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(54) Winding unit particularly for winding yarns

(57) A winding unit, particularly for winding yarns, includes a winding head provided with a device for guiding and cutting a yarn and two supports (11, 13, 19, 21). Each support is adapted to rotatably support a cardboard tube (25) which is adapted to wind the yarn in order to form a bobbin. The head has two winding positions and each support has a position for supporting the winding tube for winding the yarn and a disengagement position for unloading the full bobbin and loading a new tube.

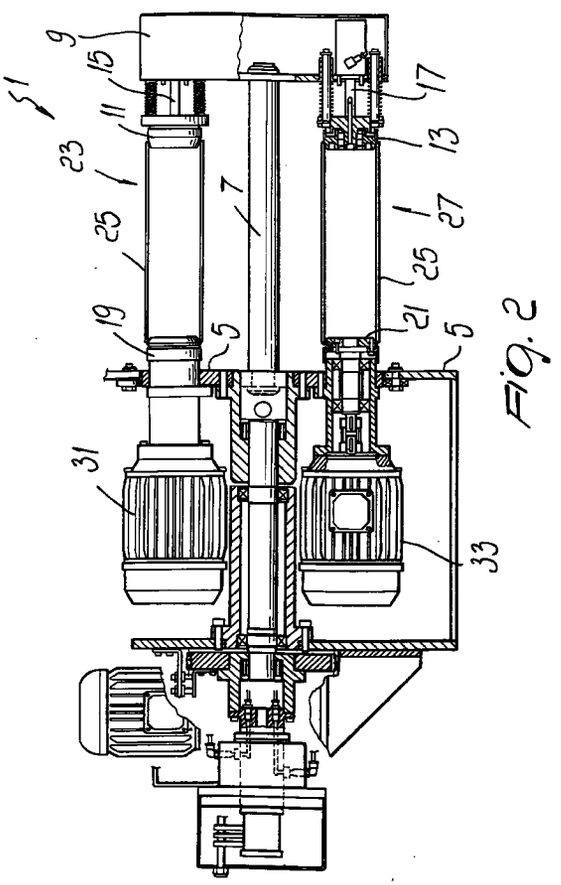

Fig. 2

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Description

[0001] The present invention relates to a winding unit particularly for winding yarns.

[0002] A problem that is strongly felt in the production of synthetic yarns is the need to quickly wind the yarn produced by the machines at very high speeds, on the order of 6 m/s, and to load and remove the bobbins of yarn efficiently and quickly.

[0003] The most effective winding units currently commercially available are constituted by a rotating turret which supports, in a cantilevered manner, a pair of horizontal spindles. A cardboard reel is fitted on each spindle and the yarn is wound on the reel alternately on one spindle while the other one is unloaded of the bobbin and loaded with a new reel.

[0004] This type of winding unit is capable of winding the yarn effectively, but it has the severe drawback that it does not allow to easily automate the operations for loading and unloading the reels and the bobbins of yarn. The bobbins must in fact be extracted from the spindle outside of the profile of the turret to allow the insertion of a new reel on the spindle, performed either manually by an operator or by virtue of a robot.

[0005] It is obvious that the manual loading and unloading operation has drawbacks caused by the need of the constant presence of an operator to maintain a bobbin unloading region which is outside the machine's profile and most of all to the weight of the full bobbins, so that it is difficult to handle the bobbins.

[0006] Robots are capable of performing these operations, but they have the severe drawback of being very expensive.

[0007] Another drawback of winding units of this kind is due to the cost of the spindles, which must be precision-manufactured with the best materials in order to be able to withstand, in cantilevered conditions, considerable weights and high rotation rates.

[0008] The aim of the present invention is to provide a winding unit which overcomes the above inconveniences of the cited prior art.

[0009] An important object of the invention is to provide a winding unit which allows to easily and cheaply automate the operations for loading and unloading the reels and bobbins.

[0010] A further object is to provide a winding unit which is constructively simpler.

[0011] A further object is to provide a winding unit which is reliable in use.

[0012] A further object is to provide a winding unit which disengages the full bobbin within the profile of the machine.

[0013] This aim, these objects and others which will become apparent hereinafter are achieved by a winding unit, as claimed in the appended claims.

[0014] Further characteristics and advantages will become apparent from the description of a preferred but not exclusive embodiment of the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

FIG. 1 is a lateral elevation view of the winding unit according to the invention;

FIG. 2 is a sectional lateral elevation view of the head of the winding unit according to the invention;

FIG. 3 is a detail side view of the head during a step for the unloading of a bobbin;

FIG. 4 is a partially sectional front elevation view of the magazine during the winding of the yarn;

FIG. 5 is a partially sectional front elevation view of the magazine in the position for loading a reel;

FIG. 6 is a lateral elevation view of the magazine;

FIG. 7 is a partially sectional front elevation view of the magazine and of the head in the position for loading a reel.

[0015] With reference to the above figures, the winding unit particularly for winding yarns according to the invention, generally designated by the reference numeral 1, comprises a winding head constituted by a rotating turret 3 having a base plate 5 which supports a pair of posts or bars, or similar supporting structures 7, which in turn support an end plate 9. The end plate 9 includes at least two flanges 11 and 13 which can move axially by means of an actuation system, for example a pneumatic cylinder 15 and 17 respectively. Each movable flange 11 and 13 lies opposite a respective base flange, 19 and 21, which is arranged on the base plate 5 of the rotating turret. The base flanges 19 and 21 may also be axially movable by means of an actuation system, for example of the pneumatic type. The two flanges 11 and 19 form a first support 23 for a reel 25 and the two flanges 13 and 21 form a second support 27 for another reel 25.

[0016] In a per se known manner, the reel 25 is constituted by cardboard cylinder which is suitable to support the wound yarn 29.

[0017] Each support 23 and 27 includes a motor, respectively 31 and 33, adapted to rotate the support 23, 27 to wind a yarn fed on the reel in a position associated with the flanges.

[0018] Advantageously, the winding unit according to the present invention includes a magazine means which is constituted by a casing 37 which is suitable to contain a plurality of reels 25 and includes a lower opening 39 which is arranged at the support 23 or 27 in the release position. The opening 39 is formed on an oscillating portion 41 of the magazine which sets at least two positions: a position for feeding a reel (FIG. 5), in which the opening 39 is adjacent to the support 23 or 27, and a

non-feeding position (FIG. 4), in which the opening 39 and the magazine are spaced from the support 23 or 27 in order to allow the rotation of the turret 3, which is suitable to move the full bobbin from the winding position to the release position.

[0019] A retention member 43 is provided at the opening 39 and is adapted to retain the reel 25 to be fed to the support 23 or 27 in a position in which it can be centered by the movable flanges. The retention member 43 is pivoted to the oscillating portion 41 in contrast with an elastic means 45, so as to allow the oscillating portion 41 to move from the feeding position to the inactive position without interfering with the reel 25 once it has been locked between the flanges of the support.

[0020] Advantageously, the full bobbin in the position 27 is unloaded within the profile of the turret, with no need to provide external space.

[0021] In a per se known manner, a yarn 35 that arrives from a production head is fed to the reel 25 which rotates at a suitable speed and is thus wound onto the reel (the upper one, in the example shown in FIG. 3) by means of a winding device which essentially includes a freely rotating roller 47 which acts on the bobbin being wound and a cam and slider assembly 49.

[0022] When the bobbin has reached a preset diameter, the turret 3 rotates substantially through 180° and simultaneously moves the full bobbin into the lower position and the empty reel into the upper position for winding. The rotation of the turret allows to supply the yarn 35 to the new reel continuously without interrupting the winding process, in a per se known manner. Also in a substantially conventional manner, the yarn is cut during the rotation of the turret, releasing the full bobbin 29, by virtue of a cutting device which is associated with the cam and slider assembly 49.

[0023] At this point, while the yarn is being wound onto the upper reel, the lower bobbin is unloaded by virtue of the opening of the flanges 13 and 21 of the support 27 (or respectively 11 and 19 of the support 23). The bobbin 29 can thus advantageously be collected by adapted conveyance or guiding devices 51 within the vertical profile of the turret and be removed from the winding unit. Once the bobbin 29 has been removed from the support, the oscillating portion 41 of the reel magazine is moved into the feeding position shown in FIG. 5, so as to have a new reel 25 between the open flanges 13 and 21, which are closed, locking the new reel 25 in the support 27. The oscillating portion 41 is then returned into the non-feeding position shown in FIG. 4 and the new reel 25 is ready to replace the upper one as soon as the winding of the upper bobbin has been completed.

[0024] In practice it has been found that the invention achieves the intended aim and objects, a winding unit having been provided which is capable of automating the operations for loading and unloading the empty cardboard tubes and the bobbins, respectively, in a constructively simple, cheap and safe manner.

[0025] The great advantage of the winding unit according to the invention is indeed that it allows to automate the various auxiliary operations without the aid of expensive robots.

[0026] The winding unit according to the invention is susceptible of numerous modifications and variations all within the scope of the appended claims. All the details may be replaced with technically equivalent elements.

[0027] The materials used, as well as the dimensions, may of course be any according to the requirements and the state of the art.

[0028] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Winding unit, particularly for winding yarns, comprising a winding head (3) arranged at an outlet producing at least one yarn, and comprising a device for guiding and cutting said yarn, said winding head (3) comprising at least two support members (23, 27, 11, 13), each support member (23, 27) being adapted to rotatably support a winding member (25) adapted to wind said yarn in order to form a bobbin, said head having at least two positions, namely a first position for winding a first said winding member and a second position for winding a second said winding member, characterized in that each of said supports has a position for supporting said winding member (25) for winding said yarn and a disengagement position for unloading said winding member and loading a new said winding member.

2. Winding unit according to claim 1, characterized in that said support comprises an axially movable means (11, 13) which can move axially in order to engage the ends of said winding member (25) and form said supporting and disengagement positions.

3. Winding unit according to claim 1 or 2, characterized in that said axially movable means comprises two flanges (11, 13) adapted to engage the ends of said winding member, which is constituted by a tube (25).

4. Winding unit according to one or more of the preceding claims, characterized in that said axially movable means (11, 13) is actuated by a fluid-driven means (15, 17).

5. Winding unit according to one or more of the preceding claims, characterized in that said bobbins

can be unloaded within the footprint of said winding head (3).

6. Winding unit according to one or more of the preceding claims, characterized in that it comprises a magazine means (37) which contains a plurality of said winding members (25) and is adapted to feed said winding members (25) to said support members (11, 13, 23, 27).

7. Winding unit according to one or more of the preceding claims, characterized in that said magazine means comprises a casing (37) adapted to contain a plurality of said winding members (25) and comprising a lower opening (39) arranged at one of said supports (23, 27) in the lower position, said opening being provided on an oscillating portion (41) of said magazine means which defines at least two positions: a position for feeding a winding member (25), in which said opening is adjacent to said support, and a non-feeding position, in which said opening and said magazine means are spaced from said support in order to allow the rotation of said winding head (3) in order to move a full bobbin from a winding position to a release position.

8. Winding unit according to one or more of the preceding claims, characterized in that a retention member (43) is provided at said opening (39) and is adapted to retain said winding member (25) to be fed to said support (11, 13, 23, 27) in a position in which it can be centered between said moving flanges (11, 13), said retention member being hinged to said oscillating portion in contrast with an elastic means (45), so as to allow the movement of said oscillating portion from the feeding position to the non-feeding position without interfering with said winding member locked between said flanges of the support.

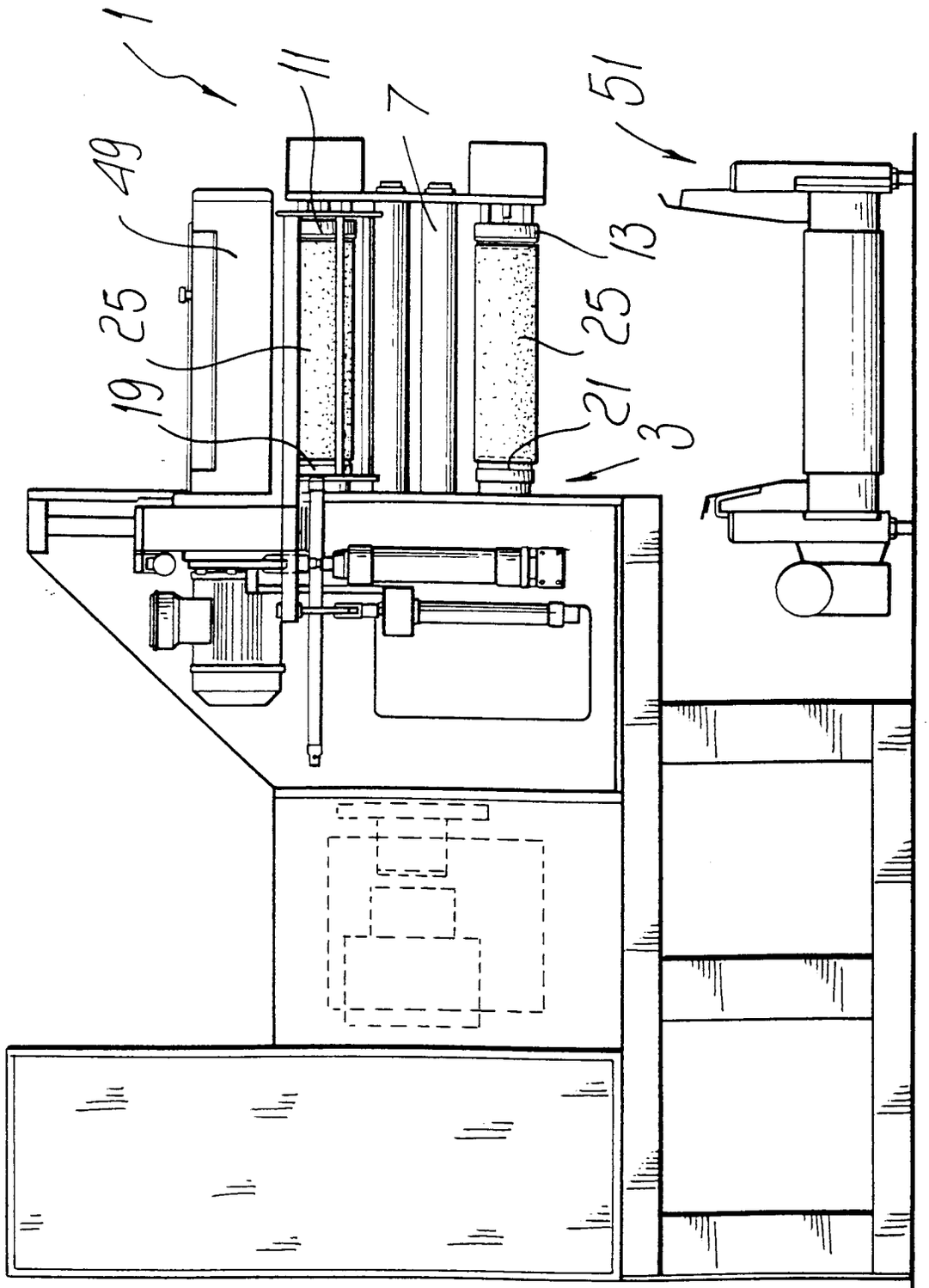

Fig. 1

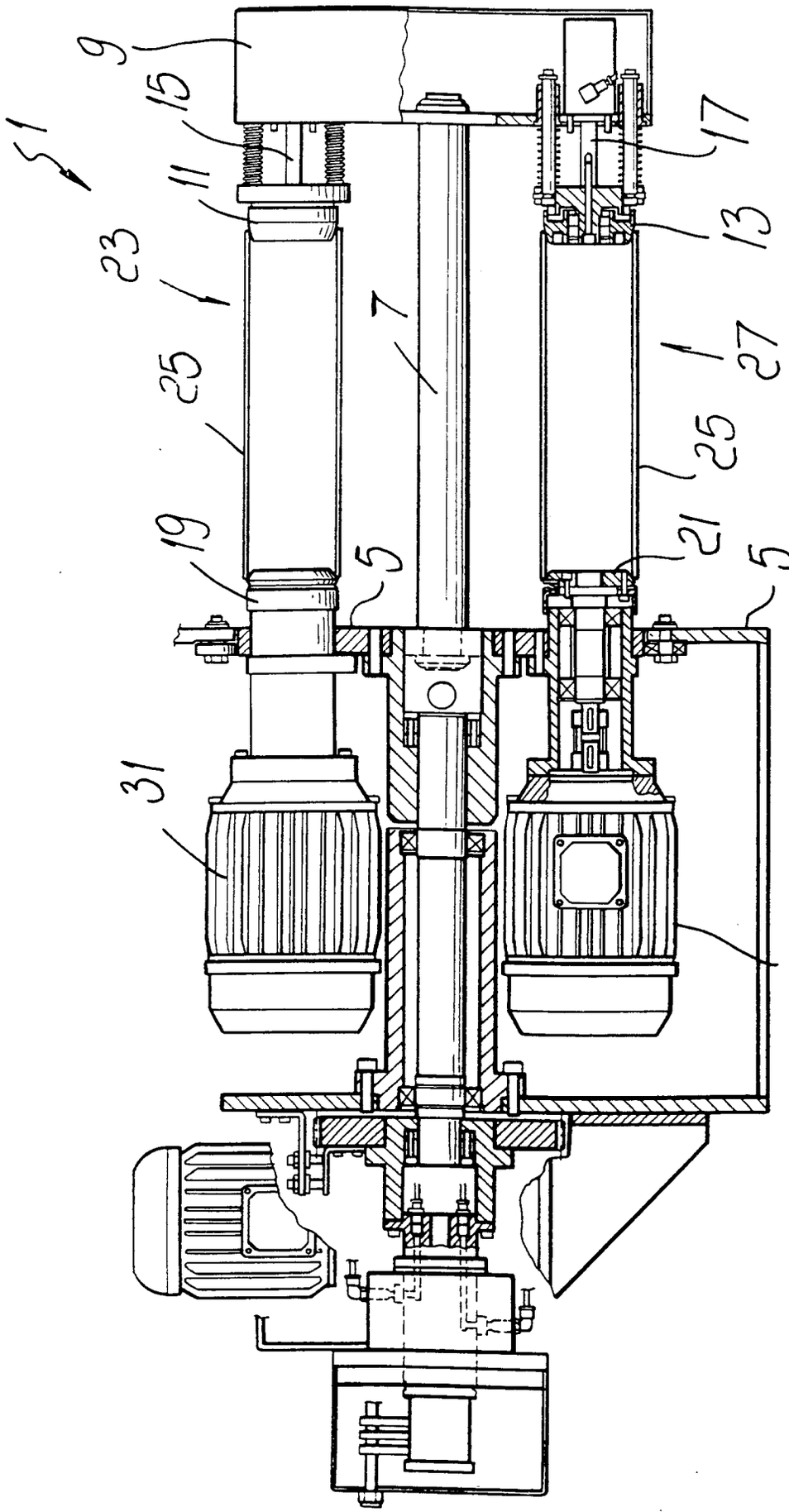

Fig. 2

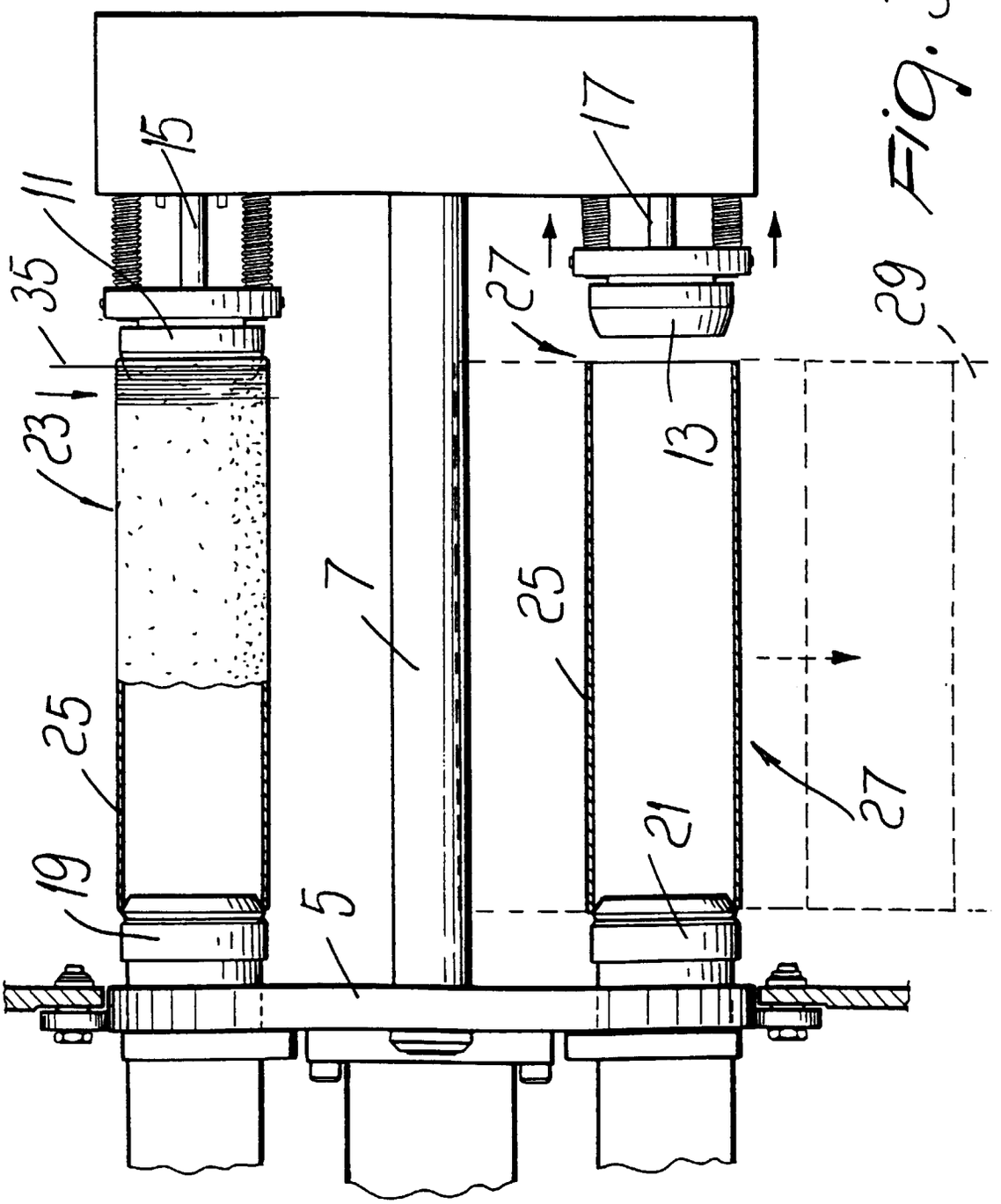

Fig. 3

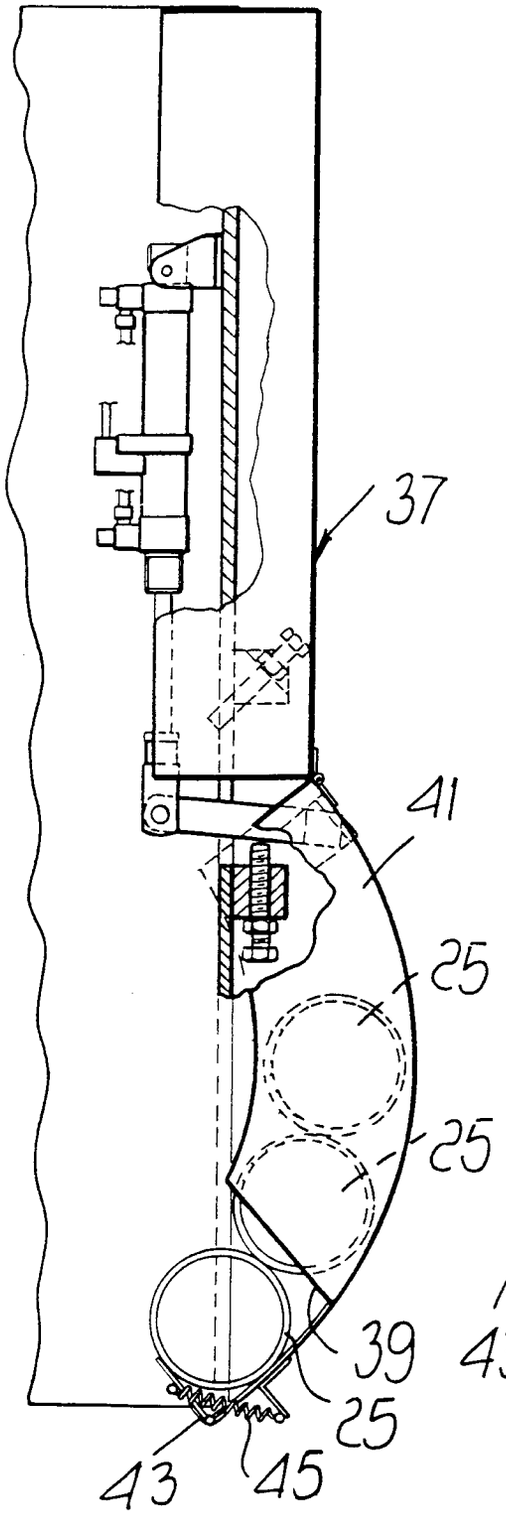

Fig. 4

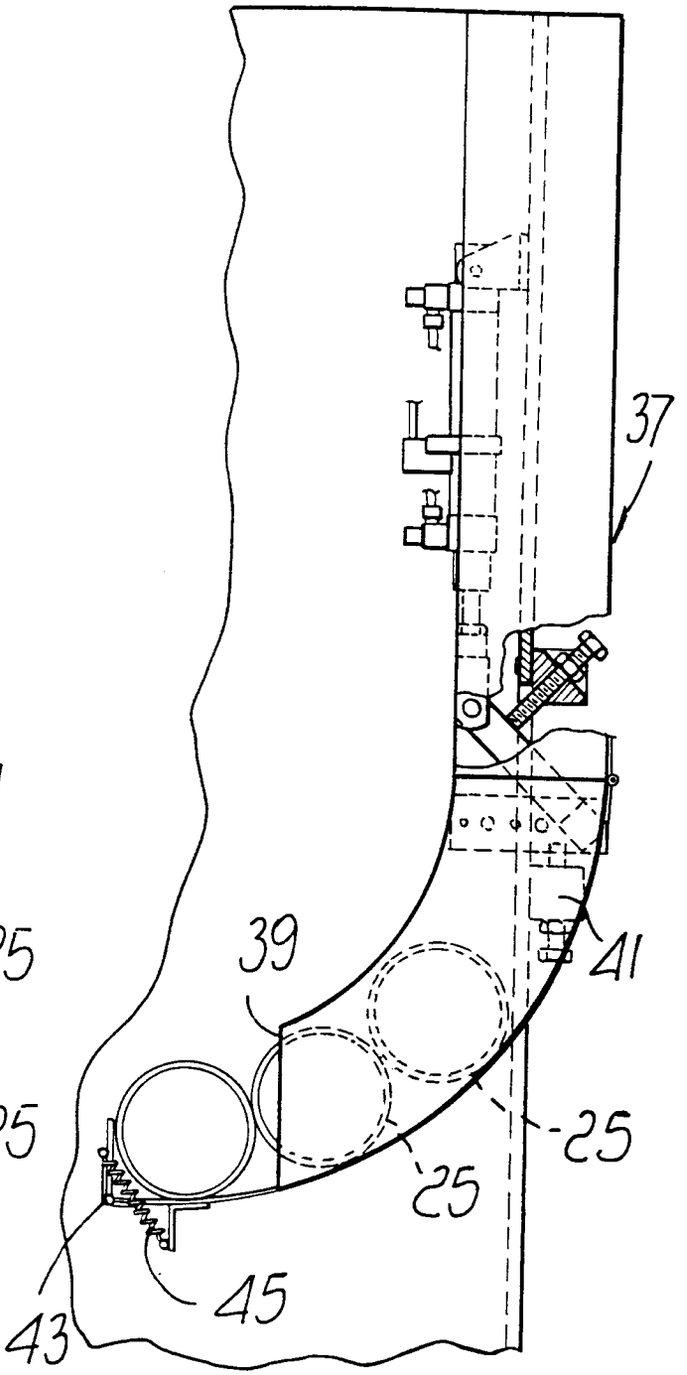

Fig. 5

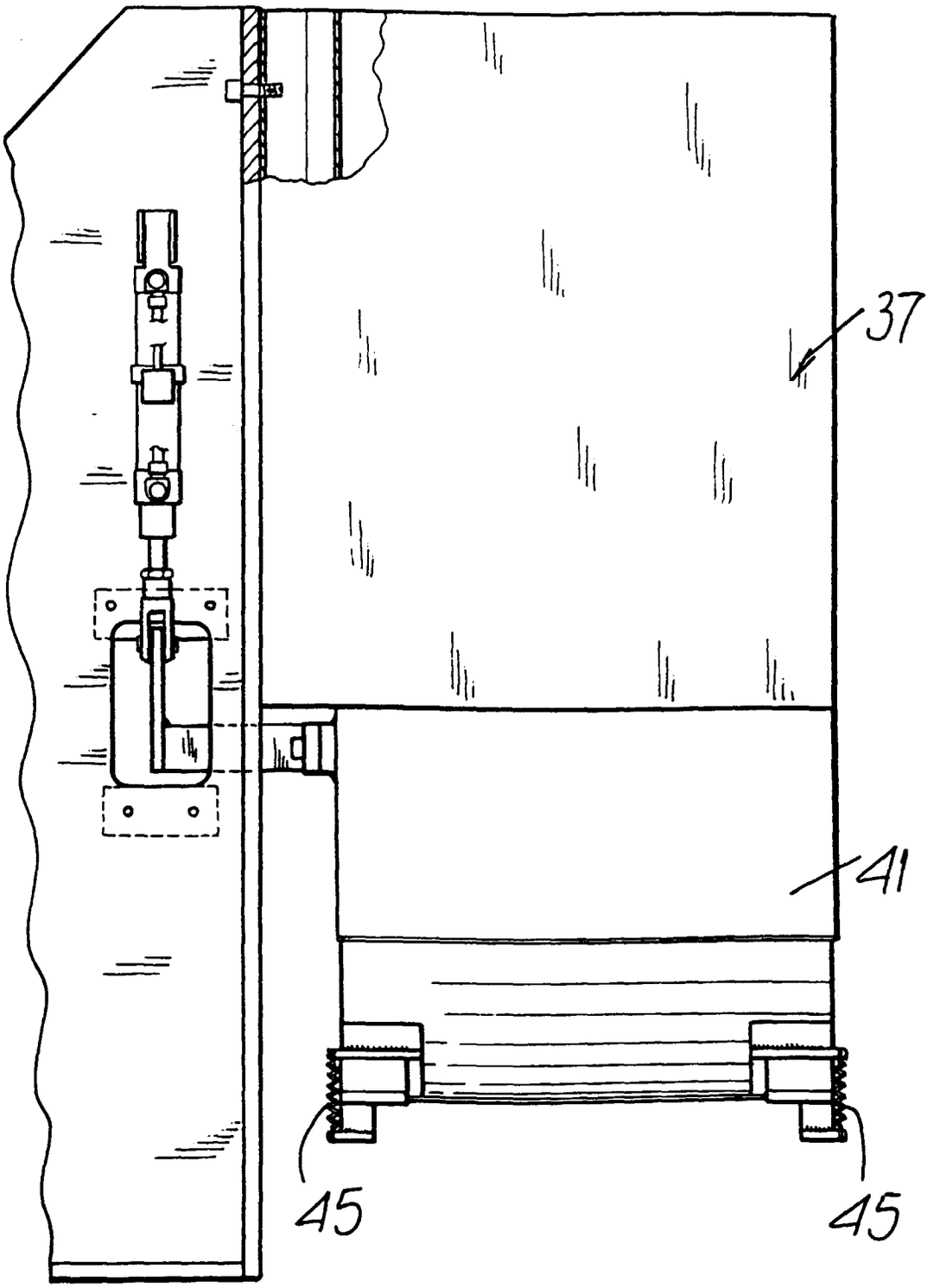

Fig. 6

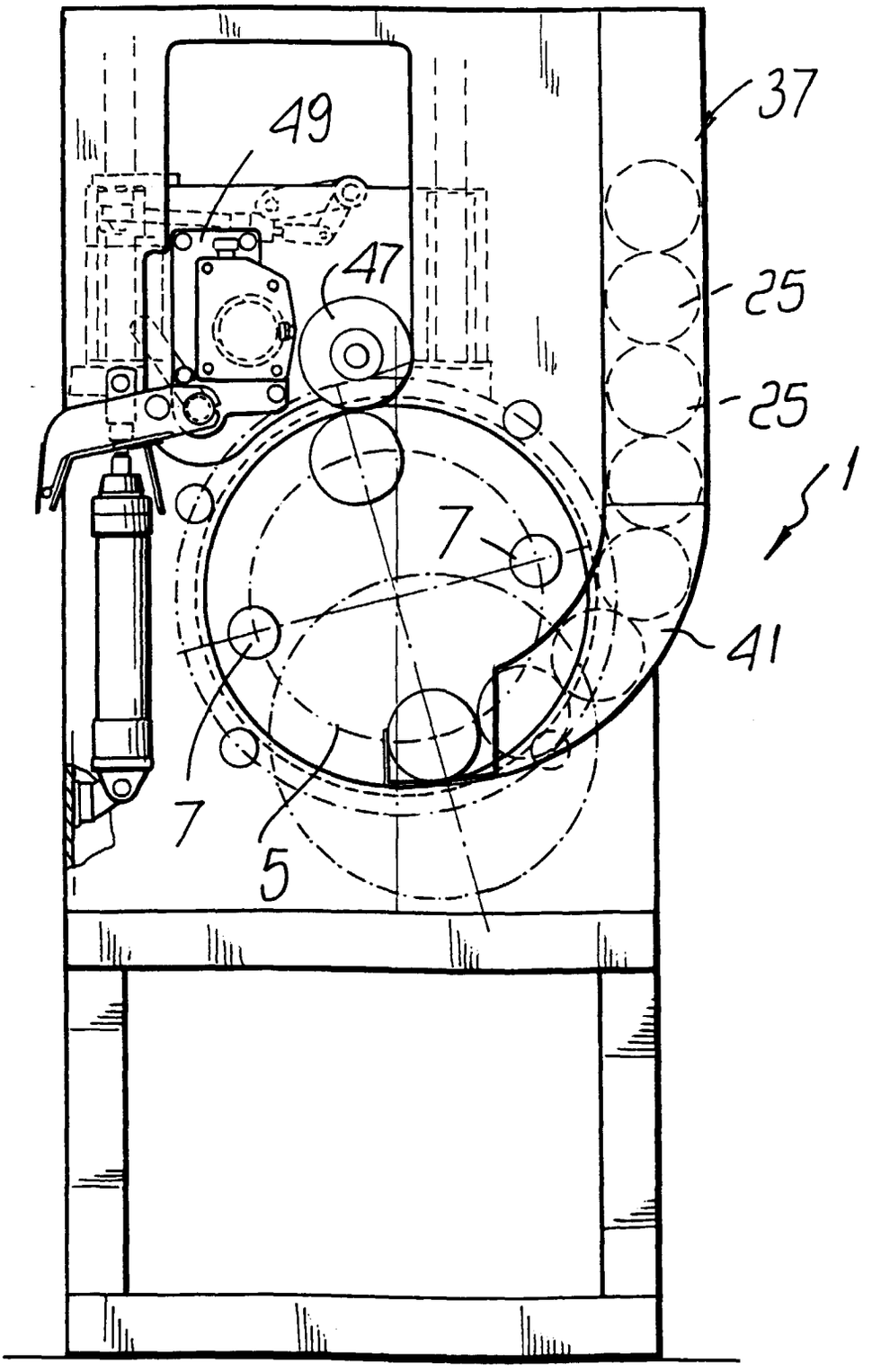

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 98 12 2670

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 March 1999	D'Hulster, E

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