(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 799 380 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.11.2014 Bulletin 2014/45

(51) Int Cl.:
B65H 54/70 *(2006.01)* ***B65H 67/08*** *(2006.01)*

(21) Application number: **14161353.9**

(22) Date of filing: **24.03.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **30.04.2013 IT PD20130115**

(71) Applicant: **Savio Macchine Tessili S.p.A.**
33170 Pordenone (IT)

(72) Inventors:
- **Baidali, Roberto**
  I-33170 PORDENONE (IT)
- **Ceolin, Mauro**
  I-33170 PORDENONE (IT)
- **Colomberotto, Giorgio**
  I-33170 PORDENONE (IT)

(74) Representative: **Mitola, Marco**
Jacobacci & Partners S.p.A.
Via Berchet 9
35131 Padova (IT)

(54) **Winder**

(57) Winder (40) comprising a plurality of winder units (30), wherein at least one of said winder units (30) is fitted with a suction device (19) suitable for performing a high vacuum suction by means of a fluidic connection to suction intakes (9, 10) for the interruption and joining operations of a yarn (2) and for starting a new feeding bobbing (1), and wherein said at least one winder unit (30) comprises a support group (13') which supports a package-holder arm (14), suitable for supporting a package (12) during winding, and/or a support roller (13), suitable for placing the package (12) in rotation at a controlled speed, Advantageously, the suction device (19) is fitted with at least one suction fan (29) suitable for generating the vacuum required, and the suction device (19) is situated under the support unit (13').

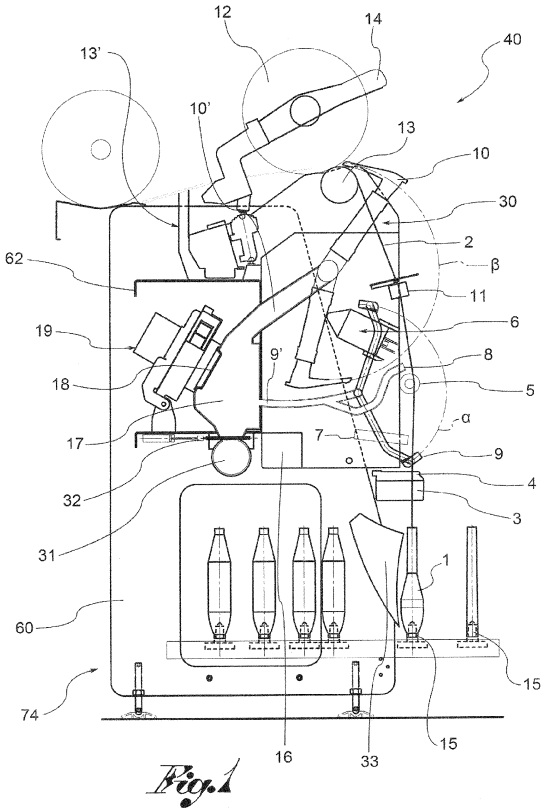

Fig.1

EP 2 799 380 A1

Description

Field of application

[0001] The present invention relates to a winder, and in particular a winder fitted with a specific suction device serving the winding stations of said winder.

State of the art

[0002] In industrial practice the ring spinning method producing feeding bobbing of yarn followed by a winding step in which the yarn is unwound from the feeding bobbing, purified of its defects, joined and rewound onto a package, is widespread. The winding is performed in the winders positioned downstream of the spinning machines.

[0003] To make both the technical difficulties tackled and resolved by the present invention and its characteristics and advantages compared to the prior art evident the winding method performed in a conventional winder will be described below.

[0004] The winders are composed of a plurality of winding units aligned along the front of the machine and provided with communal control and service equipment.

[0005] As is known, the winding process consists of unwinding a yarn from a feed bobbin and in collecting it onto a package, in identifying and removing any defective sections of yarn, by means of a yarn clearer, and in joining the interrupted ends by means of a splicer device.

[0006] In addition, during the winding around the working feeding bobbing a balloon rotating at high speed is formed and a substantial quantity of dust, fibre and hairy residues of the yarn is released. A suction intake may be placed in the vicinity of the unravelling feeding bobbing to remove and discharge such impurities.

[0007] As may be guessed, the winding units forming the winder require a significant suction service, such as for example described in the patent EP1950162B1 in the name of the Applicant, which discloses the use of single suction devices per winder units providing the high vacuum pressure needed to perform the joining cycle, while the low vacuum pressure is an optional centralised device or divided between suction devices which serve sections with several winder heads, used to reduce the quantity of dust in the winder environment when dusty materials are used.

[0008] The high vacuum service is needed to start the new feed bobbin and for each joining operation of the skein ends, and requires the suction thereof with mobile intakes (see reference numerals 9 and 10 in the drawings) and/or with a fixed intake (reference numeral 33); such suction operations, lasting to the order of 4 seconds each time, have a variable frequency depending on the quality of the yarn and the gauge assigned to the yarn-clearer, and are characterised by suction heads to the order of 600-650 nm C.A. to make catching of the skein ends and discharge of the yarn waste cycles efficient and safe.

Presentation of the invention

[0009] In conventional winders the high vacuum service is centralised, or, as for the winders described in the patent EP1950162B1, is supplied by single suction devices on the single winder heads; in all these cases the winder heads are connected and disconnected from the high vacuum service by means of the interposition of valves, for example solenoid valves, which are opened only for the duration of the suction required at the moment of its intervention on the skein ends, thus withdrawing the suction needed for the necessary time.

[0010] The embodiments of the suction service of the prior art are not without drawbacks.

[0011] By way of example, on conventional winders the efficiency of the high vacuum suction is negatively influenced by the degree of cleanliness of the suction filter; in addition the realisation of the fluid connections by means of interposing valves proves complicated and expensive.

[0012] In addition, it is also known of in the conventional winders using a centralised high vacuum service, to use centrifugal fans with reversed, self-cleaning blades which do not cause problems of arrangement in that the suction group is generally installed in the winder head. It is instead extremely complex to insert a single suction device in the winder unit exploiting the limited dimensions available - less than 310 mm - and to shape it so that its insertion does not prejudice the positioning of the winder members previously described and access and maintenance thereof, without increasing the longitudinal or lateral dimensions of the winder.

[0013] The need is therefore felt to make the prior winders really efficient so as to obtain a winder fitted with suction and cleaning devices which is a compact size, with very short regime achievement times of the vacuum suction level in a short time, with limited power and low energy consumption, which is self-cleaning and easy to maintain.

[0014] Such requirement is achieved by a winder according to claim 1.

Description of the drawings

[0015] Further characteristics and advantages of the present invention will be more clearly comprehensible from the description given below of its preferred and non-limiting embodiments, wherein:

figures 1-2 show side views, in partial cross-section, of a winder according to the present invention, in a working and maintenance configuration respectively;

figure 3 shows a cross-section view of the enlarged detail 19 in figure 2;

figure 4A shows a rear view of a winder unit accord-

ing to the present invention;
figure 4B shows a side view of the suction group of the winder according to the present invention;
figure 5 shows the detaching action of the dust caused by the flows of air in a winder according to the present invention.

Detailed description

[0016] The elements or parts of elements common to the embodiments described below will be indicated using the same reference numerals.

[0017] With reference to the aforementioned figures, reference numeral 40 globally denotes a winder comprising a plurality of winder units 30.

[0018] As mentioned, the processing on the winder unit 30 consists of unwinding a yarn 2 from a feeding bobbing 1 and collecting it on a package 12, in removing the sections of defective yarn 2, and in joining the interrupted skein ends.

[0019] According to a possible embodiment, a suction intake 33 may be positioned in the vicinity of the feeding bobbing 1 as it unravels to remove and discharge the impurities raised during unravelling of the yarn 2 from the feeding bobbing 1.

[0020] In the path as far as the package 12, a yarn clearer 11 identifies the yarn defects 2 and orders the cutting thereof.

[0021] When the yarn runs out, natural breakage occurs or cutting of the yarn 2 is commanded, the yarn clearer 11 signals to a control unit 16 of the winding station the absence of yarn in the upper part of the winder unit 30.

[0022] A sensor 4 in turn signals to a control unit 16 the possible absence of the yarn in the lower part of the winder unit 30. The control unit 16 comprises, among its functions, the control programme for the reattachment and changing procedure of the feeding bobbing 1.

[0023] The package 12 is placed in rotation at a controlled speed by a roller 13 of a support unit 13'; said support group 13' also supports a package-holder arm 14, to roll in the yarn 2, unravelling it at high speed from the feeding bobbing 1 kept still on a positioning peg 15.

[0024] The support unit 13' comprises as seen a support roller 13 of the package 12 provided with grooves for alternately shifting the yarn to the right and to the left while depositing on the package 12; According to further embodiments the support unit 13' comprises a support roller 13 of the package 12, while the shifting of the yarn to the left and to the right is performed by known devices suitable for shifting the yarn to the right and to the left, not shown in the drawings.

[0025] The yarn 2 passes through the unravelling unit 3, the yarn sensor 4 and a yarn-tensioner 5. Along the path of the yarn 2 is a splicer 6 which has the function of joining to each other the separate skein ends, in the known manner.

[0026] In particular, the interrupted skein ends are brought to the splicer 6 by suction intakes 9, 10 at the moment of yarn 2 interruptions resulting from the yarn running out, natural breakage or intervention of the yarn-clearer 11.

[0027] In particular, the intake 9 performs a rotation α which leads the suction nozzle of said intake to first catch the interrupted skein end from an unravelling unit 3, after it has been cut by a scissor 7, and after the rotation α, to deliver the skein end of the feeding bobbing 1 to the splicer 6. The intake 10 performs a rotations β which leads the suction nozzle of said intake to first catch the interrupted skein end from the package side and, after the rotation β, to deliver the skein end of the feeding bobbing 12 to the splicer 6. The splicer 6, after receiving and cutting the two skein ends to measure performs the join while the yarn waste is aspirated away by the intakes 9 and 10; in the case of intervention by the yarn clearer 11 as a result of a defect, the yarn waste coming from the package 12 which is eliminated contains the yarn defect 2. The splicer 6 then releases the joined yarn to return to its winding configuration from the feeding bobbing 1 to the package 12.

[0028] At the beginning of each new feeding bobbing 1, the new skein end is inserted by known means into the unravelling unit 3, and from here is withdrawn by the feeding bobbing side intake 9. A further fixed intake 8 of a small size may be placed next to the yarn tensioner 5, generally placed between the yarn clearer 11 and the yarn tensioner 5. At each interruption of the yarn the fixed intake 8 catches the lower skein end on the feeding bobbing side and keeps it taut between the yarn tensioner 5 and the unravelling unit 3. From this position the feeding bobbing side intake 9 is able to pick it up and bring it to the splicer 6 for the joining of the yarn and for the continuation of the winding.

[0029] At least one winder unit 30 is fitted with a suction device 19, for the high vacuum service, that is, one for each winder unit 30, controlled by the relative control unit 16; said suction device 19 is preferably put into service solely for the time of the operating cycle conducted on said unit 30. In other words, the suction device has a discontinuous action and is actuated only when at least one skein end needs to be caught.

[0030] According to one embodiment, the single suction devices 19 have an indicative unit power to the order of 0.7 kW, with flows of 250 cubic metres/h and head to the order of 650 mm C.A.

[0031] The suction device 19 is fitted with at least one suction fan 29 suitable for generating the vacuum required; the single suction device 19 is also preferably fitted with a filter 18.

[0032] Advantageously, said suction device 19 is situated under the support unit 13'.

[0033] According to one embodiment, the suction device 19 is positioned rearwards of the suction intakes 9, 10, that is opposite the skein ends intercepted by said intakes.

[0034] According to one embodiment, the winder 40

comprises a main frame 60 which supports said package-holder arm 14 and/or the support roller 13 and at least an auxiliary frame 62, wherein said auxiliary frame 62 houses and supports the suction device 19.

[0035] According to one embodiment, the suction device 19 comprises a first and a second part 70, 72 mechanically connected to each other, so that the second part 72 can be moved and opened with respect to the first part 70 for the control and maintenance operations of the winder unit 30.

[0036] For example, the second part 72 can be moved and opened with respect to the first part 70 for the control and maintenance operations of the winder unit 30, from a rear side 74 of the winder unit 30, opposite said suction intakes 9, 10.

[0037] According to a possible embodiment, the suction device 19 comprises two parts, the first part 70 being fixed and the second part 72 being hinged to the first part and suitable for being opened at the back, or rear side 74 of the winder unit 30, opposite said suction intakes 9, 10 for control and maintenance operations.

[0038] The suction device 19 is in fluidic communication with a collection chamber 17 which the inner outlets 9', 10' of the suction ducts 9, 10 respectively flow into.

[0039] Advantageously, the suction device 19 is fluidically connected to the intakes 9, 10 without the need, compared to the prior art, for shut-off valves.

[0040] The intakes 9, 10 are thus supplied with vacuum suction whenever the single suction device 19 is started for the joining cycle. The filter 18 has the function of withholding upstream the yarn waste and dust aspirated during the joining cycles which accumulate in the collection chamber 17, while the filtered air is discharged into the environment.

[0041] The intake 8 is connected directly to the inner outlet 9' which also flows into said collection chamber 17.

[0042] The suction device 19 comprises a suction wall 79 which partially delimits an inner side wall of said collection chamber 17.

[0043] Preferably, said suction wall 79 is positioned adjacent to an inner outlet 9', 10' of the suction ducts 9, 10 so as to be lapped by the suction flow coming from said inner outlet 9', 10'.

[0044] Preferably, said suction wall 79 is substantially parallel to the suction flow coming from at least one inner outlet 9', 10'.

[0045] According to a possible embodiment, the collection chamber 17 is connected to a duct 31 which deals with supplying a centralised high vacuum service for cleaning the filter 18, by means of an interposed valve 32, for example a gate valve.

[0046] The duct is placed in fluidic communication with the collection chamber 17 by opening the gate valve 32, in the moments in which the winder unit is not performing a joining cycle and the high vacuum suction evacuates the yarn waste accumulated in the collection chamber 17. This way, compared to the prior art, there is no longer any need for an auxiliary air intake to create the flow of air needed to remove the yarn waste: as can be seen in figure 5 the necessary air comes mainly from the flow F19 coming from the suction device 19 - passing in counter flow through the filter 18 partially raising and detaching the attached dust - but also from the intake 10 through the duct 10'; the flow F10 coming from the inner outlet 10' tangentially laps the suction wall 79 and/or the filter 18, deviates the flow F19 making it whirl, and thus applies an aerodynamic detachment force of the dust. This arrangement of cross-flows, directed one through the filter 18 and the other tangential to it, efficaciously detaches the dust from the filter and keeps the suction device efficient.

[0047] Preferably, the suction device 19 is fitted with braking means suitable for selectively blocking the rotation of the suction fan 29.

[0048] Selective blocking is understood to means that the suction fan 29 can be blocked in rotation as needed, that is, during the filter cleaning steps as described further below.

[0049] In fact, the suction fan 29 is typically of the centrifugal type: consequently such suction fan is able to aspirate air regardless of its direction of rotation. This way, the suction flow F19, generated by the duct 31, would tend to make the suction fan 29 rotate and thus generate a suction flow opposite said flow F19. Consequently the rotation of the suction fan 29 would oppose the cleaning of the filter 18. It follows that during the cleaning procedure of the filter 18 due to the generation of cross flows described above, it is useful to block the rotation of the suction fan 29 by means of the braking means mentioned.

[0050] According to a possible embodiment, the motor 20 of the suction fan 29 is a brushless type motor which is left powered during the cleaning steps of the filter, so as to block the suction fan 29 in clearly defined angular positions, preventing its rotation under the thrust of the flow F19.

[0051] It is also possible to arrange the internal outlets 9', 10' so that a flow F9, coming from the outlet 9', can interact with the flow F19 coming from the suction device so as to improve the cleaning efficiency of the filter 18.

[0052] According to one embodiment, the suction device 19 is positioned between at least one inner outlet 9', 10' and said duct 31, so as to be struck by the suction flow F9, F10 generated by the centralised high vacuum service and coming from said inner outlet 9', 10'.

[0053] As mentioned, according to one embodiment, the suction device 19 comprises a first and a second part 70, 72; for example the first part 70 is a fixed part of the suction device system 19 formed of the collection chamber 17 connected to the outlets 9' and 10' of the ducts 9, 10 of the air coming from the winder unit 30 without the interposition of check valves, and the second part 72 is a mobile part hinged to and suitable for opening in relation to the first part 70, comprising a filter 18, a casing 22, a fan 29 and a motor-bearing flange 21 with relative motor 20.

[0054] For example, figure 2 shows the suction device 19 in the open position with the motor 20, the motor-bearing flange 21, the casing 22 and the fan 29 positioned horizontally, while the chamber 17 remains connected to the winder unit 30; the filter can be inspected, as can the fan 29 and the chamber 17.

[0055] As regards the fan 29 it has been found that the use of metal fans requires an installed motor power of the single suction devices of around 1 kW, and proportionate power absorption; in addition the maximum vacuum pressure is achieved in excessively long times, estimated at around 3 -4 seconds. Such length of time is to the detriment of the available time in the joining cycle, which forces a higher peak vacuum pressure, of around 1000 mm C.A. to be sought, so as to efficaciously aspirate the winder yarn. It has also been found that the air flow required by the winder unit needs to be increased by around 250m^3/hour, while the high vacuum pressure could advantageously be limited to 650 mm C.A. - currently used in the centralised high vacuum pressure machines of the prior art - on condition that it is reached in a shorter time; in fact on conventional machines the vacuum pressure is immediately available, with no waiting time, whenever a joining cycle is required.

[0056] Consequently, preferably, in order to resolve the drawbacks mentioned, a low inertia fan 29 in lightweight material with a diameter of only 200 mm is used, able to withstand the regime of 9000 revs/min. and the strong starting torque of approximately 3 Nm. A lightweight fan permits the use of motors with a lower starting torque, shorter regime achievement times and consequent lower vacuum pressures, around 650 mm C.A.

[0057] Preferably, the fan 29 is made of plastic PA66 preferably strengthened with 50% fibre glass, but the coupling hub to the motor does not have sufficient fatigue resistance to resist the starting torque, so it needs to be reinforced by a inserting a drive bush 24 in lightweight metal. For example, said drive bush is made of aluminium or an alloy thereof. Such bush 24 thereby makes it possible to safely withstand the high starting torques supplied by the motor.

[0058] As regards the casing 22, a standard sizing cannot be used: interspaces between the outside of the fan and the casing reduced by approximately 50% must be used, with an increase of the air speed at the output of the rotor to approximately 23 m/sec; however to keep the output of the group at a good level - approximately 63% - the interspaces and the empty spaces between the casing 22 and the fan 29 are reduced to a minimum, so as to reduce the aeraulic losses by beating of the air in the empty spaces. Consequently to obviate the noise generated by the high speed of 23m/sec of the exhaust air, a diffuser 28 is inserted which acts both as an energy recovery diffuser and as a silencer at the air exhaust into the room.

[0059] Figure 3 shows in cross-section the single suction device 19, with the fan 29 in plastic, of a diameter of approximately 200 mm, which incorporates the drive bush 24 connected to the motor axis 20. The casing 22 has interspaces 22a and 22b reduced by half, is made of two parts 22' and 22'' joined to each other and to the motor-bearing flange 21 by screws 21', and has toroidal shapes 25' and 25'' at the outer rim of the suction fan 29, which go to limit the interspaces between the casing 22 and said fan 29 so as to reduce the aeraulic losses. The filter 18 is placed under slight pressure in a chamber area at the entrance of the air intake cone 26 of the casing 22, and may be extracted by hand, for thorough cleaning or replacement.

[0060] Figure 4A shows a rear view of a winder unit 30 positioned between two others; the diffuser 28 is placed at the output of the casing 22, not in its classic divergent shape but in the form of an expansion vessel with grip mouth 22d, see fig.4B also, to fall within the available dimensions between the left limit 30' and the right limit 30" of the winder unit 30. The flow of air aspirated by the fan 29 of the suction unit 19 is channelled into the diffuser 28, which also acts as a silencer. In the example in fig.4A the diffuser 28 is placed flush with the right rim 30'' of the winder unit 30, and receives the air coming from the fan 29, being fitted with an aperture 22d simply facing the exit mouth 22u of the casing 22. The air expands in the diffuser 28, losing most of its speed, and is lastly discharged into the environment through an aperture 59 made on the diffuser 28. Consequently, the diffuser 28 has both the function of recovering head and of silencing.

[0061] As may be seen from the description, the winder according to the invention makes it possible to overcome the drawbacks presented of the prior art.

[0062] The suction group which the present invention relates to is advantageously inserted just under the group supporting the arm and the roller of the winder unit. In this position moreover, the suction group is as close as possible to the suction intakes, thereby minimising the pressure drop of the air coming from such intakes.

[0063] Compared to the systems of the prior art, the suction device according to the present invention offers significant advantages.

[0064] With the technical solution according to the present invention the starting times of the fan are limited, the vacuum pressure is reduced to 650 mm C.A. and energy consumption thus reduced. The single suction device 19 is inserted in the winder unit 30 in such a position as not to disturb the winding operations and facilitate the self-cleaning of the filter, so that the efficiency of the single suction devices is maintained high over time. No auxiliary or shut-off valves are needed, making the single suction device more economical. The positioning of the single suction unit 19 under the group supporting the arm and the roller of the winder unit permits the introduction of an efficient diffuser which reduces the noise level of the single suction groups.

[0065] The technical solution according to the present invention permits - as well as the advantages of efficiency and quality as expounded above - a more significant saving of energy for the suction, which proves to the order

of 20-40% less than the conventional machines, depending on the number of winder units making up the machine. As regards the construction costs of the suction system, the economy permitted by the technical solution according to the present invention proves to the order of 15-30% less than the system as for example in patent EP1950162B1.

[0066] A further advantage of the present solution is to be able to unify the production lines of the winder unit according to the present invention with those of the production lines of conventional winders. In fact, the manufacturer of the winder can use the same assembly line as the conventional winder fitted with a centralised suction tank, and decide to fit a single suction device 19 per unit in place of the centralised suction tank, using the same components of the winder unit 30, simply removing the shut-off valves between the suction tank and the outlet exits.

[0067] Advantageously, the suction group no longer requires the auxiliary valve for cleaning the filter; it has in fact been proven more effective for the air aspirated by the cleaning system to come mainly from the suction device passing through the filter in counter flow raising the dust, but also passing through the intake so as to tangentially strike the filter with a detaching effect of the dust just raised; with this arrangement as well as evacuating the yarn waste accumulated in the storage tank the dust is better removed from the filter, keeping the suction device in good working order. To realise such improved solution the valves which connect the intakes of the single suction device must advantageously be eliminated, thereby achieving a constructive simplification of the suction group.

[0068] Advantageously, the single suction system according to the present invention is able to supply the winder unit a flow of approximately 250 m^3/hour at a head of 650 mm C.A. in times of less than 0.7 seconds from start-up.

Claims

1. Winder (40) comprising a plurality of winder units (30), wherein at least one of said winder units (30) is fitted with a suction device (19) suitable for performing a high vacuum suction by means of a fluidic connection to suction intakes (9, 10) for the interruption and joining operations of a yarn (2) and for starting a new feeding bobbing (1),
wherein said at least one winder unit (30) comprises a support group (13') which supports a package-holder arm (14), suitable for supporting a package (12) during winding, and/or a support roller (13), suitable for placing the package (12) in rotation at a controlled speed,
characterised in that
said suction device (19) is fitted with at least one suction fan (29) suitable for generating the vacuum required,
wherein said suction device (19) is situated under the support unit (13').

2. Winder (40) according to claim 1, wherein the suction device (19) is positioned rearwards of the suction intakes (9, 10), that is opposite the ends of yarn intercepted by said intakes.

3. Winder (40) according to claim 1 or 2, wherein the winder comprises a main frame (60) and at least one auxiliary frame (62), wherein said auxiliary frame (62) houses and supports the suction device (19).

4. Winder (40) according to any of the previous claims, wherein the suction device (19) comprises a first and a second part (70, 72) mechanically connected to each other, so that the second part (72) can be moved and opened with respect to the first part (70) for the control and maintenance operations of the winder unit (30).

5. Winder (40) according to claim 4, wherein the second part (72) can be moved and opened with respect to the first part (70) for the control and maintenance operations of the winder unit (30), from a rear side (74) of the winder unit (30), opposite said suction intakes (9, 10).

6. Winder (40) according to any of the previous claims, wherein the suction device (19) is composed of two parts (70, 72), the first part (70) being fixed and the second part (72) being hinged to the first and suitable for being opened on a rear side (74) of the winder unit (30), opposite said suction intakes (9, 10) for control and maintenance operations.

7. Winder (40) according to claim 4, 5 or 6, wherein the first part (70) is a fixed part of the single aspirator system (19) and comprises a collection chamber (17) connected to the outlets of the ducts (9') and (10') of the air coming from the winder unit without the interposition of check valves, and the second part (72) is hinged and can be opened and comprises a filter (18), a casing (22), a fan (29) and a motor-bearing flange (21) with motor (20).

8. Winder (40) according to any of the previous claims, wherein the suction device (19) is in fluidic communication with a collection chamber (17) which the inner outlets (9', 10') of the suction ducts (9, 10) flow into.

9. Winder (40) according to claim 8, wherein the suction device (19) comprises a suction wall (79) which partially delimits an inner side wall of said collection chamber (17).

10. Winder (40) according to claim 9, wherein said suction wall (79) is positioned adjacent to an inner outlet (9', 10') of the suction ducts (9, 10) so as to be lapped by the suction flow (F9, F10) coming from said inner outlet (9', 10').

11. Winder (40) according to claim 9 or 10, wherein said suction wall (79) is substantially parallel to the suction flow (F) coming from at least one inner outlet (9', 10').

12. Winder (40) according to claim 8, 9, 10 or 11, wherein said collection chamber (17) is connected to a duct (31) which deals with supplying a centralised high vacuum service for the cleaning of a filter (18), said filter (18) being associated to the suction device (19).

13. Winder (40) according to claim 12, wherein the duct (31) is selectively connected to the collection chamber (17) by means of the interposition of a valve (32).

14. Winder (40) according to claim 12 or 13, wherein the suction device (19) is positioned between at least one inner outlet (9', 10') and said duct (31), so as to be struck by the suction flow (F9, F10) generated by the centralised high vacuum service and coming from said inner outlet (9', 10').

15. Winder (40) according to any of the previous claims, wherein the suction device (19) is fitted with braking means suitable for selectively blocking the rotation of the suction fan (29).

16. Winder (40) according to any of the previous claims, wherein the suction fan (29) is fitted with a brushless type motor (20) so as to be able to block the suction fan (29) in clearly defined angular positions, preventing its rotation during the cleaning steps of a filter (18) of the suction device (19).

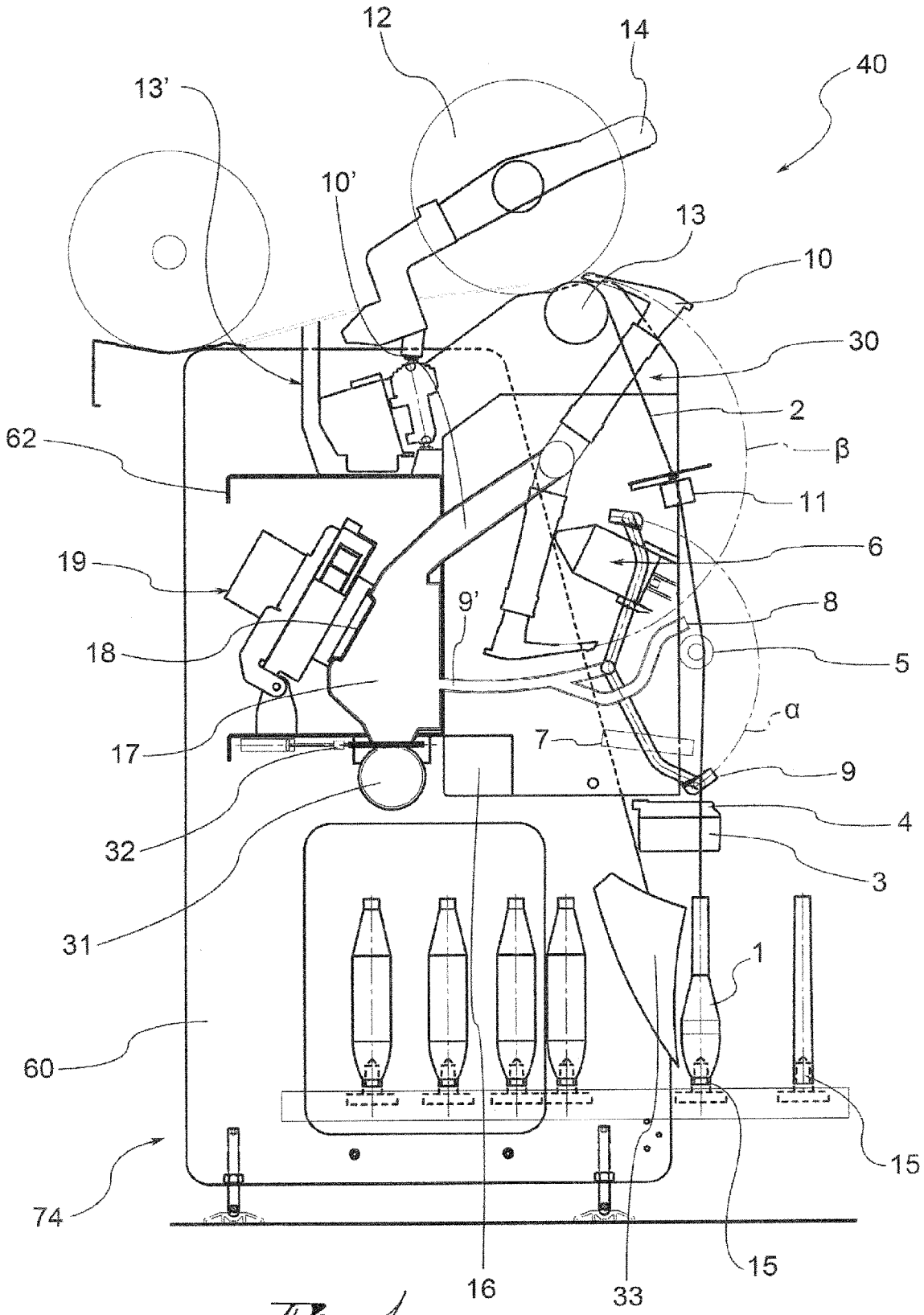
12
14
40
13'
10'
13
10
30
2
62
β
11
19
6
9'
8
18
5
α
17
7
9
32
4
3
31
1
60
15
74
16
33
15

Fig.1

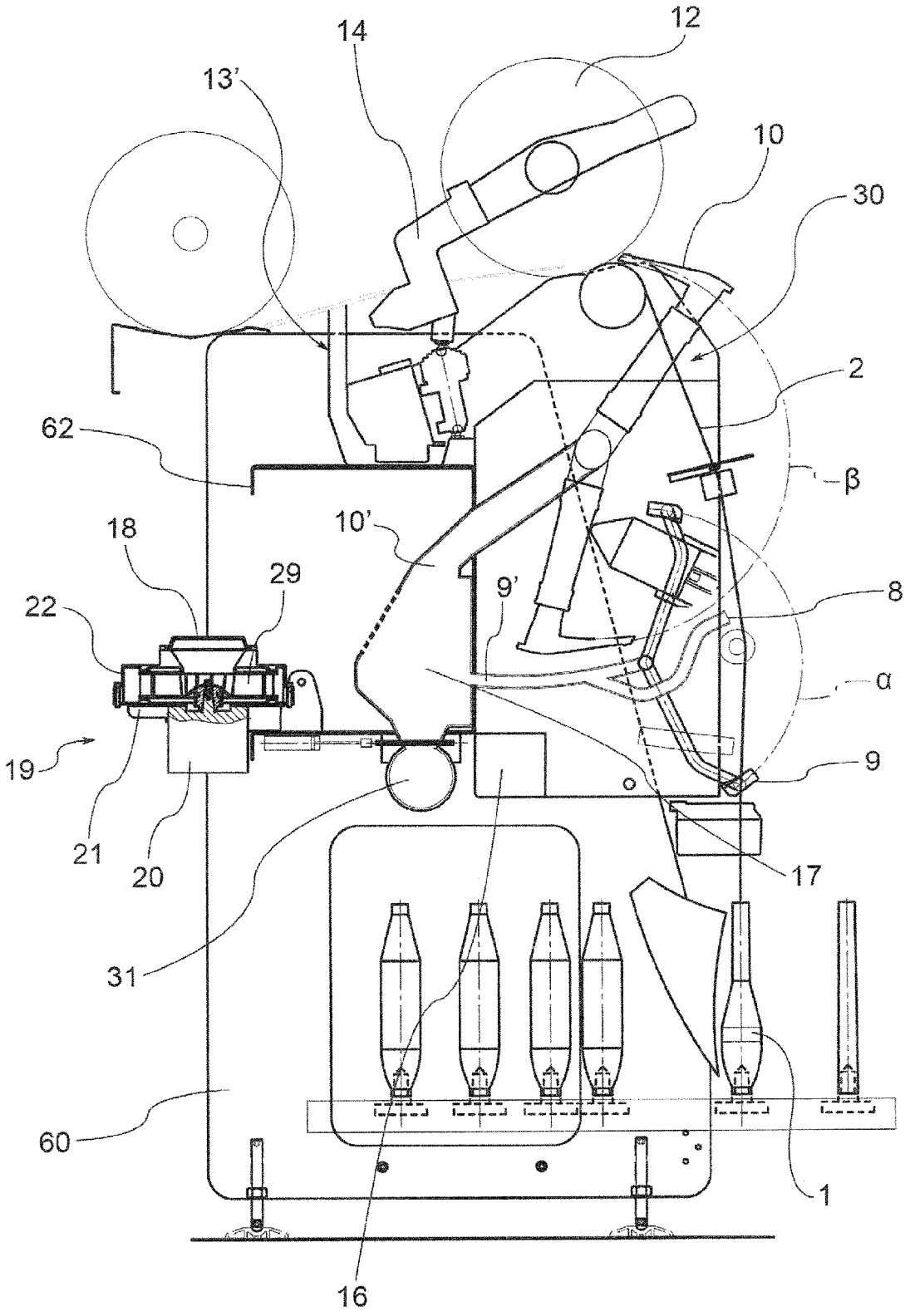

Fig. 2

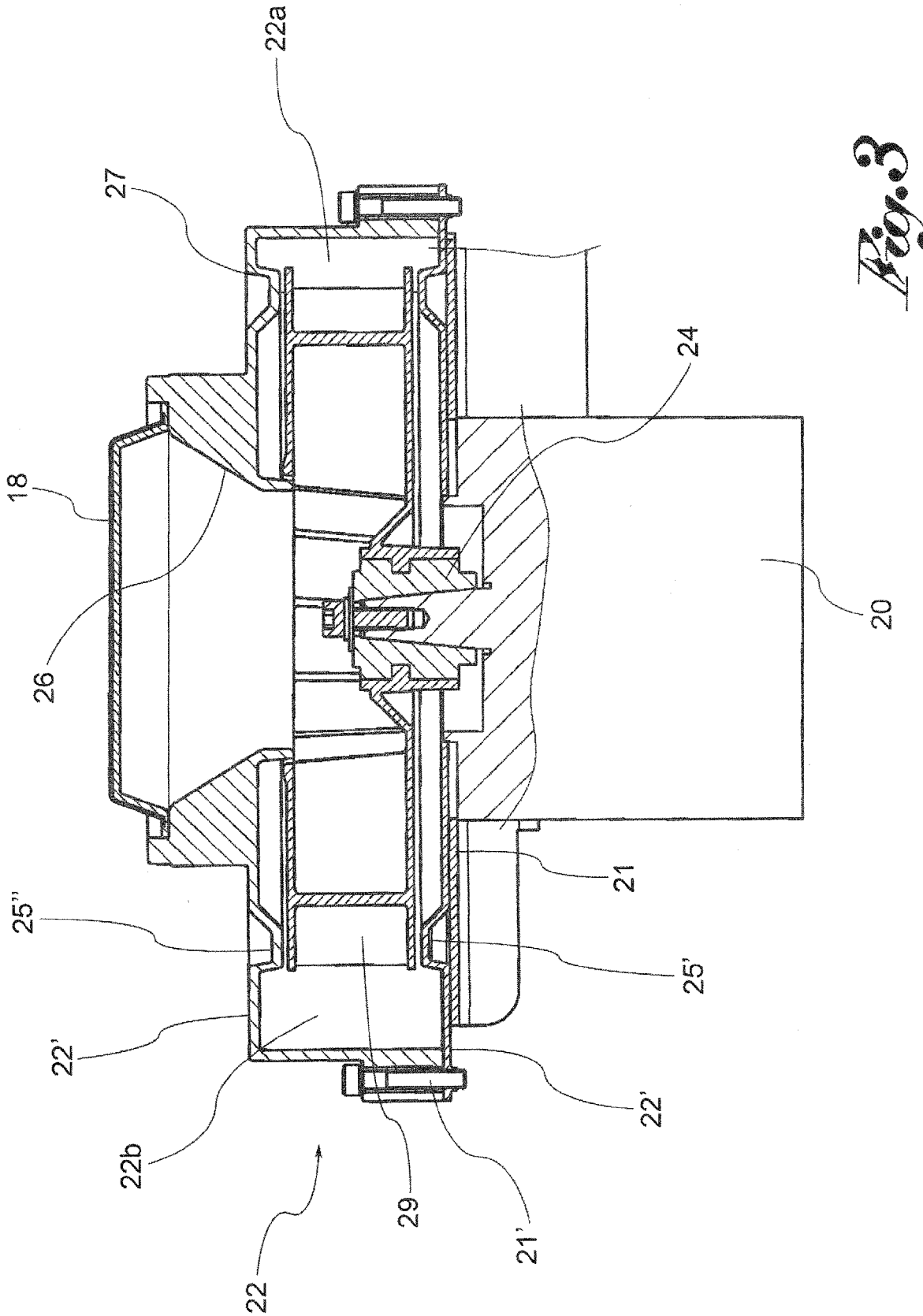

Fig.3

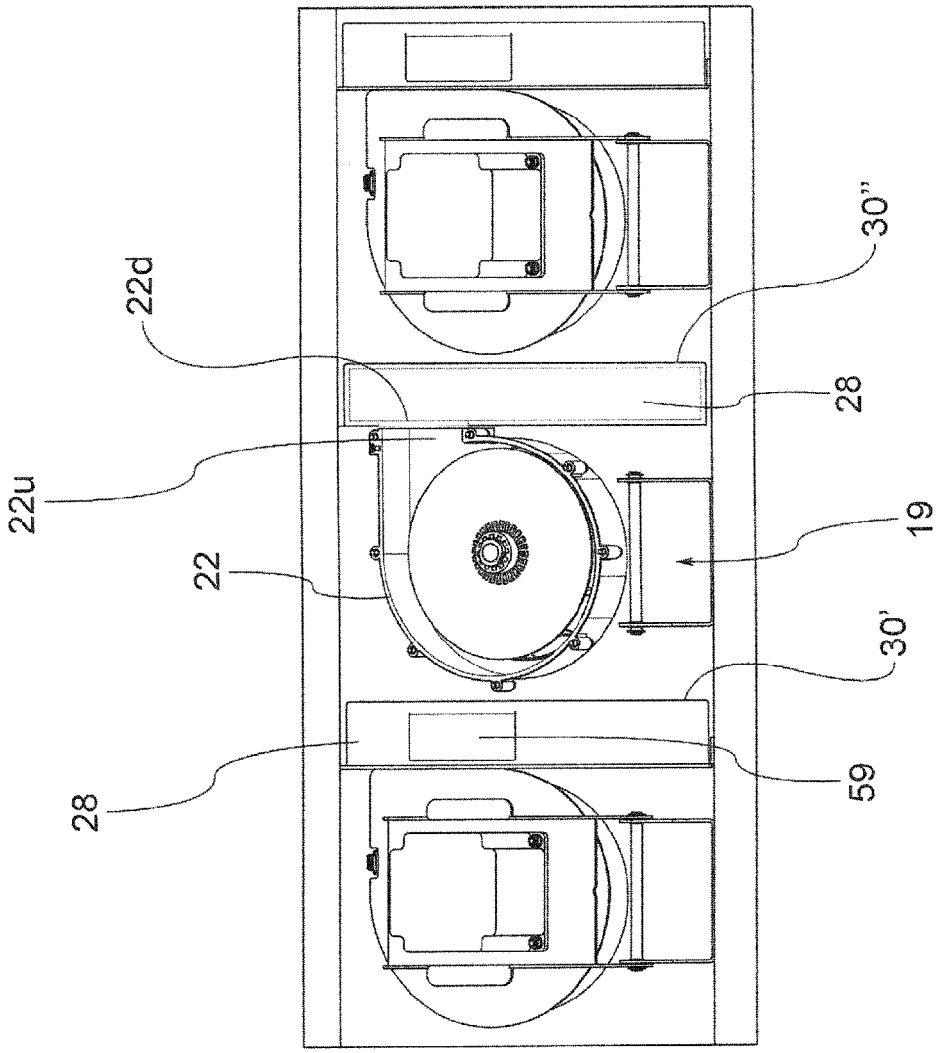

Fig. 1a

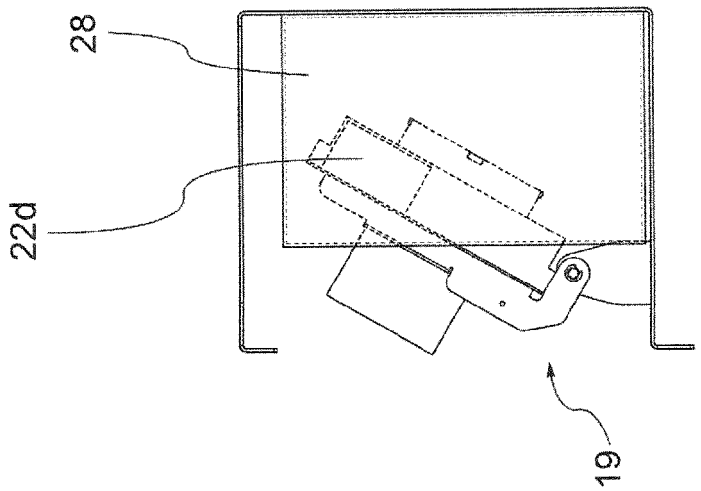

Fig. 1b

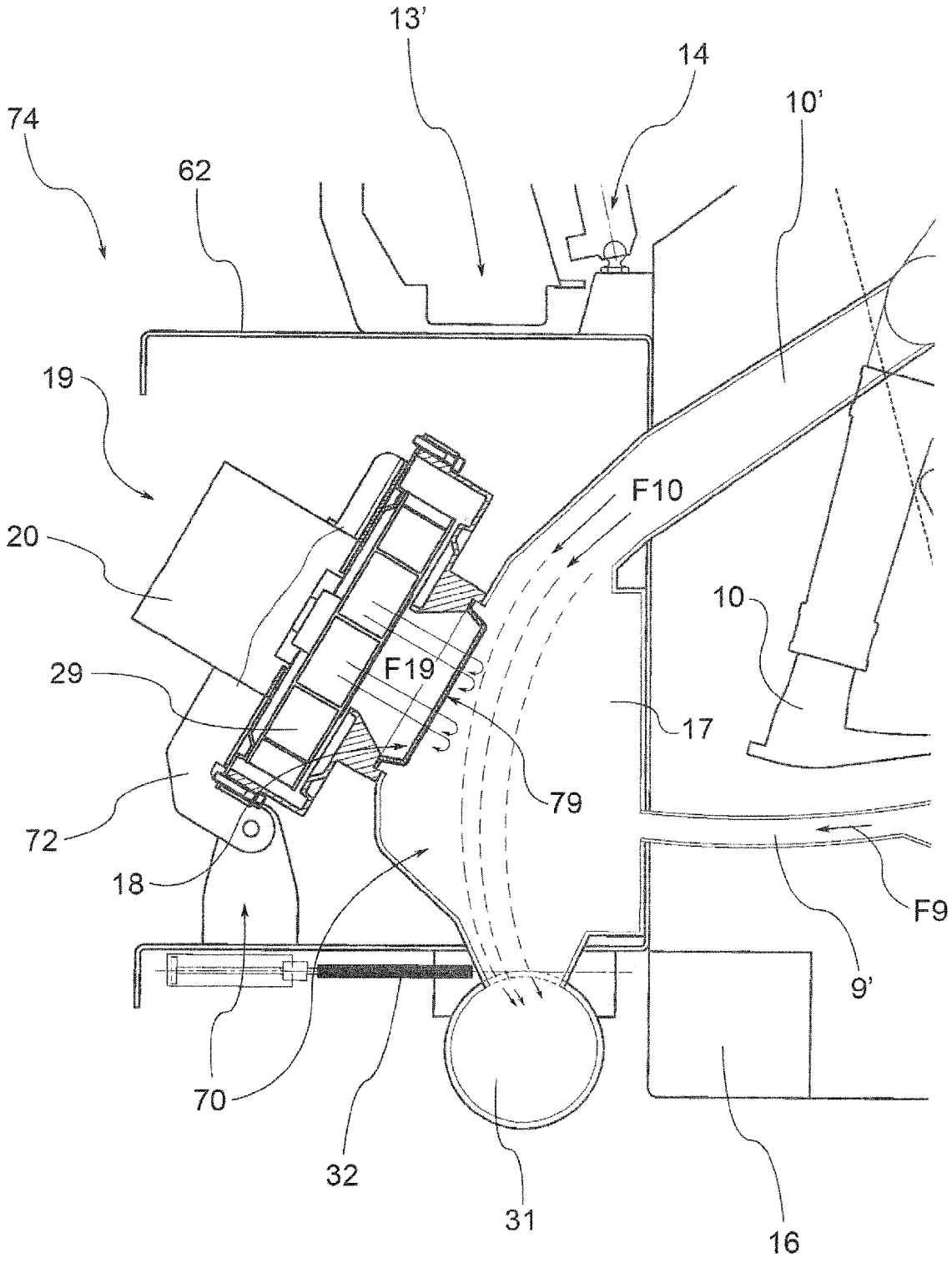

Fig. 5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 14 16 1353

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 405 964 B1 (RUESKENS HERBERT [DE] ET AL) 18 June 2002 (2002-06-18)	1-3	INV. B65H54/70
A	* column 3, lines 52-62; figure 1 *	4-16	B65H67/08
X	EP 0 662 441 A1 (SAVIO MACCHINE TESSILI SRL [IT] SAVIO MACCHINE TESSILI SPA [IT]) 12 July 1995 (1995-07-12)	1,2,8	
A	* columns 3-5; figures 1,2 *	3-7,9-16	
X	US 5 336 285 A (GRANDEK MANFRED [DE] ET AL) 9 August 1994 (1994-08-09)	1,3,4,8	
A	* column 3, line 66 - column 5, line 3; figure 1 *	2,5-7, 9-16	
X	EP 2 465 800 A1 (SAVIO MACCHINE TESSILI SPA [IT]) 20 June 2012 (2012-06-20)	1,2,8,9	
A	* paragraphs [0022] - [0025]; figures 2,3 *	3-7, 10-16	

TECHNICAL FIELDS SEARCHED (IPC)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 April 2014	Pussemier, Bart

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
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 16 1353

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-04-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6405964 B1	18-06-2002	DE 19854817 A1	31-05-2000
		EP 1004533 A2	31-05-2000
		US 6405964 B1	18-06-2002
EP 0662441 A1	12-07-1995	CN 1120084 A	10-04-1996
		DE 69501898 D1	07-05-1998
		DE 69501898 T2	15-10-1998
		EP 0662441 A1	12-07-1995
		ES 2115312 T3	16-06-1998
		IT 1269702 B	15-04-1997
		RU 95103727 A	10-11-1996
US 5336285 A	09-08-1994	DE 4229552 A1	10-03-1994
		IT 1272547 B	23-06-1997
		JP 3393683 B2	07-04-2003
		JP H06173128 A	21-06-1994
		US 5336285 A	09-08-1994
EP 2465800 A1	20-06-2012	CN 102658995 A	12-09-2012
		EP 2465800 A1	20-06-2012

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1950162 B1 **[0007] [0009] [0065]**