when the package (15) is of acceptable quality.

3. A package identification arrangement according to claim 1 or claim 2, characterised in that the yarn processing machine (20) is a false-twist crimping machine.

4. A package identification arrangement according to claim 3, characterised in that the yam processing machine (20) is configured in a plurality of bays (33), with a plurality of processing positions in each bay (33), each of which has a winding mechanism (10) and cutting device (29).

5. A package identification arrangement according to claim 4, characterised in that the signal given to the control device (28) by the quality monitoring arrangement (34) indicates that processing position at which an acceptable quality package (15) has been produced.

6. A package identification arrangement according to claim 5, characterised in that the control device (28) is operable to delay the operation of the cutting device (29) at that processing position at which a package (15) of acceptable quality has been produced.

7. A package identification arrangement according to any one of claims 4 to 6, characterised in that the control device (28) comprises a bay processor located in each bay (33) and operable to control the doff sequence of the processing positions in that bay (33), and the quality monitoring arrangement (34) is operable to send the signal to the bay processor (28) controlling the processing position at which a package (15) of acceptable quality has been produced.

8. A package identification arrangement according to claim 7, characterised in that the quality monitoring arrangement (34) comprises a display screen (27) and is operable to display the quality of the packages (15) produced at each processing position of the machine (20).

9. A package identification arrangement according to any one of claims 1 to 8, characterised in that the winding mechanism (10) comprises a suction device (21) movable between an inoperative position remote from the cutting device (29) and an operative position adjacent the cutting device (29) in which the suction device (21) is operable to forward a cut yarn (16) to waste.

10. A package identification arrangement according to claim 9, characterised in that a point of origin yam guide (17) is disposed in its normal operating position to guide the yarn (16) to the traverse device (18)

and in that the point of origin yam guide (17) and the cutting device (29) are moved from their respective normal operating and inoperative positions so as to displace the yarn (16) from the traverse device (18) when the suction device (21) moves to its operative position.

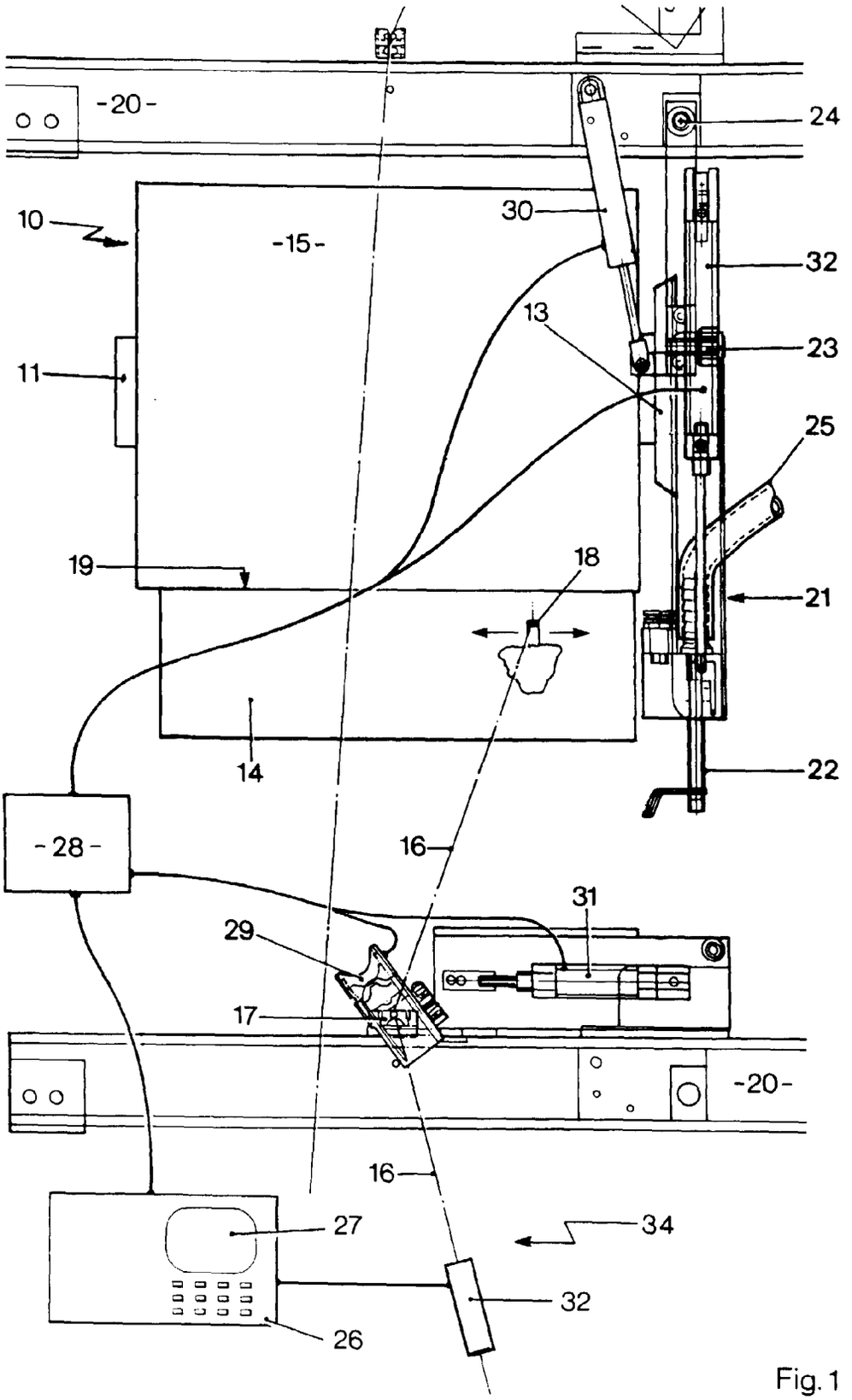
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Fig. 1

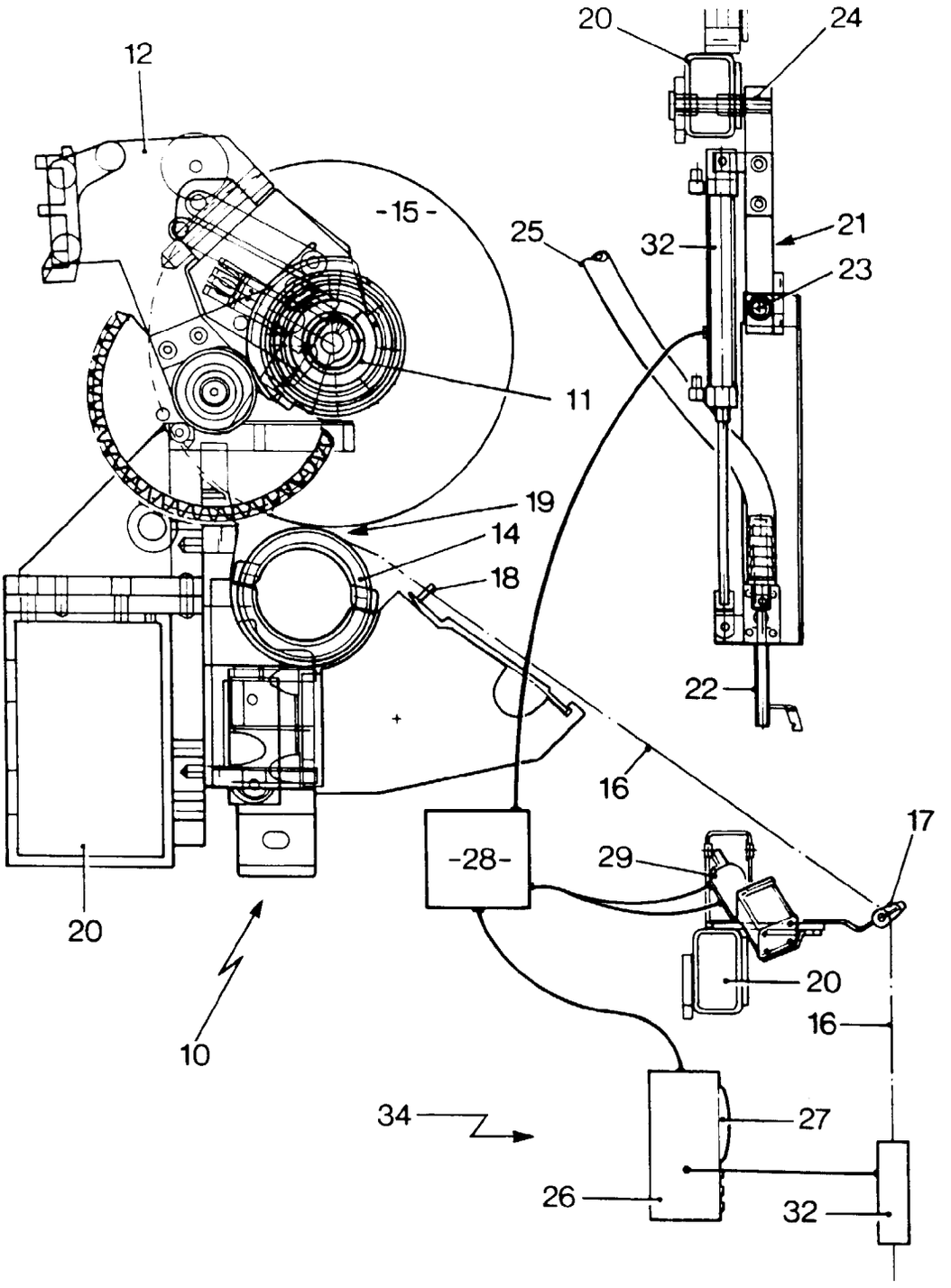
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Fig.2

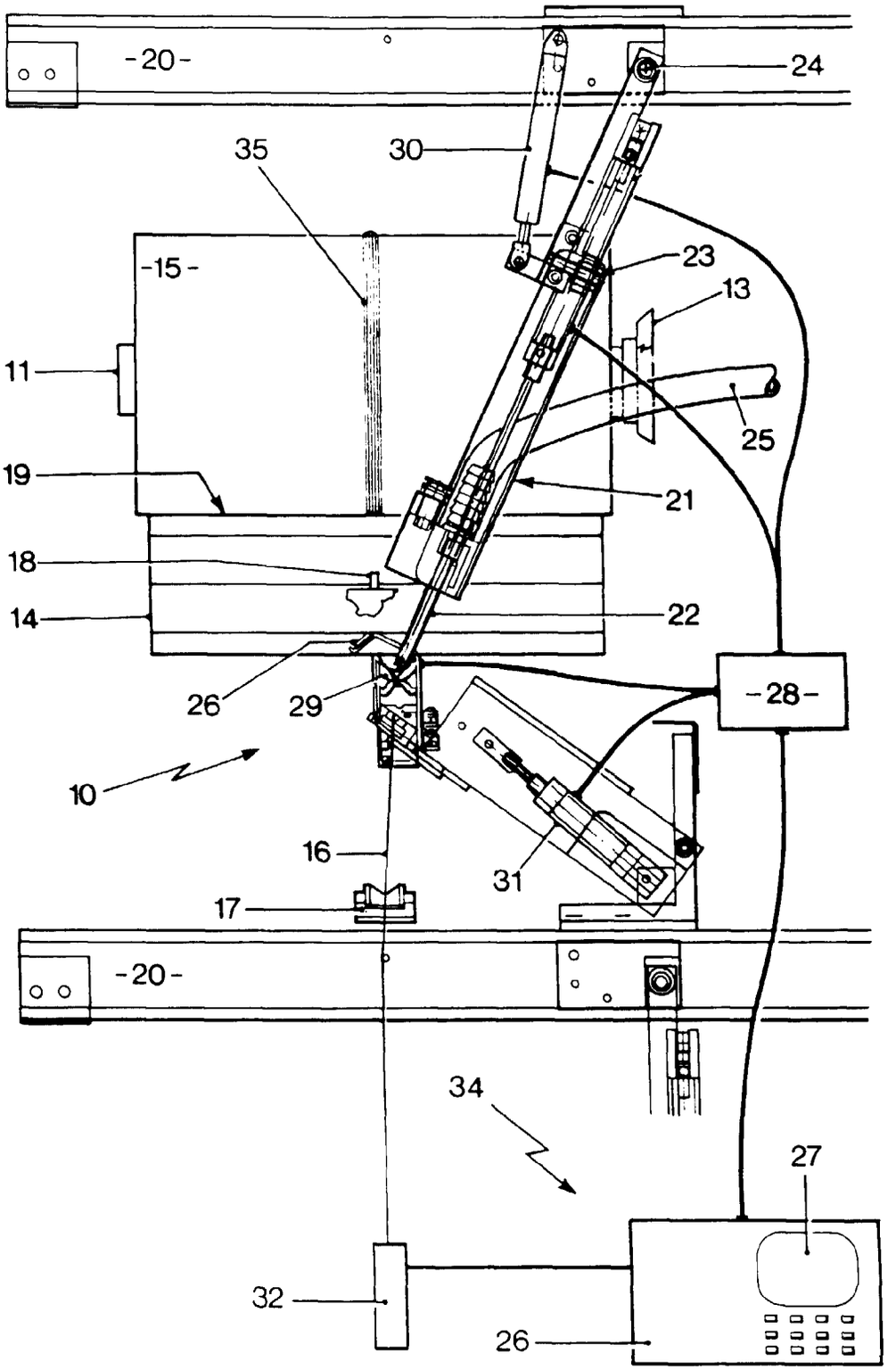
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Fig. 3

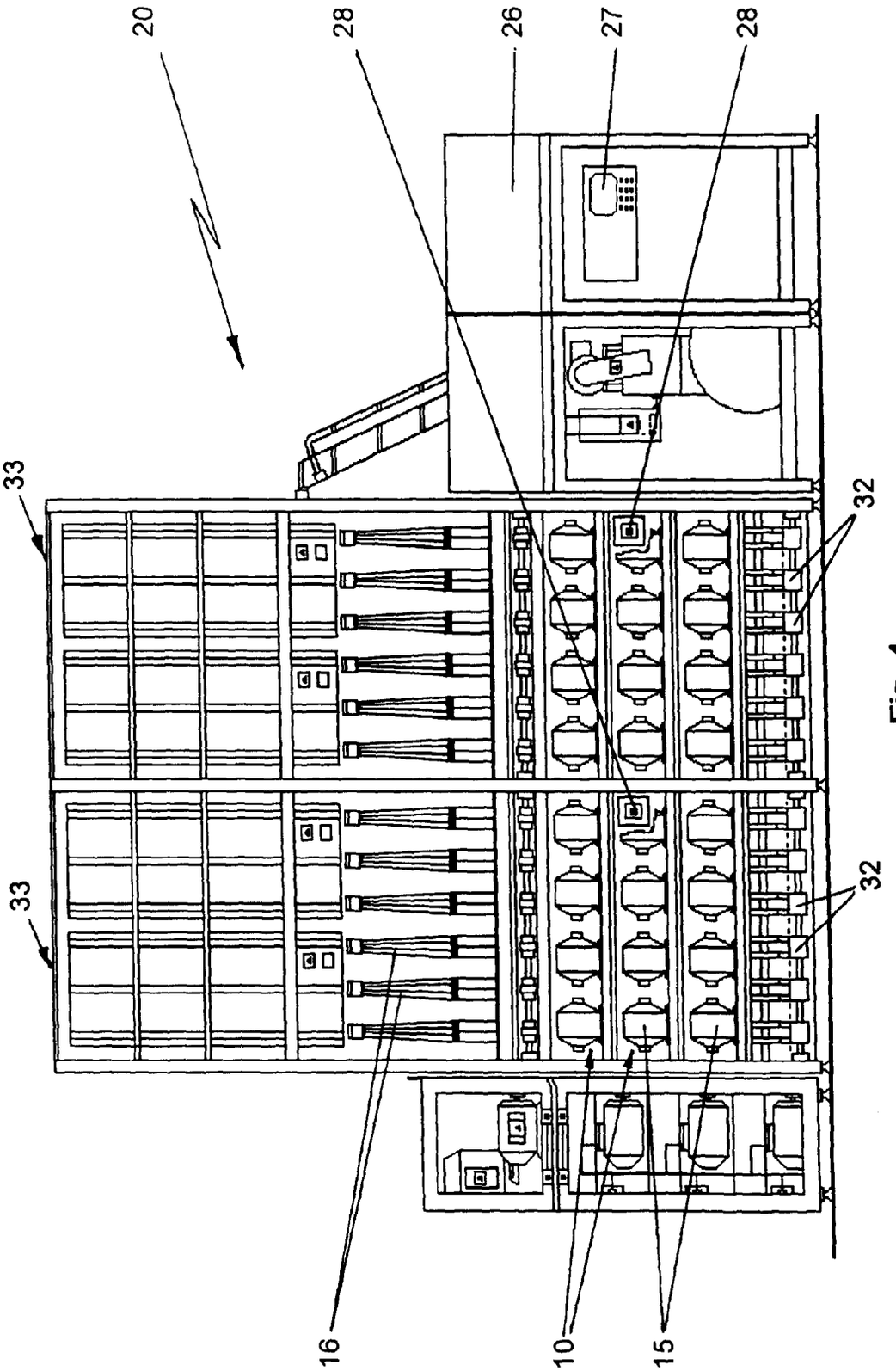

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 4925

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)
X Y	DE 44 15 677 A (BARMAG BARMER MASCHF) * page 3; example 4 * * page 4, line 58 - line 62 * * page 5, line 17 - line 31 * ---	1-3 4-8	B65H67/06 B65H63/00
Y,D	GB 2 200 756 A (RIETER SCRAGG LTD) * page 8, line 7 - line 14 * ---	4-6	
Y	DE 30 05 746 A (ERNEST SCRAGG & SONS LTD) * page 16, line 6 - line 18; figure 2 * ---	7,8	
A	EP 0 207 471 A (BARMAG BARMER MASCHF) * the whole document * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 November 1997	Tamme, H-M

CATEGORY OF CITED DOCUMENTS

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