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(54) Improvement of the device for collecting fibre slivers inside cans.

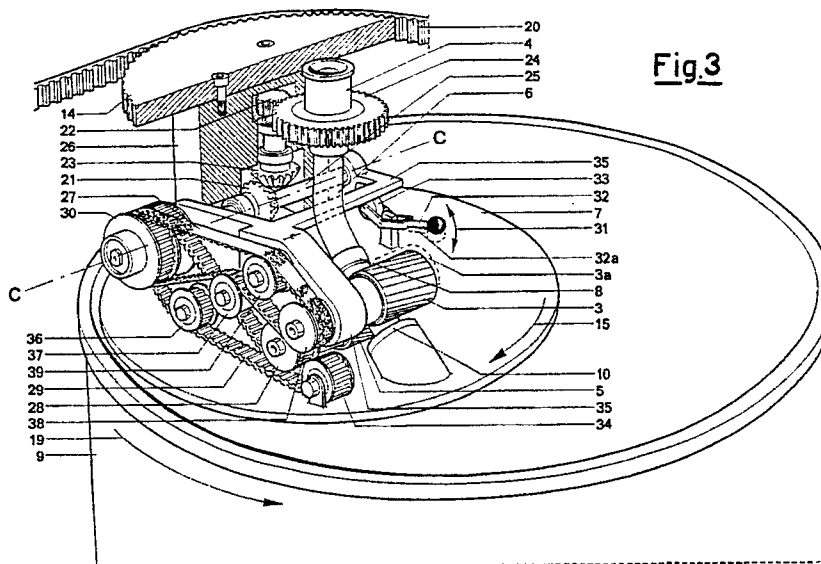
(57) The present invention relates to an improved device for collecting inside a can (9) a sliver consisting of fibres, and leaving a drawing frame, or a similar machine.

Said improved device comprises:

- a pair of driving rolls (3, 5), whose revolution axes lay on a plane substantially perpendicular to the direction of outlet of the fibre sliver from the feed duct;
- two castellated belts (27, 29) which drive said two

driving rolls, i.e., one castellated belt per driving roll, with said castellated belts being independent from each other, although they draw their motion from a same driving cog wheel (30);

- a mobile frame (35) acting as the support element for the upper driving roll (3) with its own driving belt (27), which mobile frame, by being shifted upwards by means of the action of a lever (32), deactivates the drive of the fibre sliver when the can is filled, or in case of a fortuitous breakage of said fibre sliver.



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The present invention relates to an improved device for collecting inside a can a sliver consisting of fibres leaving the drawing frame of a drawing facility, or a whatever machine used for preparing the fibres for spinning.

By means of a rotary equipment, said device deposits the sliver of fibres as mutually superimposed epicycloids in the underlying collection can, or in a whatever else container, so that the extraction of the can containing said collected sliver in order to charge it to the subsequent machines can be carried out easily, and without any damaging occurring to the same sliver.

Those skilled in the art known that the above mentioned rotary equipment is also called "coyler" in textile terminology.

When in these machines the coyler known from the prior art are used, drawbacks result, which are caused by the fibre sliver running towards the deposit being formed inside the underlying can, along a path with a plurality of more or less sharp bends, winding its way from its outlet from the drawing frame, until it comes to the nip of the driving rolls. These latter are often called "coyler calender" by those skilled in the art.

More or less sharp bends cause the fibre sliver to be exposed to high friction values, and can cause damages to, or breakages of, the fibres at the bending points, endangering the subsequent processes which take place in the downstream machinery.

Said high friction values result in the tensile stress applied by the coyler calender to the fibres undergoing a considerable increase. The high stress causes irregularities to arise in the fibre sliver, and, in extreme cases, can start the breakage of the same sliver, blocking the whole drawing facility, with damages to the production which not always can be accepted.

According to the present state of the art, the trend is known to operate with faster and faster drawing facilities, in order to increase the productivity of the factories. As a consequence, the speed of deposition of the fibre sliver inside the underlying can has to be increased. While it runs along its winding path, the fibre sliver is submitted to a higher tensile stress and hence the above reminded drawbacks gain strength, causing frequent breakages of the same fibre sliver. As those skilled in the art will easily understand, the above situation as at all unacceptable both from the view point of the quality of the same sliver deposited inside the can, and, all the more so, as regards the occurrence of production interruptions -- caused by the breakages of the sliver -- in that they considerably worsen the efficiency of the production cycle. Furthermore, the presently known coyler have a complex structure and consequently are high en-

ergy consuming and their cost is high; they furthermore require frequent servicing; besides all the above, they are also very noisy when running, and generate noise levels which not always are tolerated in textile factories.

The main purpose of the present invention is, above all, of providing a rotary equipment (coyler) device which is constituted by simple elements which are capable of guiding and driving the fibre sliver into the underlying can through a path which is as rectilinear as possible, in order to provide a reliable operation without causing even minimal damages to the fibre sliver in any operative situations, with the above mentioned drawbacks being hence overcome.

Furthermore said device according to the present invention is of simple structure, therefore resulting in low energy consumptions and in a low manufacturing cost and is furthermore easy to be serviced. It is moreover of contained noisiness.

These and still other advantages are achieved by the improved device according to the present invention for collecting inside a can a fibre sliver leaving a drawing frame, or similar machines for preparing the fibres for spinning, and said device, equipped with a stretch having the shape of a condensing funnel, comprises:

- a pair of driving rolls, whose revolution axes lay on a plane substantially perpendicular to the direction according to which the fibre sliver leaves said condensing funnel, thus obliging the same fibre sliver to deposit inside the underlying can without undergoing considerable deviations from a straight running direction;

- two castellated belts which drive said two driving rolls, i.e., one castellated belt per driving roll, with each one of said castellated belts being independent from the other one, although both of them draw their motion from a same driving cog wheel rigidly keyed on the driving shaft driven to revolve through a set of gear wheels;

- a mobile frame idlingly hinged around the above said revolution shaft, which mobile frame is the support element which supports the upper driving roll together with its relevant driving belt, and with further rolling elements which serve to guide the same castellated belt.

Another feature of the device according to the present invention is that the mobile frame can be caused to rotate around said revolution shaft, with it being thus shifted upwards, by means of the action of a lever, in order to disable the drive of the fibre sliver when the can is filled, or in case of a fortuitous breakage of said fibre sliver.

According to a form of practical embodiment, the device according to the present invention is provided, in order to actuate the sliver driving rolls, with two "V"-belts, or with similar flexible drive

elements.

Still clearer features according to the improvement of the instant invention, will be set forth in the following disclosure in detail of the same invention made by referring to the exemplifying form of practical embodiment schematically represented in the drawings of the hereto attached figures, with further peculiarities and characteristics being clarified. In this regard, anyone should clearly understand that any possible changes in the mutual positions of the elements and the consequently resulting possible simplified structures have to be regarded as being comprised within the scope of the requested protection, as structural variants falling inside the purview of the original idea.

In the hereto attached drawings:

Figure 1 shows a schematic view in axonometric perspective of the device according to the present invention, shows the rotary equipment with the sliver driving rolls so positioned that their revolution axes lay on a plane which is substantially perpendicular to the direction of outlet of the fibre sliver from the feed duct. This latter duct guides the fibre sliver from the outlet of this latter from the drawing frame up to the nip of said driving rolls.

The figure shows also the upper portion of the underlying collection can;

Figure 2 shows a schematic, sectional front view of the fibre sliver feed duct, showing the position of the axes of revolution of the sliver driving rolls, the inlet element constituted by the condensing funnel and the outlet stretch with the direction of deposition of the fibre sliver into the interior of the can;

Figure 3 shows a schematic, partially sectional view in axonometric perspective of the device according to the present invention, showing the assembly of the rotary equipment with the pairs of gearwheels, and the cog wheels and the shafts for movement transmission, and also shows the castellated belts which actuate the driving rolls to rotate, together with the mobile support frame which supports the upper driving roll, which support frame can be shifted upwards by means of the action of a lever, also shown in the Figure, which lever lifts said mobile frame by causing it to rotate around the shaft it is hinged onto.

Furthermore, for the sake of clearness of the whole assembly, all those parts have been omitted, which are not necessary for understanding the invention, such as the rotation driving motor, the several support structures, and still other elements, well-known to those skilled in the art.

In said hereto attached Figures:

1 is the sliver consisting of textile fibres, coming from the outlet of the drawing frame (not shown) of the drawing facility; 2 is a stationary

portion of the duct, inside whose interior the fibre sliver 1 runs. At the bend, or a large curvature radius, the fibre sliver is pressed against the inner side 2b, and, on the contrary, gets detached from the external side 2a; therefore along the bend, the fibre slivers runs with no contact with said external side; 3 is the upper driving roll, supported by a mobile frame by means of which said driving roll 3 can be lifted to reach its high position 3a in which it is spaced apart from the underlying driving roll 5. The underlying driving roll 5 is stationary and is anchored to the underlying plate 7 by means of a whatever anchoring element known from the prior art (not shown in the figures). The driving rolls 3 and 5 revolve, in order to drive the fibre sliver 1 pinched between them, around their revolution axes, the traces of which are O_1 and O_2 ; 4 is a stationary sleeve which performs the task of guiding the fibre sliver 1 through the cog disk 14.

The axis of said sleeve 4 coincides with the axis of rotation of the rotary equipment and therefore coincides with the axis of rotation of the plate 7 and of the cog disk 14.

6 is a short stretch of duct, which guides the fibre sliver 1 from the outlet from the sleeve 4 to the inlet to the condensing funnel 8 and it has a slightly bent shape. Inside the interior of the bent stretch 6, the fibres are slightly compressed against the inner side 6a, and get spaced apart from the external side 6b.

Said duct stretch 6 is rotatable together with the plate 7, in that it is rigidly coupled with the condensing funnel-shaped element 8; 7 is the rotary plate which supports the whole improved device according to the present invention. Said plate is rigidly affixed to the cog disk 14 through the vertical element 26; 8 is the condensing element which guides and compacts, thanks to its converging, funnel-like shape, the fibre sliver 1 before this latter is pinched by the revolving driving rolls 3 and 5, which oblige said sliver 1 to deposit inside the interior of the underlying collecting can 9 according to the direction shown by the arrow 11; 12 is the arrow showing the trajectory and direction of the running fibre sliver 1 when it enters the stationary guide duct 2; 10 is the guide sleeve in order to guide the fibre sliver 1 after that this latter leaves the driving rolls 3 and 5.

Said guide sleeve 10 has a divergent interior shape, inside which the fibre sliver expands owing to the effect of its own elasticity after having been compressed by the rolls 3 and 5. Said guide sleeve 10 is additionally rigidly coupled with the rotary support plate 7; 14 is the cog disk, or cog wheel, which, by being driven to rotate by the castellated belt 20, transmits its rotary movement to the whole rotary equipment (i.e., the coyle) and, therefore, to the improved device according to the

present invention; B-B is the trace of the plane on which the revolution axes of the rolls 3 and 5 lay. Said plane is substantially perpendicular to the direction 11, and forms an angle α with the plane on which the rotary support plate 7 lays, with trace A-A; 15 is the arrow which indicates the revolution direction of the whole device according to the present invention supported by the underlying plate 7.

The rotation 15 and the simultaneous rotation 19 of the underlying collection can 9 generate the composition of two revolutionary movements, which causes the fibre sliver 1 exiting the plate 7 according to the direction 11, to deposit with an epicycloidal arrangement inside said collecting can 9; 18 and 16 are the protective cases, or carter, which contain the means or elements for actuating the improved device according to the present invention; 21 and 23 are a pair of bevel gears which transmit the revolution movement from the pinion 22 to the shaft 25.

The pinion 22 acts as a satellite, because it is caused to revolve around the central, stationary gear wheel 24, and while it rotates around said gear wheel 24, it revolves around its own axis, thus generating a rotation which is transmitted to the shaft 25; 26 is a vertical element which rigidly connects the cog disk 14 with the rotary plate 7.

Said vertical element 26 furthermore houses, inside its own interior, means, or elements, for motion transmission (see Figure 3); 30 is the double cog wheel rigidly keyed onto the revolution shaft 24 with the axis with trace C-C. Said double cog wheel 30 actuates simultaneously the two mutually independent castellated belts 27 and 29; 27 is the castellated belt which transmits the revolutionary motion to the upper driving roll 3 through the cog wheel 38 and the return/guide cog wheels 39 and 37; 29 is the castellated belt which transmits the revolutionary motion to the lower driving roll 5 through the cog wheel 28 and the return/guide cog wheels 34 and 36; 35 is the mobile frame idlingly hinged around the shaft 25, and hence capable of being angularly shifted around the axis C-C as its rotation fulcrum.

Said mobile frame 35 is the support element which supports the driving roll 3 and hence the castellated belt 27 and the cog wheels 38, 39 and 37; 32 is the lever which, acting through the wheel 33, pushes upwards the mobile frame 35 in order to keep the driving roll 3 to its upper position 3a in order to deactivate the driving of the fibre sliver 1 by the coiler calender, thus causing the filling of the underlying can 9 to be discontinued; 32a is the trace of the lever portion in its position of "mobile frame UP", to which the "driving roll 3 in position 3a" corresponds; 31 is the arrow which indicates the angular shift of the lever 32, manually carried

out by the attending operator, or automatically carried out by a whatever actuator.

The device for collecting inside a can a fibre sliver leaving a drawing frame as illustrated in the hereto attached tables, can be easily understood.

As those skilled in the art are well aware of, the driving rolls 3 and 5 are kept in their driving position -- and hence working position -- by a fixed-calibration spring.

When the fibre sliver 1 undergoes a breakage, or when the preestablished length-of fibre sliver is reached inside the can -- therefore under filled-can conditions -- the drawing frame and the device according to the present invention stop and the driving roll 3 is lifted to its position 3a by means of the actuation of the lever 32, which is moved to its position 32a.

A device already known from the prior art and therefore not illustrated herein, feeds a jet of compressed air, acting as an injector, in order to perform the operation of automatic introduction of the fibre sliver 1, in order to cause this latter to get engaged by the nip of the driving rolls.

The drawing frame and the device according to the present invention are started again and the fibre sliver 1, pinched and driven by the rolls 3 and 5 -- which have already been approached again to each other by the lever 32 being returned back to its resting position -- starts depositing according to overlapping epicycloids inside the underlying collecting rotary can 9.

Thanks to the advantageous position assumed by the pair of driving rolls 3 and 5 in the improved device according to the instant invention, the fibre sliver 1 is no longer obliged to undergo elbow-like and marked curvilinear deviations while running along more or less sharp bends, so that it is dragged by said rolls 3 and 5 with a rather low tensile stress, in that the friction caused by the contact of said fibre sliver with the walls of the duct results to be of an extremely limited value.

In fact, the fibre sliver 1, by running along a rather straight path, as compared to the devices known from the prior art, will be exposed to a very limited friction of contact with the internal walls of the various duct stretches. All the above results in the advantage that one will have the certainty that the fibre sliver 1 will not suffer any damages, and hence that it will not undergo any accidental breakages even when the collection speed will be considerably increased in order to increase the production efficiency.

Of course, the principle of the improvement achieved by means of the present invention being taken for granted, the structural details and the forms of practical embodiment thereof may be more or less varied relatively to as herein disclosed and illustrated, without thereby departing from the

scope of the present invention.

Claims

1. Improved device for collecting inside a can a fibre sliver leaving a drawing frame, or a similar machine, equipped with a stretch having the shape of a condensing funnel and with a rotary equipment, characterized in that it comprises:
- a pair of driving rolls, whose revolution axes lay on a plane substantially perpendicular to the direction according to which the fibre sliver leaves said condensing funnel, thus obliging the same fibre sliver to deposit inside the underlying can without undergoing considerable deviations from a straight running direction;
 - two castellated belts which drive said two driving rolls, i.e., one castellated belt per driving roll, with each one of said castellated belts being independent from each other, although both of them draw their motion from a same driving cog wheel rigidly keyed on the driving shaft driven to revolve through a set of gear wheels;
 - a mobile frame idlingly hinged around the above said revolution shaft, which mobile frame is the support element which supports the upper driving roll together with its relevant driving belt, and with further rolling elements which serve to guide the same castellated belt.
2. Improved device for collecting inside a can a fibre sliver, according to claim 1, characterized in that the mobile frame can be caused to rotate around said revolution shaft, thus being shifted upwards by means of the action of a lever, or by means of the action of a whatever pushing actuator, in order to disable the drive of the fibre sliver when the can is filled, or in case of a fortuitous breakage of said fibre sliver.
3. Improved device for collecting inside a can a fibre sliver, according to claim 1, characterized in that the belts which drive the driving rolls to revolve are "V"-belts, or similar flexible driving elements.

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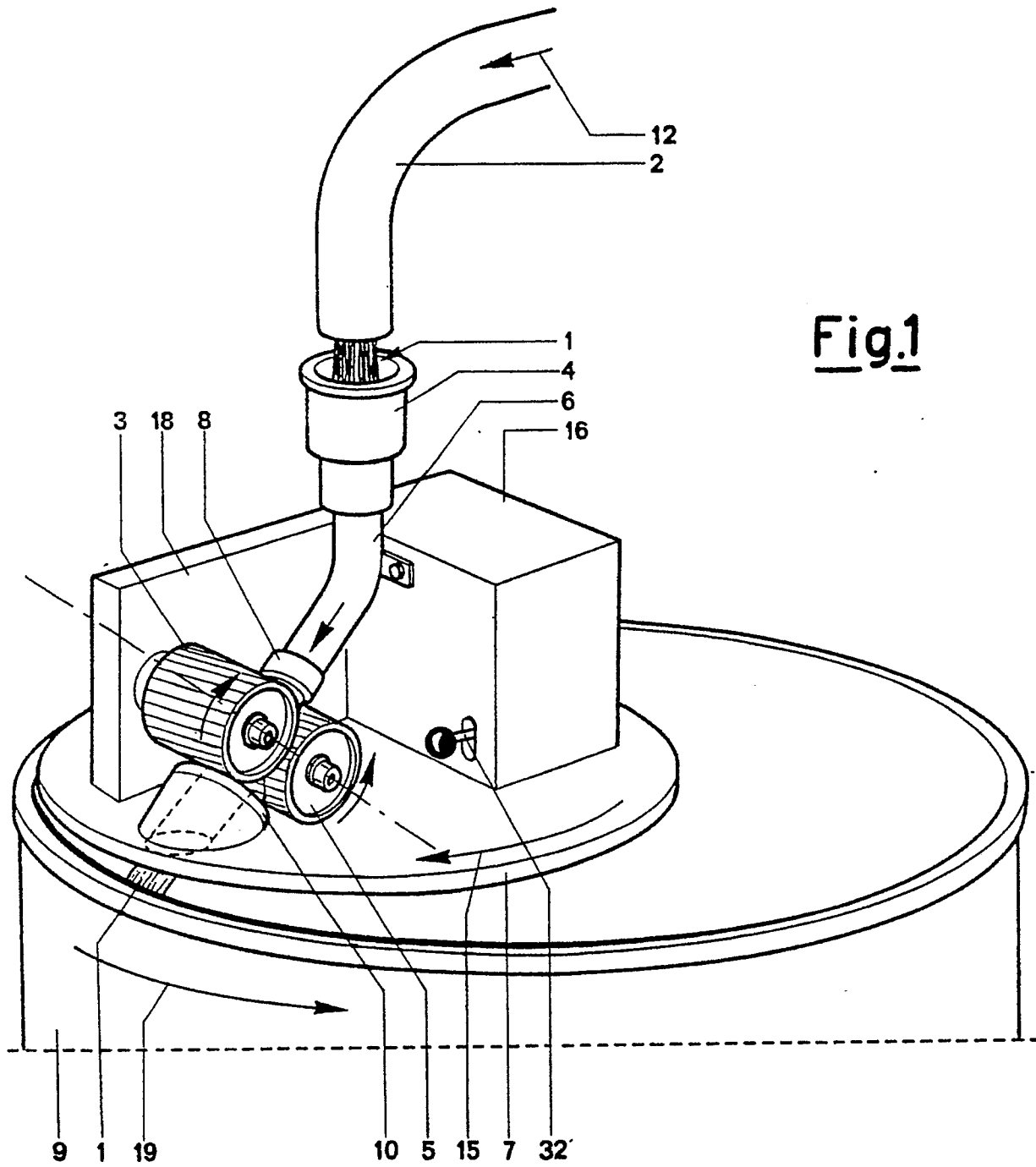


Fig.2

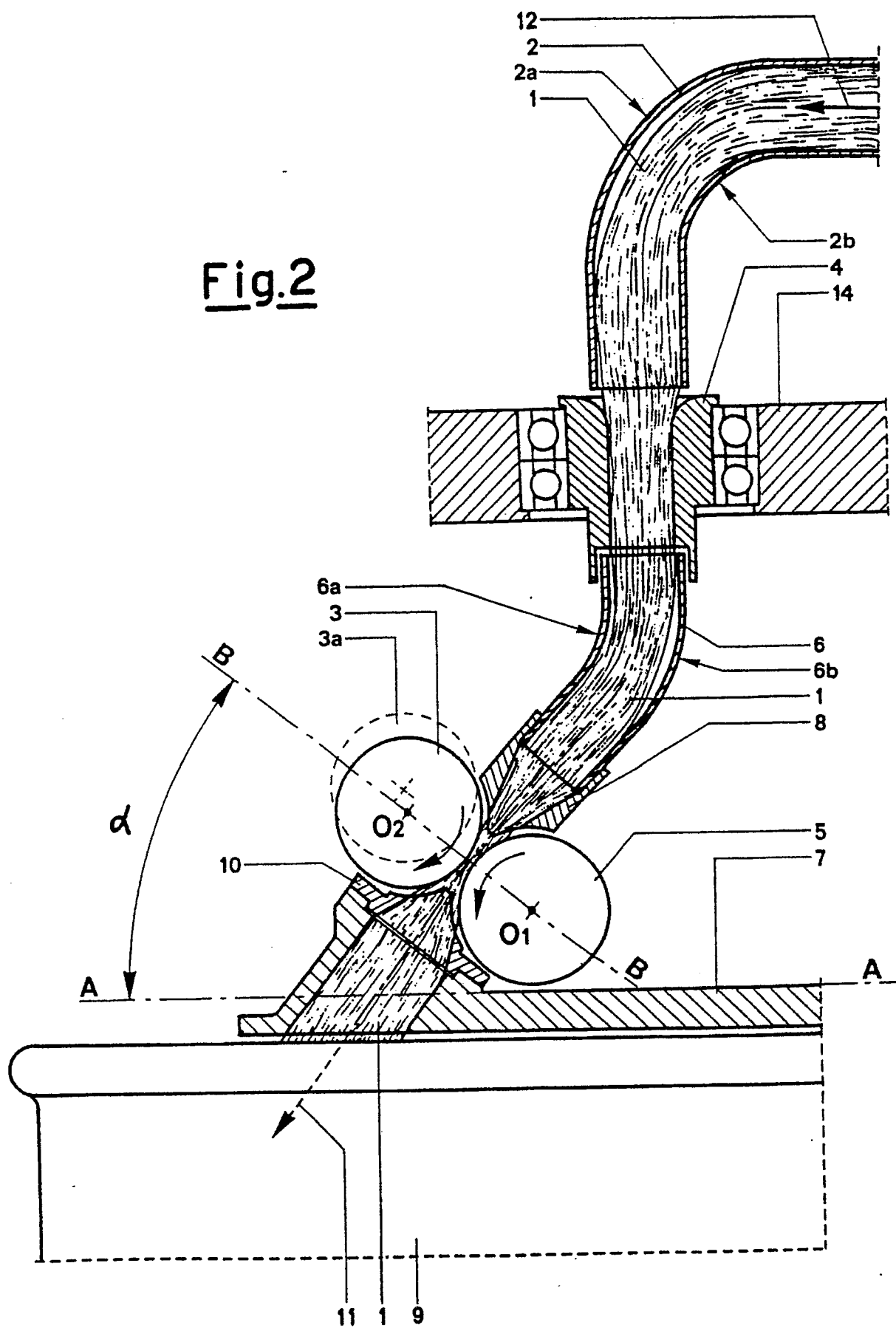
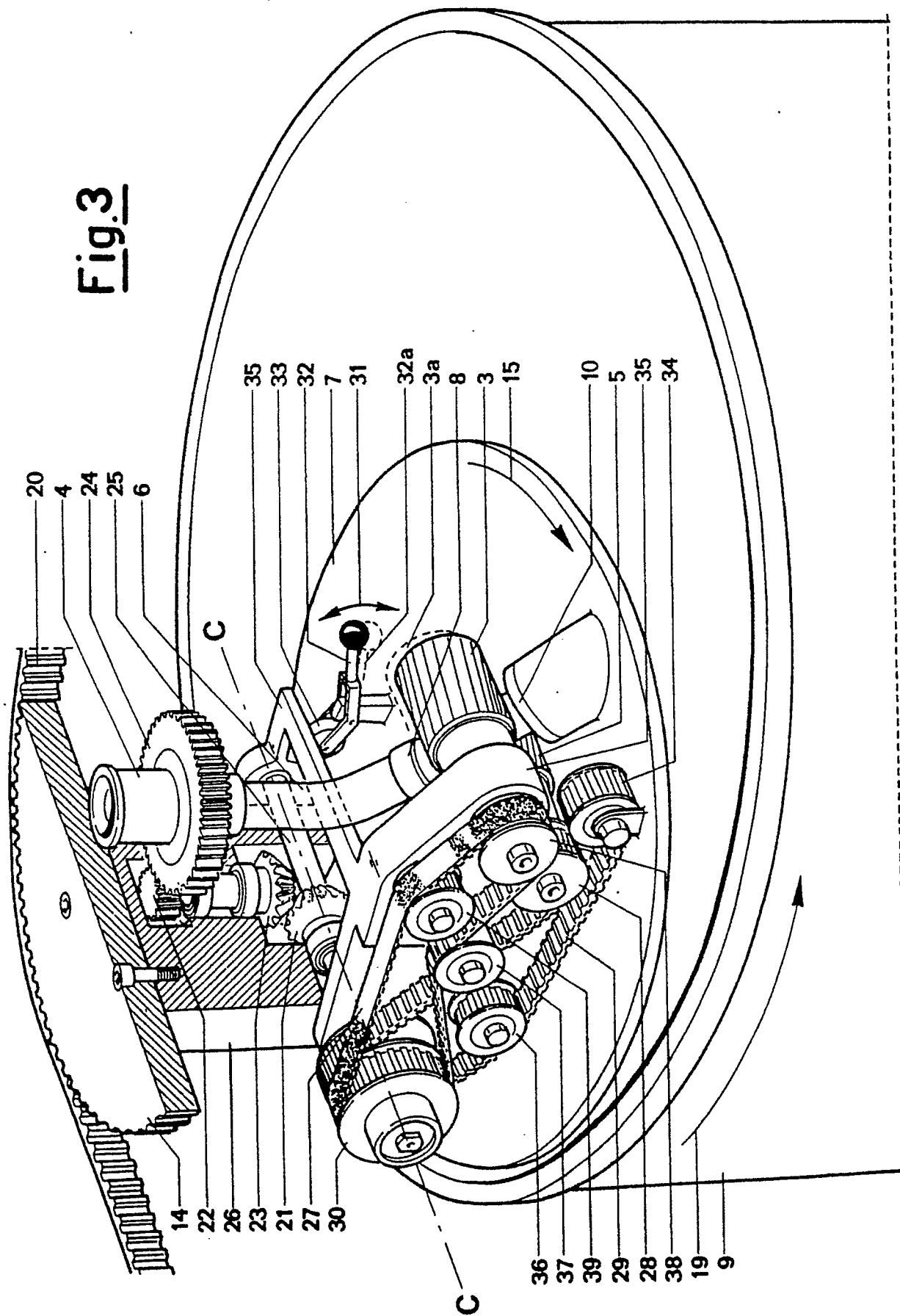


Fig.3





EP 90 20 1610

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)
A	EP-A-298519 (HOLLINGWORTH GMBH) * column 5, lines 17 - 48; figure 1 * ---	1	B65H54/80
A	DE-A-1950773 (THE WARNER & SWASEY COMP.) * page 9, lines 9 - 23; figures 4, 5 * * page 10, lines 18 - 24 * ---	1	
A	FR-A-2348288 (FRIEDR. KRUPP GMBH) * page 4, line 6 - page 5, line 20; figures 1, 2 * ---	1	
A	CH-A-460599 (SCHUBERT & SALZER MASCHINENFABRIK AG) * column 2, lines 26 - 40; figures 1-3 * * column 3, lines 8 - 32 * ---	1, 2	
A	US-A-3035311 (P.C. WOODBURY) * column 2, line 53 - column 3, line 10; figures 6, 7 * ---	1, 2	
A	EP-A-175072 (A. ROSINK MASCHINENBAU) * claim 1; figures 2-4 * -----	1, 3	TECHNICAL FIELDS SEARCHED (Int. Cl.5) B65H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 SEPTEMBER 1990	Examiner HOEFER W. D.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			