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board the service trolley and driven by an electric motor controlled for operating with speeds periodically varied according to the needs of the suction mouths to be served in the intervention cycles.



Description

[0001] The present invention refers to the open-end spinning, i.e. a rotor spinning. Open end spinning machines generally consist of a plurality of individual spinning units, aligned on the two fronts of the machine, each of which is made up of a spinning rotor, which produces twisted yarn from the singularised fibres of a rove, and of a collecting unit that - after performing the quality control of the yarn by interposition of a slubcatcher between the two components - takes the yarn to wind onto a quill to form a reel. This reel thus forms by pulling and winding the yarn on its surface, being driven in rotation by the below roller whereon the reel in formation rests. The yarn is wound in crossed-over coils onto the rotating reel since the collecting unit is equipped with a yarn guiding device that distributes the yarn with axial back and forth motion on the outer surface of the reel.

[0002] The structure of the individual spinning station is illustrated in a front view in the diagram of figure 1, and in a side view in figure 2. Such a structure has already been described in greater details in the European patent application 1.712.663 A2 to the same applicant.

[0003] Hereinafter we list the components of the spinning unit 1 consisting, proceeding from the bottom upwards, of the spinning unit itself 2 and the collecting unit 3, which lead to the transformation of the rove of parallel fibres into twisted yarn wound on the reel.

[0004] The spinning unit 2 consists of:

- S band or rove deposited in a double spiral in the
- 4 cylindrical supply vessel
- 5 supply roller 5
- 6 funnel-shaped conveyor 6
- 7 card with toothed clothing that supplies the
- 8 spinning rotor of the
- F twisted yarn, which axially comes out of the
- 9 central opening and receives the twisting from the rotation of the rotor 8,
- 11,12 pair of extraction cylinders
- 14 slubcatcher of the quality control of the yarn F. The collecting unit 3 consists of:
- 15 yarn detection sensor
- 16 compensator of the variations in length of the path between the spinning unit 2 and the depositing point of the yarn F on the reel
- 21 yarn guide that distributes the yarn driven by the
- 20 motor that drives in back and forth motion the
- 22 longitudinal shaft in common with other units of the spinning machine,
- 25 reel that collects the yarn F, supported by
- 26 reel-holding arm equipped with two
- 27 idle tailblocks that can be opened to hold the
- 28 quill of the driven reel 25 resting on the
- 29 driving roller or collecting cylinder.

[0005] Recently devised automatic open-end spinning machines are equipped with service trolleys C that patrol

the fronts of the spinning machines and automatically carry out the required interventions stopping in front of the spinning unit that requires them. For longer open-end spinning machines, up to four service trolleys are provided that operate on the two fronts of the spinning machine.

[0006] The interventions required are essentially of three types:

- starting, at the beginning of the spinning when the spinning machine is inactive, starting it up and then placing a new quill into each station, carrying out the start-up through a reattachment with an auxiliary yarn and winding the produced yarn onto the new quill to give a reel, after having eliminated the section of auxiliary yarn;
- reattachment, when the yarn is interrupted due to the cutting by the slubcatcher or for whatever other reason, without having yet reached the length necessary for the completion of the reel, using the yarn already produced on the side of the reel, carrying out the reattachment and resuming the winding on the same reel. The reattachment procedure consists, in its essential features, in opening, cleaning and closing the rotor, preparing the tail of the rove, capturing and preparing the end on the side of the reel, restarting the rotor and resuming supplying, re-introducing the prepared end into the rotor, re-extracting the end connected to the newly produced yarn winding it once again onto the collecting unit. The programmed cleaning cycle is equivalent to the reattachment cycle, caused by a controlled breaking of the yarn;
- doffing, after having reached the necessary length for the completion of the reel. The finished reel is discharged and then one proceeds starting the unit as outlined above.

[0007] Such interventions of the patrol trolleys concern both the doffing and the starting (or re-starting) operations of the spinning station and the repair of the yarn breakage due both to natural causes or commanded by the slubcatcher during spinning.

[0008] In general, such interventions are carried out by separating the reel 25 from its driving cylinder 29, stopping its motion and transferring the driving of the reel 25 or of its quill 28 to an auxiliary driving roller placed on board the service trolley. In general, the trolley is equipped with its own control unit that, on the basis of the intervention requirements of the spinning units, moves at the unit to be served and proceeds to make the intervention. The control unit of the trolley controls both the movements and the operation of the members of the trolley that carry out the required operating cycle.

[0009] In the field of devices and intervention procedures of service trolleys in automated open end spinning machines the applicant is the owner, amongst other things, of patents EP 340.863, EP 443.220, EP 473.212, EP 1.524.339, EP 1.524.229, EP 1.524.230, as well as

of the patent application EP 1.712.663 A2.

[0010] One can refer to such prior art references for more details on the structure and operation of the service trolleys.

[0011] The intervention processes carried out by the service trolleys consist of a considerable number of steps that the trolley carries out, moving at the single open-end spinning unit or station and connecting both to its spinning rotor and to its collecting unit above, temporarily disconnecting such members from their centralised controls and driving of the machine and operating on them with their own driving capable of taking the spinning back to normal operating speed, before reactivating the centralised controls and returning the spinning unit to its normal driving. During the service operations of the trolley at the open-end spinning unit, suction services are required through suction mouths arranged on the trolley that are brought closer to the various service members which operate in sequence. For example, in the doffing and starting cycle the following services are provided:

- a mobile mouth for suction and linking of the reserve, which takes, sucks and holds the auxiliary yarn from its reel until the new yarn on the new collection quill is gripped,
- a fixed preparation device, which operates on the reserve yarn, which sucks the yarn by holding it taut for cutting and preparing the tail and evacuates the piece of cut yarn,
- a fixed mouth for evacuating the fibres that are released during preparation,
- a mobile anti-curling mouth, which recovers and releases the loop of yarn during the extraction transient step after reattachment and before delivery back to the spinning unit,
- a mobile mouth for sucking the yarn from the reel if, once the required length has been reached, it is wished to deposit some coils on the tip of the quill.

[0012] Again as an example, in the reattachment cycle substantially the same services are provided by the same members, but carried out on the yarn wound on the reel:

- the mobile mouth for sucking from the reel, which takes, sucks and holds the yarn already produced in order to take it to reattachment. During reattachment, the same mouth keeps the section of yarn comprised between the prepared end and the reel under tension, during the movements for supplying the yarn to the spinning unit for reattachment,
- the yarn preparing device of the reel, which sucks the yarn by holding it taut for cutting and preparing the tail and evacuates the piece of cut yarn,
- the mouth for evacuating the fibres that are released during preparation,
- the mobile anti-curling mouth, which recovers and releases the loop of yarn during the extraction transient step after reattachment and before delivery

back to the spinning unit, already described in EP 1.712.663.

[0013] For example, the suction mouth of the reel can require high flow rates and high depression for capturing the end, but once the end has been captured a low depression value is sufficient in the rest of the cycle. The mouth of the reserve requires high depression and low flow rate until the new yarn is gripped in the quill. The preparing device and the suction of the scraps work at high depression and low flow rate for very few seconds and then at low depression until delivery of the prepared yarn. The anti-curling mouth requires a low flow rate with variable depression.

[0014] In the prior art the suction needs of the service trolley are in general satisfied through a centralised aspirator of the machine that is connected to auxiliary channels arranged on the two fronts of the open-end spinning machine. Such channels are equipped with delivery valves for each spinning unit, which the service trolley connects to each time it arrives, taking the suction service in depression and then closing the connection at its departure. From time to time, the service trolley distributes the suction taken from the common distribution channels of the centralised suction to its members. The centralised system, in any case, has to make a high value of depression available, even if in most of the steps of the service cycles a more modest depression value is actually needed, which is obtained by throttling the suction through throttling valves.

[0015] In the prior art, it is quite common practice to provide the various yarn processing stations with the intake services generated by a fixed and centralised unit connected by a distribution system to the processing stations. Already, the distribution system, with its ducts, fittings and valves with the relative losses, is the source of energy waste. An example of such distribution practice and of its drawbacks can be found in the patent application EP 1.707.524. Such a document refers to the suction service required in a winder to take the yarn of the reel side through a mobile mouth. The winder described consists of a plurality of winding stations connected to a common vacuum supply: the vacuum value used in each winding station is modulated locally by an opening and closing valve controlled by a stepper motor. Of course, the centralised vacuum production unit must be driven in continuous to always readily supply the maximum vacuum value that could be required, even at times when service is not required. Above all else, the depression value that can actually be supplied, when service is required, greatly depends on the number and on the distance of the work stations that require it simultaneously. This practice of generating vacuum is quite wasteful and not very reliable especially for open-end spinning machines that, in the higher productivity versions, are provided with even more than 500 spinning stations on two fronts, by lengths of around 70 metres.

[0016] For open-end spinning machines, such a cen-

tralised technical solution is not devoid of drawbacks, the most evident of which are the following. The distribution of suction by means of the auxiliary channels is complex and energy-consuming, especially for long machines. The centralised suction system can only provide one level of depression to the whole machine and cannot vary it upon request of a single spinning unit. If two or more service trolleys require suction simultaneously, the level of depression during suction inevitably decreases.

[0017] The present invention relates to an independent device for generating suction placed on board the trolley that, during the reattaching, doffing and starting cycles of the spinning, provides for generating the suction required by each spinning unit and that allows the depression value to be modulated during the execution of the required intervention cycles.

[0018] In particular, the present invention permits to improve the efficiency of the interventions of the trolley and to overcome the drawbacks of the centralised suction service.

[0019] In order to better highlight the problems tackled and the technical solutions proposed with the present invention we refer, in the following description, to a trolley wherein the suction device according to the invention is installed, to the service of an open-end spinning machine, as an example but not for limiting purposes.

[0020] The device according to the invention is defined, in its essential components, in the first claim whereas its variants and preferred embodiments are specified and defined in the dependent claims.

[0021] In order to more clearly illustrate features and advantages of the present invention, it is described with reference to a typical embodiment thereof schematically shown in figures 3, 4 and 5 as an example and not for limiting purposes.

[0022] Figures 1 and 2 show the diagram of an open-end spinning station in its most significant components, in a typical embodiment thereof, respectively according to a front view and a side view, which must be served by the service trolley. The left part of figure 2 indicatively shows the bulk of the service trolley C placed in front of the spinning station of a open end spinning machine. Figures 1 and 2 explain the technical problem tackled by the present invention.

[0023] As shown in figure 3, the suction generating device comprises an individual suction unit 40, at least one for each trolley. Such a suction unit consists of a rotary aspirator provided with a rotor 41 driven by an electric motor 42 (indicated with a broken line) controlled for operating with speeds periodically varied according to the needs of the suction mouths to be served. According to a preferred embodiment of the invention such a rotor 41 is a centrifugal rotor driven by a brushless electric motor 42 driven in frequency by the control unit 45 of the service trolley. The trolley receives the electric power supply necessary for the motor, as well as that necessary for the other members of the trolley, from the open-end spinning machine and it does not receive the centralised suction

service.

[0024] Such a technical solution permits to vary the depression value that results to be necessary for capturing the ends of the yarns and keeping them under tension during the intervention cycles of the trolley. Figures 4 are examples of the progression of the suction depressions, of the flow rates and of the powers required to a centrifugal aspirator of a service trolley for open-end spinning machines and referring to atmospheric air. Figure 4A shows, for a centrifugal aspirator like the aspirator 40, the characteristic progression of the suction depression ΔP in Pascal according to the flow rate in mc/h, parametrised on different rotation speed values. Figure 4B shows, for said centrifugal aspirator, the characteristic progression of the power absorbed, again according to the flow rate in mc/h, again parametrised on different rotation speed values.

[0025] As shown in figure 3, the suction side of the rotor 41 comprises an intake manifold 46 whereon a filter 47 is placed, which holds the scraps, i.e. the pieces of yarn and the fibres that are released during the cycles.

[0026] The filter 47 consists of a vertical container, having such volume and shape as to collect filaments and fibres for a work period of the order of magnitude of one hour, wherein an inclined filtering wall 48 having a net from 20 to 25 mesh is inserted, and which ends in the lower part with a discharge hopper.

[0027] With such an arrangement, when the suction flow ceases, most of the coarse material intercepted and held by the filtering wall 48 spontaneously falls downwards into the hopper 49 beneath, releasing the filtering wall. The hopper 49 is periodically discharged by connecting it, in certain positions, to a discharge duct in depression.

[0028] On the suction side of the aspirator 40, for example in the upper part of the filter 47, a relief valve 43 is mounted that is only opened when the centrifugal aspirator 40 is used for its flow downstream, whereas it is kept closed when the centrifugal aspirator 40 is used for its intake flow from the various mouths of the service trolley.

[0029] In figure 3, on the left branch of the manifold 46 the connections with the required intake services are arranged, which in figure 3 are illustrated with a thicker line. For example, with reference to the reattachment cycle, the duct 50 is connected to the mobile mouth 51 for the intake and handling of the reel yarn and it is intercepted by the valve 52. On the duct 50, before the intake mouth 51 from the reel, a sensor 53 is mounted that detects the presence or not of the yarn and is connected to the control unit 45 of the trolley. In turn, the control unit 45 controls both the opening and the closing of the valve 52 to give suction to the intake mouth from the reel, and the rotation speed of the motor 42 by driving it in frequency to give the desired level of the depression and flow rate values. After the valve 52 has been opened, the mouth 51 is activated by the suction device provided by the present invention, initially with a low depression level, predeter-

mined on the basis of the type of yarn being produced.

[0030] The depression value normally required for the mobile mouth is around 2000 Pa.

[0031] If the sensor 53 immediately detects the presence of the yarn, there is no need to increase the depression and it is sufficient for the sucked yarn to be held simply laid out until it is brought back to the spinning unit and in particular to the opening 9 of the rotor 8. At this point, the suction through the mouth of the reel yarn can be interrupted. If, on the other hand, the sensor 53 does not immediately detect the presence of the yarn, the depression is gradually increased, by increasing the speed of the motor 42, until there is a signal of the presence of the yarn. The increase in speed is permitted up to a predetermined maximum value, in general corresponding to generating a depression of around 4000 Pa, beyond which it is pointless to go because the yarn is impossible to be captured being it tangled or caught. In this case, the operator needs to intervene.

[0032] The yarn captured by the reel is then supplied to the preparing device.

[0033] As shown in figure 3, on the left branch of the manifold 46, the duct 60 is connected to the yarn preparing device 61 and is intercepted by the valve 62. A parallel duct 64, intercepted by the valve 65, is connected to the suction mouth 66 of the scraps of the preparation of the yarn. During the preparation of the end of the yarn, the control unit 45 controls both the opening and the closing of the two valves 62 and 65 to give suction to the preparing device 61 and to the suction mouth of the scraps, and the rotation speed of the motor 42 driving it in frequency to give the desired level of the depression values.

[0034] The depression value normally required for the preparation of the yarn and the collection of the scraps is from 4000 to 7000 Pa.

[0035] In the preparation, the aspirator 40 is controlled with predetermined depression that is sufficient to keep the yarn immobile for cutting with scissors and for the defibring of its end with compressed air, with suction of the pieces of yarn and of the fibres that are released.

[0036] After the yarn has been brought back to the spinning unit, the anti-curling mouth 72 already described in greater details in the patent application EP 1.712.663 A2, is activated. Such an anti-curling mouth 72 is placed on a duct 70 connected to the manifold 46, intercepted through the valve 71. On the anti-curling mouth 72 sensors 73 are mounted, which detect both presence or not of the yarn and the length of the loop of yarn inside it, and which are connected to the control unit 45 of the trolley for gradually releasing such a loop. In turn, the control unit 45 controls the opening and closing of the valve 71, and at the same time determines both the rotation speed of the motor 42, driving it in frequency to give a dosed suction to the anti-curling mouth, and the rotation speed of the reel 25 during the step of returning the spinning unit to its normal operation after the reattachment of the yarn.

[0037] The depression value normally required for the

anti-curling mouth 72 is from 8000 to 12000 Pa.

[0038] The operations of the doffing cycle are carried out when the reel has reached the required length, and it is necessary to begin a new reel or when a new processing begins. The initial operations of the doffing cycle are analogous to those of the reattachment cycle but are carried out on an auxiliary yarn that must then be eliminated from the reel that has been started. Such an auxiliary or reserve yarn is introduced into the spinning rotor 8 to "fish" the fibres from the spinning rotor to produce the new yarn. The manipulation of the reserve yarn is carried out by a mobile suction mouth of the reserve, which takes, sucks and holds the auxiliary yarn from its reel until it is connected with the new yarn, the section of the auxiliary yarn is eliminated, and the new yarn is gripped on the new collection quill. Once the auxiliary yarn has been gripped on the new quill it is worked like the normal yarn, apart from eliminating it from the reel.

[0039] For example, with reference to the doffing cycle, the mobile suction mouth 81 of the reserve is connected to the intake manifold 46 by the duct 80, intercepted by the valve 82. On the duct 80, before the suction mouth 81 from the reserve, a sensor 83 is mounted that detects the presence or not of the yarn and is connected to the control unit 45 of the trolley. In turn, the control unit 45 controls both the opening and the closing of the valve 82 to give suction to the suction mouth from the reserve, and the rotation speed of the motor 42 by driving it in frequency to give the desired level of depression and flow rate.

[0040] Once the auxiliary yarn has been captured, it is prepared and introduced into the spinning rotor 8 to fish the new yarn, like in the reattachment cycle. The auxiliary yarn continues to be sucked into its mouth, until the new yarn has reached a sufficient length to make it constrain onto the new quill 28. Once the new yarn is fixed on the reel, the section of auxiliary yarn is cut and sucked away from its mouth. The mobile mouth 81 of the reserve thus requires higher depression values in the initial step of capturing the end and the final step of eliminating it, whereas the intermediate steps only require a little suction to keep the auxiliary yarn simply laid out.

[0041] The two depression values normally required in such steps for the mouth of the reserve are respectively around 5000 and 8000 Pa.

[0042] Once the path of the yarn from the spinning unit to the collecting reel is established by the new yarn, the spinning starts again with a normal reattachment cycle. Figure 3 illustrates the device according to the invention in the functions of a supplier of suction carried out in its stops at the open-end spinning units.

[0043] In such suction supply functions, the flow rate of the aspirator 40 is discharged from its outlet side by the duct 90 that ends with a diverter 91 of the discharge. In figure 3, the diverter 91 opens the shutter 92 and diverts the flow into the duct 94 open towards the atmosphere.

[0044] When it operates as a suction supply, the flow conveyed by the aspirator 40 goes from the suction side

consisting of the suction mouths 51, 61, 66, 72 and 81 to the outlet side that corresponds to the duct 94 for discharging into the atmosphere.

[0045] The device according to the invention has the characteristic of being able to be configured not only as a suction supply, according to what is outlined with reference to figure 3, to the mouths placed on the service trolley positioned in front of a spinning unit and using the suction side of the aspirator 40, but also as a supply of compressed blowing air for the trolley in translation, and no longer blocked in front of a spinning unit, instead using the outlet side of the aspirator 40, as described herein-after.

[0046] According to a preferred embodiment of the invention, the device according to the invention is indeed also used as a supply of blowing air during its translation along the fronts of the open-end machine on which the spinning units are aligned, according to the diagram shown in figure 5.

[0047] Such blowing air is generally injected into the points of the spinning units in which there is the greatest need for cleaning from the impurities developed in the spinning, like dust and fluff of the hair of the yarn. To this purpose blowing mouths are placed on one or both sides of the service trolley arranged, from the bottom upwards with reference to figure 1, at the level corresponding to serving, for example:

- the initial band guide,
- the supply roller 5,
- the funnel-shaped conveyor 6,
- the inlet area of the transportation air of the fibres from the card 7 to the rotor 8,
- the slubcatcher 14,
- the sensor 15 detecting the presence of the yarn,
- the compensator 16 and the yarn guide 21, as well as other points sensitive to the depositing of impurities like the positioning bumpers of the trolley, the sliding rails of the trolley, the surface of the reel and so on.

[0048] The blowing pressure value normally required for the blowing mouths is of the order of 140-200 Pa, with flow rates of around 300 mc/h.

[0049] The blowing service is generally carried out during the translation of the trolley and is interrupted during the service stops of the trolley.

[0050] The configuration of the device according to the invention in the blowing service is shown in figure 5, in which the part involved in the blowing service is illustrated with a thicker line.

[0051] As already stated, the relief valve 43 placed in the upper part of the filter 47 is kept open whereas all of the valves 52, 62, 65, 71 and 82, installed on the distribution of the suction, are kept closed. During blowing, the flow rate of the aspirator 40 is discharged from its outlet side by the duct 90 that ends with a diverter 91 that closes the discharge to the atmosphere through the shut-

ter 92 and introduces it into one or more vertical distributors 100 placed at the side of the service trolley.

[0052] Along the vertical extension of the distributors 100 blowing nozzles 101 are mounted, so that the flow conveyed by the aspirator 40 goes from the suction side, which consists of the relief valve 43, to the outlet side which consists of the blowing nozzles 101 arranged to correspond to the points of the spinning units to be served through the blowing.

[0053] The device according to the present invention offers substantial progress with respect to the devices of the prior art that provides for the centralised suction service distributed along the machine.

[0054] A significant reduction in cost of the open-end spinning machine is obtained, thanks to the total elimination of the suction distribution channels and their connections to the trolley through intercepted controls. The distribution system is in general made through constructive systems that do not have an effective seal and that cause significant losses of the depression values in the points served. The distribution channels in any case require an additional base flow rate to obtain a transportation speed that is sufficient for the transportation of the fluff and the filaments in the channels that can even be longer than 40 metres and with substantial load losses.

[0055] With the present invention, the energy consumption is greatly reduced, since the suction device on board the trolley permits to treat just the volume of air required for carrying out the service cycles, which is much less because the depression is generated locally and there are no distributed load losses. The additional base flow rate is no longer necessary since the fluff is held, transported on the trolley and periodically discharged.

[0056] The provided depression value can be modulated according to the requirements of the yarn being processed and to the step of the cycle being carried out. With the centralised suction this is not possible because the depression value must always be at the maximum level, since on the same front two trolleys working and with different requirements can be present. The great length and the great aerodynamic inertia of the channels do not however allow the depression values to be modulated to the actual need of the service to a spinning unit.

[0057] The suction device according to the invention permits to substantially increase the efficiency of the trolley and the yield of the open-end spinning machine because the increased success of the capturing of yarn and the reduction in preparation time of the yarn and driving time of the anti-curling mouth allow a clear reduction in the time of each service cycle.

Claims

1. A device for generating and providing the suction depression required for the execution of the intervention cycles carried out by a service trolley at the spinning units of an open-end spinning machine, and

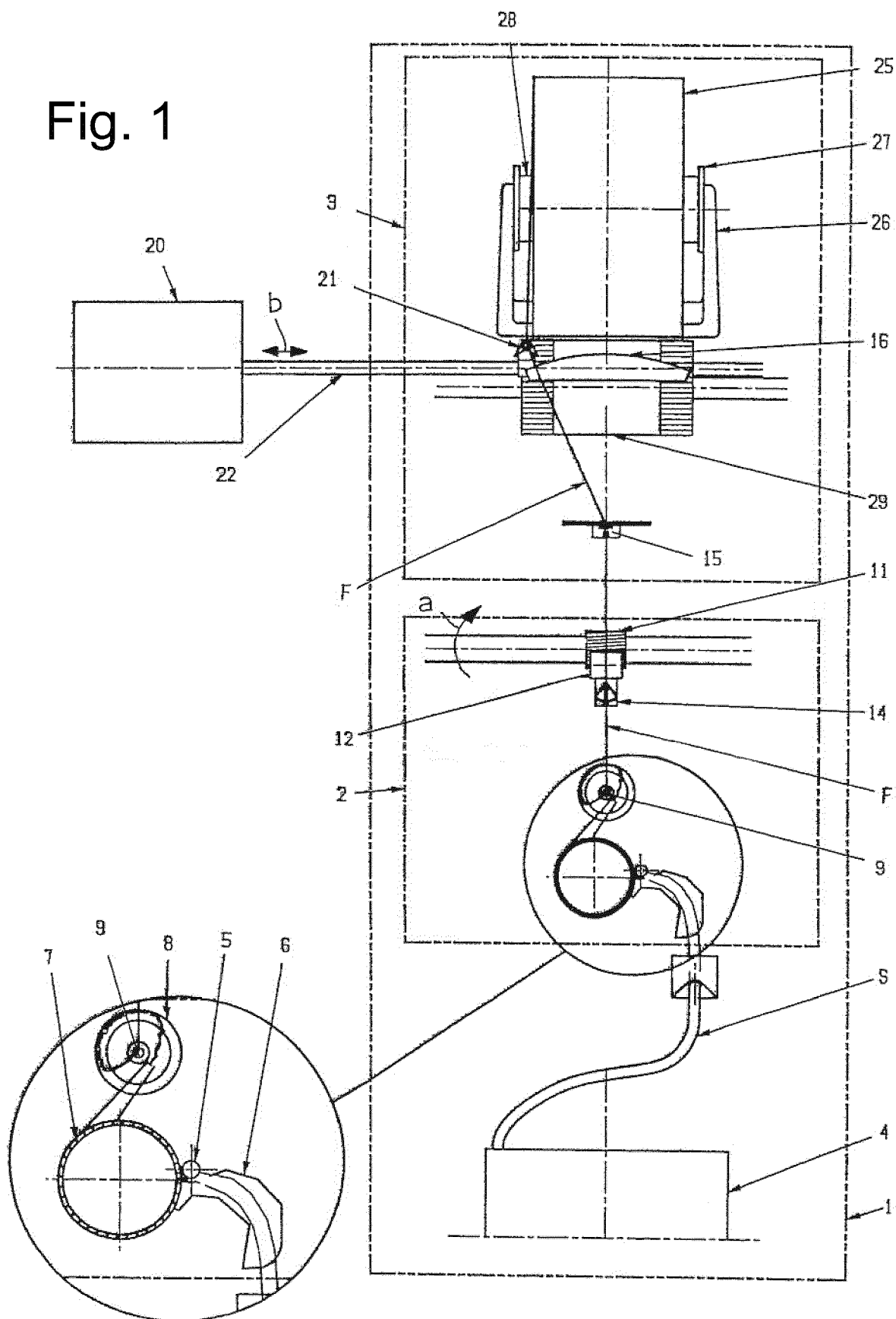
in particular of the reattaching, doffing and starting cycles of the spinning, **characterized in that** it consists of an independent device (40) generating a suction, placed on board of the service trolley (C), which generates the suction required by each spinning unit and which modulates the depression value during the execution of the intervention cycles.

2. The device for generating and providing the suction depression according to claim 1, **characterized in that** the suction generating device comprises an individual suction unit (40) consisting in a rotary aspirator with a rotor (41) driven by an electric motor (42) controlled for operating with speeds periodically varied according to the needs of the suction mouths to be served for the intervention cycles.
3. The device for generating and providing the suction depression according to claim 2, **characterized in that** the rotor (41) is a centrifugal rotor driven by an electric "brushless" motor (42) driven in frequency by the control unit (45) of the service trolley.
4. The device for generating and providing the suction depression according to claim 2, **characterized in that** the suction side of the rotor (41) comprises an intake manifold (46) on which a filter (47) is placed, which retains the scraps released during the cycles.
5. The device for generating and providing the suction depression according to claim 4, **characterized in that** the filter (47) consists of a vertical container, wherein an inclined filtering wall (48) is inserted, made of a net from 20 to 25 mesh, and which terminates in the lower part with a discharge hopper (49).
6. The device for generating and providing the suction depression according to claim 1, **characterized in that** on the suction side of the aspirator (40) a relief valve (43) is placed, which is only opened when the centrifugal aspirator (40) is used for its supply flow downstream, and closed when the centrifugal aspirator (40) is used for its intake flow from the various mouths of the service trolley.
7. The device for generating and providing the suction depression according to claim 6, **characterized in that** the relief valve (43) is mounted on the upper part of the filter (47).
8. The device for generating and providing the suction depression according to claim 4, **characterized in that** the connections for the required intake services are placed on the manifold (46).
9. The device for generating and providing the suction depression according to claim 8, **characterized in that** the connections to the required intake services

comprise:

- a duct (50) for the service at the mobile mouth (51) for the intake and handling of the reel yarn,
 - a duct (60) connected to the yarn preparing device (61),
 - a duct (64) connected to the mouth (66) for sucking the scraps of the yarn preparation,
 - a duct (70) connected to the anti-curling mouth (72),
 - a duct (80) connected with the mobile mouth (81) for sucking the reserve.
10. The device for generating and providing the suction depression according to claim 9, **characterized in that** one or more connecting ducts (50,60,64,70,80) are intercepted by valves (52,62,65,71,82) and are provided with sensors (53,73,83) for detecting the presence of the yarn, connected to the control unit (45) of the trolley, which controls both the opening and the closing of said valves, and the rotary speed of the motor (42) by driving it in frequency in order to provide the desired level of the depression and flow rate values.
 11. The device for generating and providing the suction depression according to one or more preceding claims, **characterized in that** the outlet side of the aspirator (40) is discharged by a duct (90) terminating with a diverter (91) which, when the device acts as an aspiration supplier, either opens a shutter (92) and diverts the flow into the duct (94) open towards the atmosphere or, when the device acts as a blowing supplier, closes the discharge to the atmosphere through the shutter (92) and introduces it into more blowing distributors (100).

Fig. 1



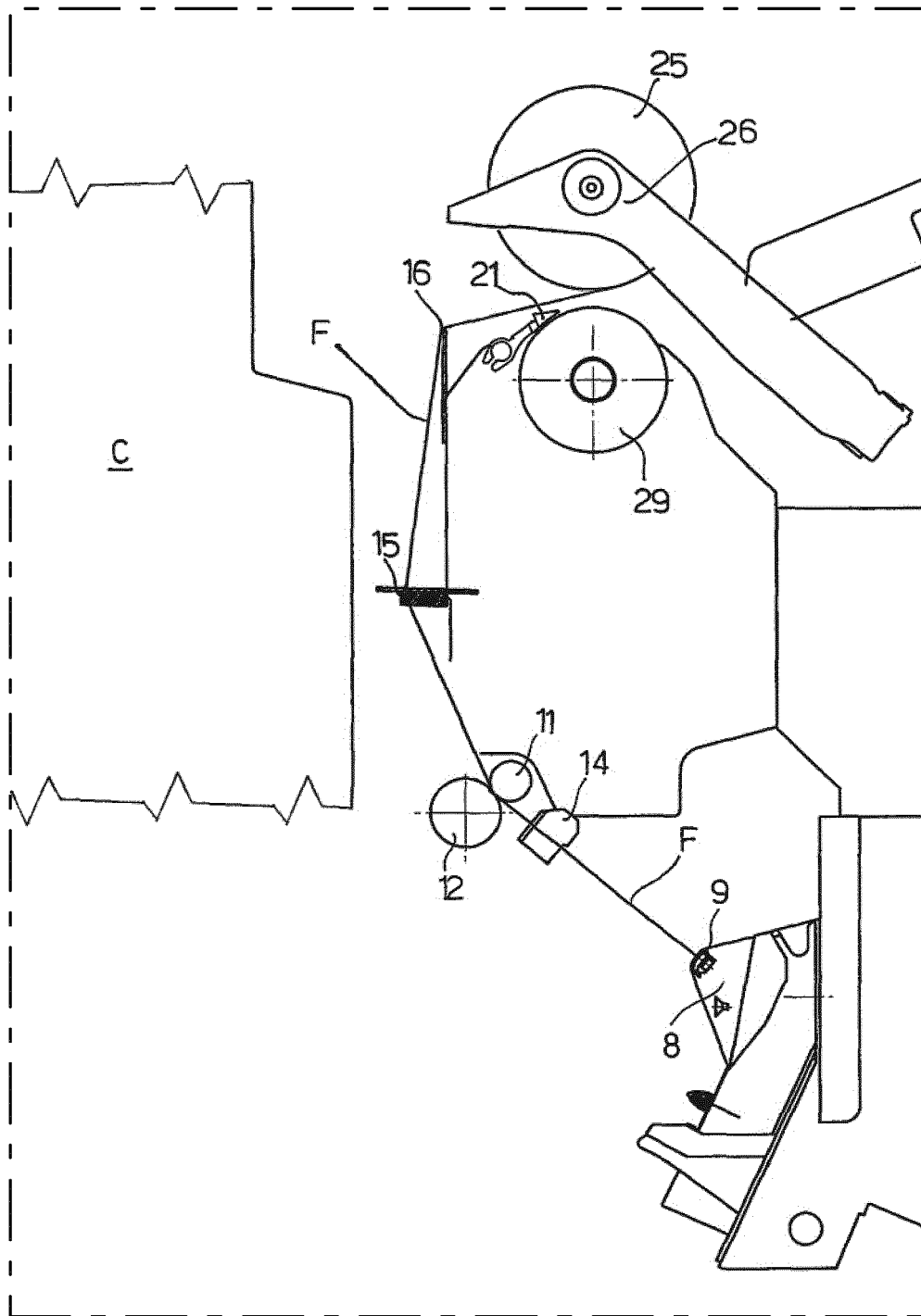


Fig. 2

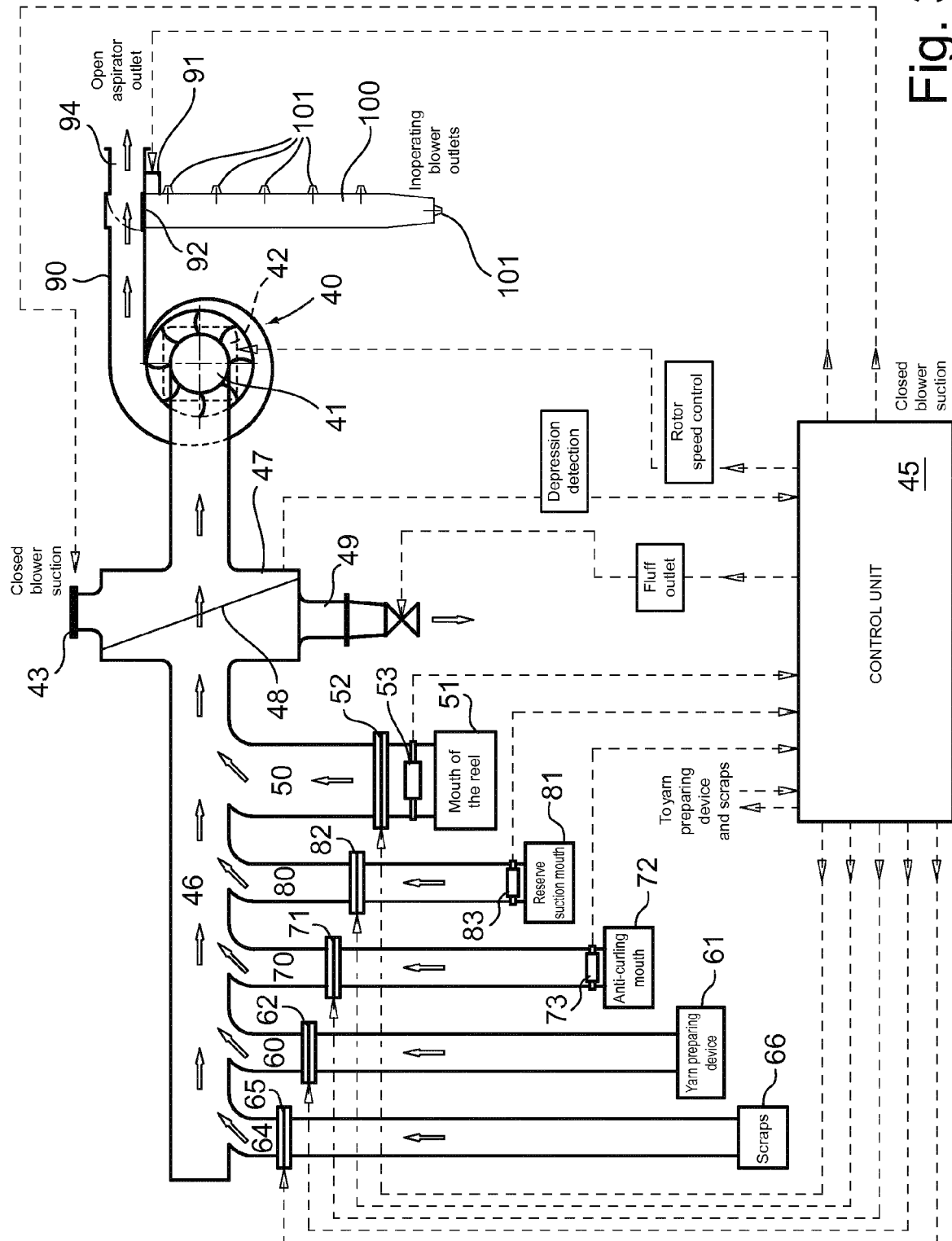


Fig. 3

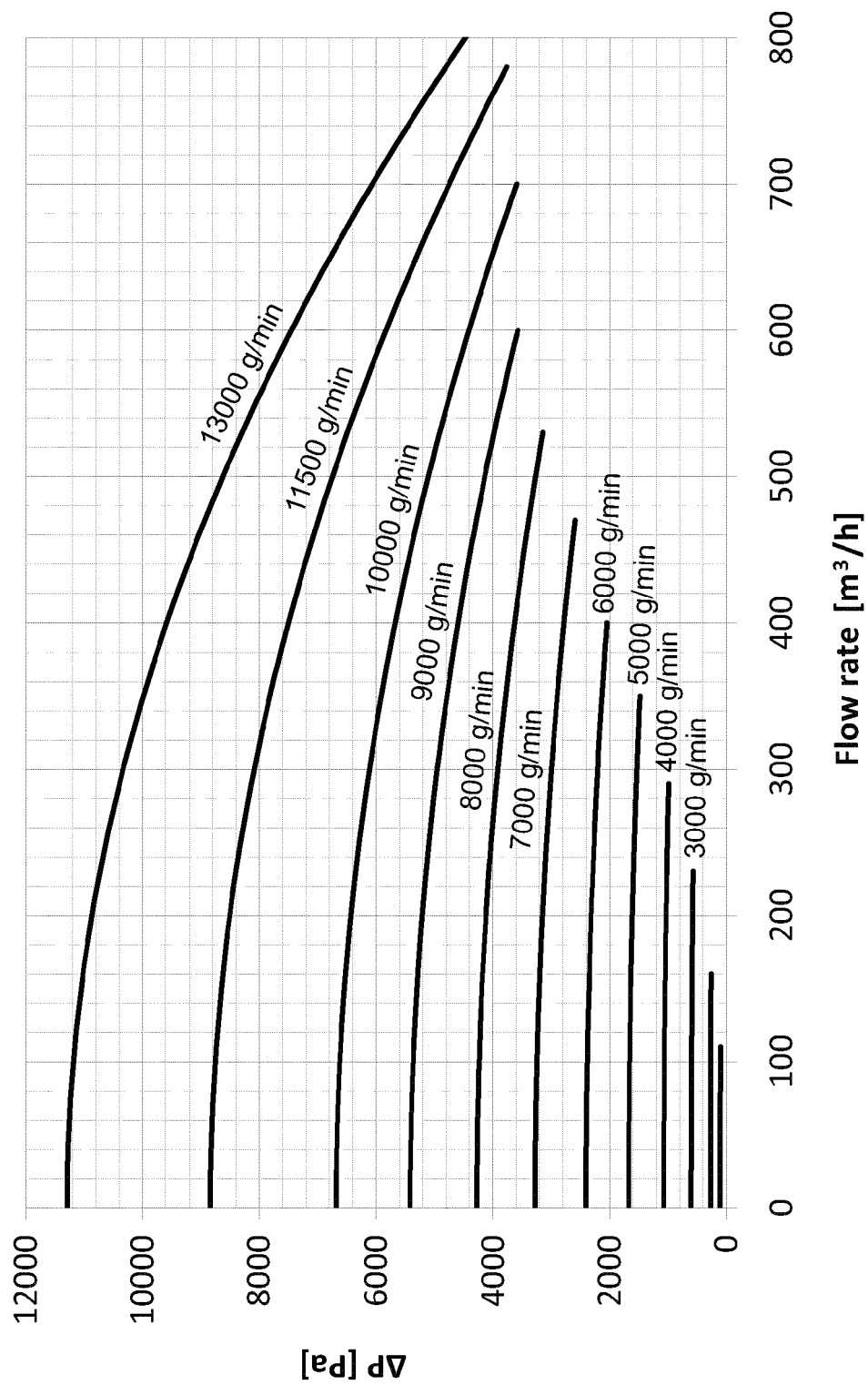


Fig. 4A

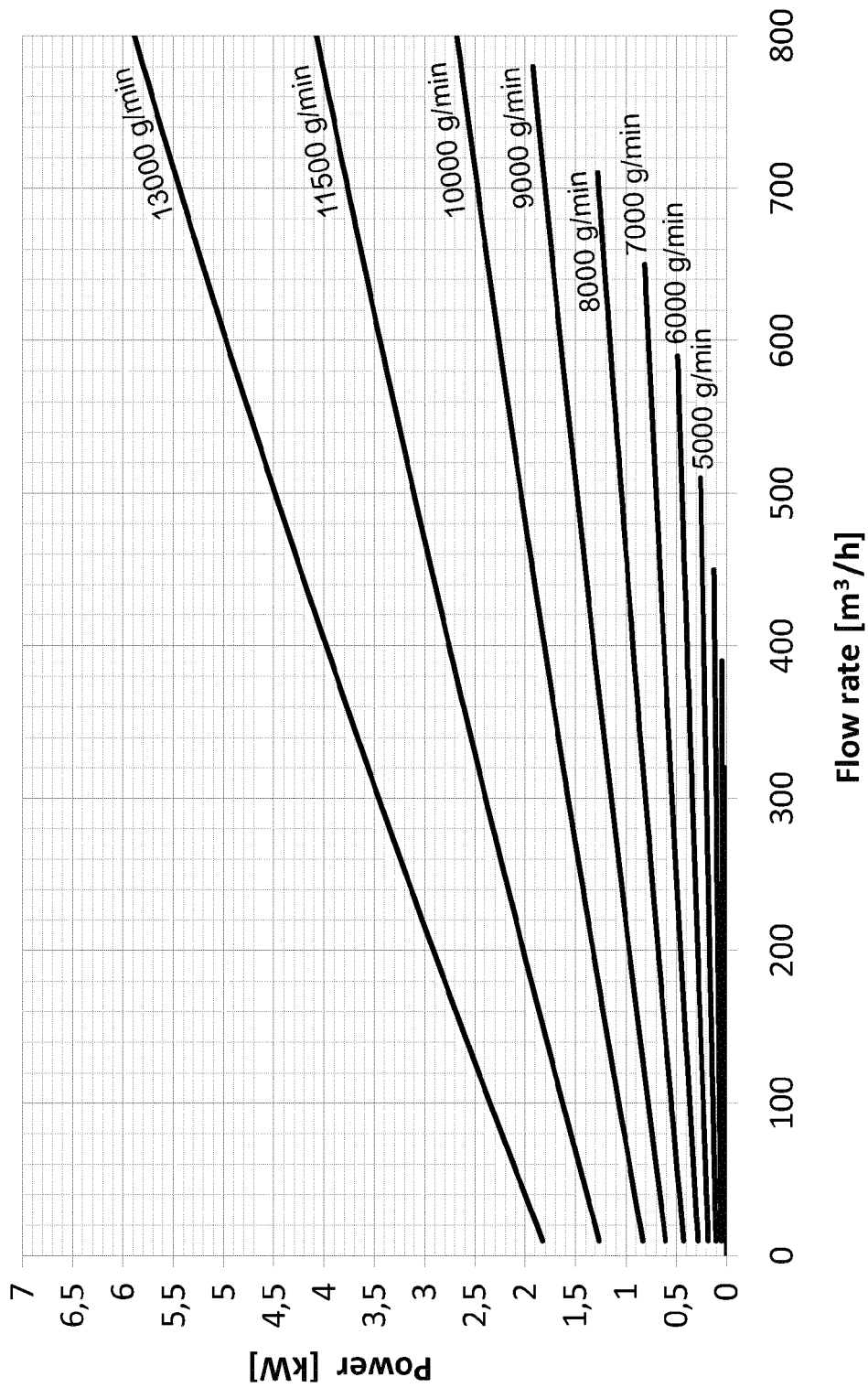


Fig. 4B

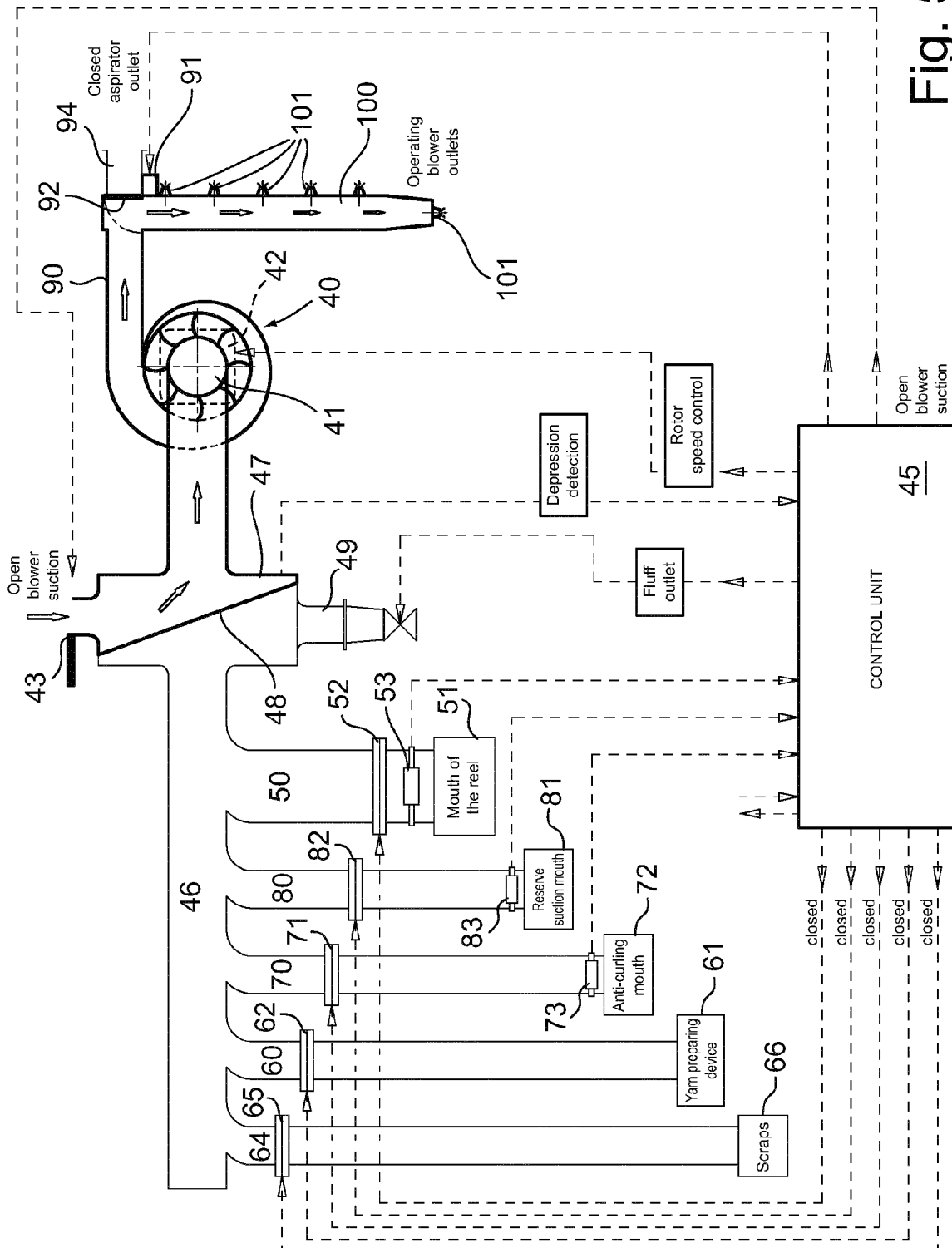


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 12 16 9156

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	EP 1 707 524 A1 (SAURER GMBH & CO KG [DE] OERLIKON TEXTILE GMBH & CO KG [DE]) 4 October 2006 (2006-10-04) * sentence 13, paragraph 11; claim 1; figure 1 * -----	1-11	INV. D01H4/50 B65H67/08
			TECHNICAL FIELDS SEARCHED (IPC)
			D01H B65H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 6 September 2012	Examiner Dupuis, Jean-Luc
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 16 9156

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06-09-2012

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