The present invention relates to an open end spinning apparatus comprising a stationary spinning element, a stationary opening cylinder housing, and a fibre feed channel which leads from the opening cylinder housing to the spinning element and which is sub-divided into a stationary and a moveable part by a parting plane which extends at an angle exceeding 5° relative to the direction of movement of the moveable part of the fibre feed channel, and also comprising a moveable cover for the spinning element provided with a stop which cooperates with the stop on a housing which accommodates the spinning element.

In a known device of this type, the stationary part of the fibre feed channel is arranged in an opening cylinder housing which is screwed to the machine frame (DE-OS 2,130,688). The moveable part of the fibre feed channel is arranged in a rotor lid which can be pivoted about a vertical pivot pin in and out of the operating position. In so doing it slides over the surface of the opening cylinder housing which forms the parting surface of the fibre feed channel. In addition the lid is mounted on the pivot pin in such manner that it satisfactorily covers the rotor housing. In this way a seal cannot be provided between the two longitudinal portions of the fibre feed channel and therefore secondary air penetrates into the fibre feed channel. It is also known to arrange the rotor lid, with the moveable part of the fibre feed channel, on a cover which can be pivoted about a pivot pin arranged below the spinning location and extending in the longitudinal direction of the machine (DE-PS 2,161,619). For the alignment of the rotor lid in relation to the spinning rotor, in addition to the fibre feed channel, a guide path and a sliding surface are provided which continuously guide the rotor lid concentrically with the pivot pin. In this case a greater tolerance must be provided in the region of the parting surface of the two parts of the fibre feed channel so that here secondary air enters the fibre feed channel.

It is also known to seal the parting plane of the fibre feed channel by means of an annular seal (DE-PS 2,721,386). A concentric application of the cover with the moveable part of the fibre feed channel leads to a rapid destruction of this annular seal. Therefore, in this known device, both the cover and the opening cylinder housing with the annular seal are mounted so as to be pivotable about a pivot pin and control means in the form of a pressure lug are provided in such manner that in the case of the closing and opening movement of the cover, the opening cylinder housing is pivoted away to such an extent that the cover can assume its closed position without touching the annular seal and that only in the closed position the opening cylinder housing is pivoted back towards the annular seal. This is an extremely costly construction due to the pivoted suspension of the opening cylinder housing in that all the drives are additionally affected by this pivoting facility, which must be taken into account in their installation. Thus the difficulty consists in that, for the fixing of the pivotable feed channel component with the cover, an over-definition exists inasmuch as an alignment following the rotor both in the central and axial directions necessitates a specific position with respect to the connection channel component of the opening cylinder housing. The fibre feed channel is then sealed by moving back the opening cylinder housing. As the opening cylinder housing, together with the opening cylinder, must itself be fixed in a specific fashion both in relation to the drive of the opening cylinder and in relation to the feed shaft, this backwards movement is possible only in the special case in which the feed shaft serves as pivot for the opening cylinder housing together with the opening cylinder. This requires that the opening cylinder be arranged in a manner which is not acceptable in all cases and additionally leads to a costly mounting of the opening cylinder housing on the feed shaft and of the feed shaft itself in the machine frame.

It is also known to limit the maximum pivoting movement of the cover by stop means. In this case, however, the two housings for the friction cylinders and for the opening cylinder are pivotably mounted and in operation cannot assume a fixed position so that the stop means can not define the relative position of the two parts of the fibre feed channel but merely prevent the cover from being moved too far towards the friction cylinders.

DE-A 33 47 726 has disclosed an OE friction spinning apparatus with a plurality of spinning units which comprise a fibre feed channel which extends from the opening cylinder housing to the spinning element and which is sub-divided into a stationary and a moveable part. The clearly defined positioning and fixing of the moveable feed channel component in relation to the connection elements which is necessary for the correct operation of these devices is not possible with the described device. When the moveable component which contains the fibre feed channel is closed, said component merely rests against the bearing housing. This bearing of the moveable component, which is achieved only by the influence of gravitational force, does not, however, ensure a clearly defined positioning of the fibre feed channel suitable for the spinning operation.

Therefore the aim of the invention is to provide a precise fixing of the moveable feed channel component, with the cover, in relation to the two connection elements, the spinning rotor and friction cylinders on the one hand and the fibre feed channel in the opening cylinder housing on the other hand. In the case of this fixing the sealing of the channel parting plane constitutes a secondary problem.

The aim of the invention is fulfilled in that a latch is provided which secures the cover, positioned in relation to the spinning element by means of the cooperating stop means*, in its operating position and that the fibre feed channel is provided with an elastic parting surface in the parting plane. This ensures, in a simple fashion, that the opening

and closing of the rotor housing and of the friction cylinder housing, when the opening unit is stationary, is facilitated by one single pivoting movement of the moveable fibre feed channel about one single pivot pin. This not only simplifies the construction with regard to the bearing of the opening cylinder housing and the connection of the drive means for the opening cylinder and the feed cylinder, but also permits a simple mounting and adjustment of the individual elements in relation to one another and sealing of the channel parting plane, which has a positive influence on the overall spinning properties of the spinning device.

For a satisfactory spinning function, a positioning of the feed channel mouth in relation to the friction cylinders and in relation to the wedge shaped gap accurate to fractions of millimetres is of importance. The same also applies with regard to the spinning rotor. In accordance with the invention this important fixing is carried out directly in relation to the spinning element (friction cylinders or spinning rotor), any resultant differences at the parting plane of the fibre feed channel being compensated by an elastic parting surface. This ensures both the fixing of that part of the fibre feed channel arranged in the cover and also the sealing of the parting plane of the fibre feed channel. The loaded orientation of the parting surface ensures that the movement of the longitudinal portion, in the time during which its end is in contact with the annular seal, has a movement component at right angles to the parting plane. This leads to a reduction or complete avoidance of sliding movements of the longitudinal portion relative to the elastic parting surface, resulting in an increase in the life expectancy of the elastic parting surface. No pivoting housing, no guide ramp and no control means for the opening and closing process are required here and therefore an apparatus which is substantially simpler and thus also cheaper than in the case of the prior art is obtained.

The elastic parting surface can be designed in different ways, for example as a flexible plate or a flexibly mounted plate; preferably an elastic annular seal is arranged in the parting surface. The elasticity of the parting surface is obtained by means of the annular seal, whereas the surface which bears the annular seal can be rigid. Although it is fundamentally possible to arrange the elastic element either on the stationary or the moveable part of the fibre feed channel or also on both parts of this channel, this element is preferably arranged on the stationary channel component.

For optimal fibre transport to the open end spinning element, sealing is required both between the moveable part of the fibre feed channel and its stationary part and also between the moveable part and the housing which accommodates the open end spinning element (spinning rotor, friction spinning elements etc). Because of the normal relative movements of the open end spinning element and the opening cylinder housing and the orientation of the fibre feed channel thereby defined, it has proved to be advantageous for the angle of inclination between the parting surface and the direction of movement of the moveable longitudinal portion to be greater then 5°, but no greater than 45°.

Fundamentally the moveable part of the fibre feed channel can be moved in any desired fashion in relation to the parting surface and the stationary part of the fibre feed channel. For structural reasons it is particularly advantageous if, in an open end spinning apparatus comprising a spinning rotor, the cover is pivotable about a pivot pin which extends horizontally in a plane in parallel to the collecting channel plane of the spinning rotor. In the case of an open end spinning apparatus comprising two driven friction spinning elements which form a wedge shaped gap, the cover is preferably pivotable about a pivot pin which extends perpendicularly to the axes of the friction spinning elements in parallel to the plane passing through the axes of the two friction spinning elements.

In accordance with an advantageous feature of the invention, in order to completely avoid movement components in parallel to the parting surface it can be provided that the cover is pivotable about a pivot pin which is arranged in the plane of the parting surface of the two parts of the fibre feed channel.

Advantageously the cover is assigned a guide bolt which aligns the moveable part of the fibre feed channel, during its movement into its operating position, in relation to the stationary part in parallel to the pivot pin. In this way an exact positioning of the fibre feed channel in relation to the spinning elements is obtained together with reliable sealing of the fibre feed channel.

An optimal fixing of the cover, with the moveable part of the fibre feed channel, in relation to the spinning element or spinning elements and in relation to the stationary part of the fibre feed channel is achieved, in accordance with a further development of the invention, in that the stop means and/or the guide bolt is/are arranged at the end, facing away from the parting surface, of the surface of the cover which bears against the housing.

In the case of a divided fibre feed channel, the subject of the invention facilitates, in a simple fashion, a satisfactory fixing of the moveable part of the fibre feed channel in the cover in relation to the connection elements - the spinning element (spinning rotor or friction cylinders) and the stationary part of the fibre feed channel. This results in trouble-free fibre transport without the need to provide a pivot mounting of the opening cylinder housing and without the need to provide guide ramps between the opening cylinder housing and the cover, which bears the moveable part of the fibre feed channel, for the spinning assembly. Thus, in comparison to the prior art, a simpler and sturdier apparatus is provided which is thus also less liable to malfunction. A long life expectancy of the flexible or flexibly mounting element is also ensured as the moveable part

of the fibre feed channel, in ascending the elastic parting surface, has a movement component perpendicular to the parting surface.

In the following two exemplary embodiments will be described making reference to drawings wherein:

Fig. 1 is a cross-section through an open end friction spinning apparatus designed in accordance with the invention;

Fig. 2 is a cross-section through a rotor spinning apparatus designed in accordance with the invention;

Fig. 3 is a cross-sectional diagram of the fibre feed channel portion and

Fig. 4 is a cross-sectional diagram of a modification of a detail of the apparatus illustrated in Figure 1.

The open end friction spinning apparatus shown in Figure 1 comprises two rotation-symmetrical, driven friction spinning elements 1, of which at least one is perforated. In the illustrated design, this perforated friction spinning element has a form of a cylinder. At least the perforated friction spinning element 1 is connected to an underpressure source via a suction pipe 10.

The two friction spinning elements 1 - of which only one is visible in Figure 1 - are arranged in a housing 16 and are driven in the same direction by a tangential belt 2.

In advance of the friction spinning elements 1 is arranged a fibre feed apparatus 9 (see Figure 2) and an opening cylinder 3. The opening cylinder 3 is located in a housing 30 and is driven by means of a tangential belt 33 via a wharve 32 positioned on its shaft 31.

From the opening cylinder 3, a fibre feed channel 4 extends into the wedge shaped gap (not shown) between the two friction spinning elements 1.

To render accessible the wedge shaped gap between the friction spinning elements 1 without the need to release the drive means of the driven elements, the fibre feed channel 4 is sub-divided into a stationary part 40, arranged in the housing 30 of the opening cylinder 3, and a moveable part 41.

The moveable part 41 is arranged in a pivotable cover 5 which covers the wedge shaped gap between the friction spinning elements 1. The cover 5 is mounted by means of a pivot pin 51 on a carrier 50 arranged on the housing 30. In relation to the direction of transport of the fibre material through the friction spinning elements 1, the pivot pin 51 is arranged in advance of the said spinning elements and extends perpendicularly to the axes of the friction spinning elements and in parallel to the plane 13 passing through said axes.

The cover 5, together with the moveable part 41 of the fibre feed channel 4, can be brought from the illustrated operating position into a servicing position in which the wedge shaped gap between the friction spinning elements 1 is freely accessible. Here the parting surface 6 between the two parts 40 and 41 of the fibre feed channel 4 is likewise exposed and therefore both the part 40 and the part 41 of the fibre feed channel 4 can be cleaned from here.

In the parting surface 6 between the two parts 40 and 41 of the fibre feed channel 4 is arranged an annular seal 60 which is mounted in a groove 61 of the housing 30 and projects somewhat beyond the groove 61.

In the illustrated exemplary embodiment, the parting surface 6 is arranged such that the pivot pin 51 for the cover 5 and for the moveable part 41 of the fibre feed channel 4 is arranged in the parting surface 6. In this way the direction of movement (double arrow 7) of the end, facing towards the annular seal 60, of the moveable part 41 of the fibre feed channel 4 is aligned at an angle α of 90° relative to the parting surface 6.

Figure 1 shows that the cover 5, together with the moveable part 41 of the fibre feed channel 4, is assigned a stop means 8 which delimits the movement of the cover 5. This stop means comprises a first element 53 on the cover 5 and a second element 82 on the housing 16 to enable the cover 5, and thus the moveable part 41 of the fibre feed channel 4, to be precisely positioned in relation to the friction spinning

element 1. A latch 83 secures the cover 5 in its operating position.

The open end friction spinning apparatus operates in a conventional fashion. A sliver (not shown) is fed by means of the aforementioned fibre feed apparatus 9 (Figure 2) to the opening cylinder 3 which opens the sliver to form individual fibres. The individual fibres pass through the fibre feed channel 4 into the wedge shaped gap between the two friction spinning elements 1. As a result of the rotation of these friction spinning elements 1, the fibres are bound into the end of a thread which, in a manner known per se, is continuously drawn off by means of a pair of removal cylinders (not shown).

If, for servicing purposes, the wedge shaped gap between the friction spinning elements 1 or the parting surface 6 of the fibre feed channel 4 is to be rendered accessible, this is achieved by pivoting the cover 5 about the pivot pin 51. The chosen relative arrangement of pivot pin 51 and parting surface 6 ensures that the cover 5, with the moveable part 41 of the fibre feed channel 4, in its opening movement (see direction of movement indicated by double arrow 7) is moved along a plane which passes through the fibre feed channel 4 and perpendicularly to the parting surface 6. In this way no sliding movements occur between the cover 5 and the annular seal 60 mounted in the housing 30. As a result the annular seal 60 possesses a long life expectancy.

In its closing movement, the cover 5, with its stop element 53, bears against the stationary stop element 82 of the housing 16, whereby the position of the cover 5 in relation to the friction spinning elements 1 arranged in the housing 16 is precisely defined. Any resultant differences at the partingpoint of the fibre feed channel 4 are compensated by the elastic parting surface 6. In the case of a precise positioning of the moveable part 41 of the fibre feed channel 4 in relation to the friction spinning elements 1, a satisfactory seal is obtained between the two parts 40 and 41 of the fibre feed channel 4.

The annular seal 60 is dimensioned in such manner and has a flexibility which is such that it substantially or even completely absorbs tangential movement components, by deformation, in the time between the contacting between the cover 5 and annular seal 60 and the abutment of the cover 5 against the stop 8. This avoids sliding friction between the cover 5 with the moveable part 41 of the fibre feed channel 4 and the annular seal 60, which leads to an extended life expectancy of the annular seal 60. The annular seal 60 is either, as shown, inlet into a groove 61 or, in contrast thereto, is glued, or attached by other means, on a surface which terminates in the parting surface 6.

For the adjustment of the moveable part 41 of the fibre feed channel 4 in parallel to the plane 13, a guide bolt 15, which engages in a recess 52 of the cover 5, is provided on the housing 16. In this case the moveable part 41 of the fibre feed channel 4 is sealed and fixed in its operating position not only in relation to the stationary part 40 of the fibre feed channel 4 but also in relation to the housing 16.

It is advantageous if, in contrast to the design shown in Figure 1, the angle α between the parting surface 6 and the direction of movement (double arrow 7) of the moveable part 41 of the fibre feed channel 4 is greater than 5°, but no greater than 45°. This ensures that the movement of this moveable part 41 of the fibre feed channel 4 has a movement component perpendicular both to the parting surface 6 and also to the parting plane between the moveable part 41 of the fibre feed channel 4 and the housing 16 for the friction spinning elements 1. Here, in contrast to the illustrated design, the pivot pin for the cover 5 can also extend behind the friction spinning elements 1 relative to the material transport direction.

The stop element and the guide bolt shown in Figure 1 can also be combined with one another as illustrated in Figure 4. In accordance with Figure 4, a bolt 87 with a conical head 88 is introduced into a threaded bore 17 provided in the

housing 16, where the bolt 87 is secured in the respective position by a fixing nut 89.

The head 88 engages in a conical bore 54 of a plate 55. This plate bears a plurality of threaded bolts 56 which project through bores 57 in the cover 5. On the side of the cover 5 facing away from the plate 55, two locking nuts 58 and 59 are screwed onto the threaded bolts 56 and secured in relation to one another by locking. The bores 57 in the cover have a larger diameter than the threaded bolts 56 so that the plate 55 can be adjusted transversely to the axis of the bolt 87.

The bolt 87 can thus be adjusted in the direction of movement of the cover 5, whereas this plate 55 can be adjusted transversely thereto in order to align the fibre feed channel 4 in parallel to the collecting surface (plane 13). This is facilitated by appropriate tolerances of the bearing on the pivot pin 51 and/or the design of the cover 5. Naturally it is also possible to arrange both the adjustable plate 55 and the bolt 87 on the cover 5 or to arrange both elements 55 and 87 on the housing 16, in which case it is also possible to provide a stop element 8, and a guide bolt 15 independent thereof, in place of the bolt 87.

In the case of a possible arrangement of these adjusting and aligning elements (guide bolt 15/recess 52 and stop means 8 / bolt 87) in the vicinity of the parting surface 6, possible tolerances would manifest more intensely at the junction point between the fibre feed channel 8 and the friction spinning elements 1. For this reason, in the illustrated embodiment, the guide bolt 15 and the recess 52 which cooperates therewith, as well as the stop element 8 are arranged at the end, facing away from the parting surface 6, of the surface of the cover 5 which bears against the housing 16. This ensures an optimal adjustment of the cover 5 in relation to the housing 16.

Figure 2 is a cross-section through an open end rotor spinning apparatus comprising a rotor housing 12 which accommodates a spinning rotor 11. The rotor housing 12, with the spinning rotor 11, is covered by a lid 85 which is supported by a cover 80 which can be pivoted about a pivot pin 81. The pivot pin 81 is arranged below the open end spinning apparatus and extends horizontally in a plane in parallel to the collecting channel plane 14 of the spinning rotor 11.

The cover 80 covers not only the rotor housing 12 but also the fibre feed apparatus 9 and the housing 34 with the opening cylinder 30, from which the divided fibre feed channel 4 extends to the spinning rotor 11. The moveable part 41 of the fibre feed channel 4 is arranged in the lid 85 and is entrained during the pivoting movement of the cover 80.

In accordance with Figure 2, a stationary guide bolt or pin 15, which engages in a corresponding recess 84 in the cover 80, is provided on the rotor housing 12. By means of this guide bolt 15 assigned to the cover 80, the moveable longitudinal portion 41 is aligned in its movement into the illustrated operating position relative to the stationary longitudinal portion 40 of the fibre feed channel 4 and also in relation to the rotor housing 12 both vertically and in parallel to the pivot pin 81. A stop means 8 is also provided one element 82 of which is arranged on the rotor housing 12 and the other element 86 of which is arranged on the cover 80 or on the lid 85. The recess 84 can also be arranged in the lid 85 instead of in the cover 80.

The stop means 8 and the guide bolt 15 ensure satisfactory sealing between the two parts 40 and 41 of the fibre feed channel 4 and also fixing in relation to the rotor housing 12.

To enable the lid 85, with the moveable part 41 of the fibre feed channel 4, to be brought into an optimal position both in relation to the rotor housing 12 and in relation to the stationary part 40 of the fibre feed channel 4, the lid 85 is adjustable on the cover 8 in a manner which has not been shown.

In contrast to the design illustrated in Figure 2, an advantageous embodiment of the sealed, divided fibre feed channel 4 consists in that the pivot pin 81 for the cover, which pivot pin extends in parallel to the collecting channel plane 14, is arranged above instead of below the open end spinning apparatus.

As can be seen from Figure 3, the parting surface 6 is arranged at an inclined angle α relative to the direction of movement (double arrow 7) of the moveable part 41 of the fibre feed channel 4 in the region of the parting surface 6. In the closing movement, the lid 85, with the part 41 of the fibre feed channel 4, reaches the annular seal 60 only in the last phase of its movement, whereas in the opening movement it is in contact with the annular seal 60 only in the very first phase of this movement.

By virtue of the described design of the annular seal 60, the angle of inclination (angle α) can even differ substantially from a right angle. It has proved that sliding movements can be avoided if the angle α is greater than 5°. This angle α is selected such that the moveable part 41 of the fibre feed channel 4 executes a movement, the components of which extend perpendicularly, as far as possible, to the two parting surfaces which are to be sealed.

The two exemplary embodiments illustrate that the described, divided fibre feed channel 4 can be used in combination with different open end spinning apparatus. Apart from the described designs, other modifications, for example by exchanging features one with another or by replacing these by equivalents and combinations thereof, are also possible. Thus the annular seal 60 can be arranged as desired, in the part (housing 30 or 34) which accommodates the stationary part 40 of the fibre feed channel 4 or instead in the part (cover 5; 80 or lid 85) which accommodates the moveable part 41 of the fibre feed channel. Furthermore, instead an annular seal 60, an elastic parting surface designed in another form, for example in the form of a flexible or flexibly mounted plate,

can be arranged at one or both of the ends, facing towards one another, of the parts 40 and 41 of the fibre feed channel 4.

Also in the case of a device as shown in Figure 1, the part 41 of the fibre feed channel 4 can be arranged in a part which is adjustable in relation to the cover 5 in order to achieve as precise as possible an adjustment of this moveable part 41 both in relation to the stationary part 40 of the fibre feed channel 4 and in relation to the friction spinning elements 1.

In contrast to the aforegoing, it is also possible for the moveable part 41 of the fibre feed channel 4, in contrast to the illustrated exemplary embodiments, to be pivoted about an axis which extends in parallel to the axis of the friction spinning elements 1 or the part plane between the rotor housing 12 and the lid 85 or in parallel to the axis of the fibre feed channel 4. However, the moveable part 41 of the fibre feed channel 4 can be arranged not on a circular arc but also linearly or along a curve defined by a guide. In all these cases it is possible to define the direction of movement (see double arrow 7) such that for the duration of the contact with the annular seal 60, the moveable part 41 of the fibre feed channel 4 has a movement component which extends perpendicularly to the parting surface 6 passing through the annular seal 60, between the two parts 40 and 41 of the fibre feed channel 4.

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PATENT CLAIMS

1. An open end spinning apparatus comprising a stationary spinning element, a stationary opening cylinder housing, and a fibre feed channel which leads from the opening cylinder housing to the spinning element and which is sub-divided into a stationary and a moveable part by a parting plane which extends at an angle exceeding 5° relative to the direction of movement of the moveable part of the fibre feed channel, also comprising a moveable cover for the spinning element which is provided with a stop means which cooperates with the stop means on a housing which accommodates the spinning element, characterised in that a latch (83) is provided which secures the cover (5, 80), which is positioned relative to the spinning element (1, 11) by the cooperating stop means (86,82)*, in its operating position and that the fibre feed channel (4) has an elastic parting surface (6) in the parting plane.

2. An apparatus as claimed in Claim 1, characterised in that an elastic annular seal (60) is arranged in the parting surface (6).

3. An apparatus as claimed in Claim 1 or 2, characterised in that the elastic element is arranged on the stationary part (40) of the fibre feed channel (4).

4. An apparatus as claimed in one or more of Claims 1 to 3, characterised in that the angle (α) does not exceed 45°.

5. An apparatus as claimed in one or more of Claims 1 to 4 for an open end spinning apparatus comprising a spinning rotor, characterised in that the cover (80) is pivotable about a pivot pin (81) which extends horizontally in a plane parallel to the collecting channel plane of the spinning rotor (11).

6. An apparatus as claimed in one or more of Claims 1 to 4 for an open end spinning apparatus comprising two driven friction spinning elements which form a wedge shaped gap, characterised in that the cover (5) is pivotable about a pivot

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pin (51) which extends perpendicularly to the axes of the friction spinning elements (1) in parallel to the plane (13) passing through the axes of the two friction elements (1).

7. An apparatus as claimed in one or more of Claims 1 to 3, 5 or 6, characterised in that the cover (5) is pivotable about a pivot pin (51) which is arranged in the plane of the parting surface (6) of the two parts (40, 41) of the fibre feed channel (4).

8. An apparatus as claimed in one or more of Claims 5 to 7 characterised in that the cover (5, 80) is assigned a guide bolt (15) which aligns the moveable part (41) of the fibre feed channel (4), in its movement into the operating position, relative to the stationary part (40) in parallel to the pivot pin (51, 81).

9. An apparatus as claimed in one or more of Claims 1 to 8, characterised in that the stop means (8) and/or the guide bolt (15) is/are arranged at the end, facing away from the parting surface (6), of the surface of the cover (5, 80) which bears against the housing (16, 12).