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The invention relates to an open-end rotor-spinning device with a rotor shaft which is mounted in the wedge-shaped gap between supporting discs and to the free end of which is assigned an axial bearing.

It is known to mount the shaft of an open-end spinning rotor radially in the wedge-shaped gap between two pairs of supporting discs arranged at a distance from one another and, for the purpose of securing it axially in position, to press its free end against a step bearing, for example against a disc or a ball, by means of an axial force imparted to the shaft (DE-PS 2.061.462 and DE-PS 2.514.734). The axles of the two pairs of supporting discs are mounted so as to be freely rotatable in a bearing housing which is fixed to a baseplate rigid with the machine. The rotor shaft is driven directly by means of a tangential belt running between the pairs of supporting discs, but it can also be driven indirectly via the supporting discs or a pressure roller arranged between the two pairs of supporting discs (DE-OS 1.901.453).

This mounting makes it possible to operate the spinning device at high speeds of rotation and allows the spinning rotor to be exchanged quickly, since its shaft can, without difficulty, be drawn out of the bearing and introduced into the latter again. However, a disadvantage is that the bearing is expensive, and dismantling and installation of the supporting-disc mounting, for example to exchange supporting discs with a worn contact coating, during operation, is prevented by the drive means. In this case, the machine has to be stopped, as a result of which its production output is reduced.

These disadvantages are also present in another known device, wherein a ball-bearing, in which the free shaft end

of reduced diameter is mounted, is used as an axial bearing for a rotor shaft mounted radially in the wedge-shaped gap between two pairs of supporting discs (DE-OS 2.205.189).

The object of the present invention is to create a simplified mounting for the rotor shaft, which also makes it possible to remove and exchange the supporting discs while the machine is in operation. A further object is to increase the operating rotation speed of the spinning rotor without increasing the running speed of the drive means.

According to the invention, the first-mentioned object is achieved in that the rotor shaft is mounted at two bearing points, of which one bearing point is formed by supporting discs arranged in the vicinity of the spinning rotor and the second bearing point is a bearing which absorbs axial and radial forces and which receives the free end of the rotor shaft.

In an advantageous development of the subject of the invention, the free end of the rotor shaft is of reduced diameter. Appropriately, the bearing at the end of the rotor shaft is a roller bearing which absorbs axial forces in the direction going away from the spinning rotor, but which releases the end of the rotor shaft in the direction of the spinning rotor. In a further embodiment, the bearing at the end of the rotor shaft is a plain bearing. To secure the axial position of the spinning rotor during running, an axial thrust is generated by arranging the axles of the supporting discs so that they are skew. Alternatively, the axial force securing the spinning rotor in an axial position is generated by a magnet acting on the end of the rotor shaft.

Exact axial positioning of the spinning rotor is made possible by the axial adjustability of the bearing receiving the end of the rotor shaft. This is achieved in a simple

way by arranging the bearing at the end of the rotor shaft in an adjustable bearing bush. To maintain the bearing free from vibration, the bearing is mounted resiliently in the bearing bush. Because a centring bore through which the rotor shaft is guided is located in front of the bearing at the end of the rotor shaft, damage to the bearing when the rotor shaft is pushed in and the escape of lubricants from the bearing are prevented.

Sagging of the rotor shaft caused by the drive means is avoided, even when the shaft diameter is relatively small, by arranging the drive means in the vicinity of the supporting discs. The rotor shaft is preferably driven directly by means of a tangential belt. However, the rotor shaft can also be driven by a friction roller, in which case, for example, a tangential belt or an electric motor serves as a drive means for the friction roller. To stop the rotor shaft quickly, a braking device is arranged between the drive means and the bearing at the end of the rotor shaft. Only a slight load on the bearing is ensured in that the braking device contains two pivoting arms arranged on both sides of the rotor shaft and provided with brake jaws.

The problem of increasing the operating rotation speed of the spinning rotor without increasing the running speed of the drive means is solved in that the diameter of the rotor shaft in the region of the drive means is reduced.

Exemplary embodiments of the invention are described in more detail below with reference to the drawings, in which:

Figure 1 shows, in a side view and partially in section, a first embodiment of the rotor mounting designed according to the invention, with a pair of supporting discs and a roller bearing receiving the shaft end;

Figure 2 shows the plan view of the device according to Figure 1;

Figure 3 shows, in a side view and partially in section, a modification of the device according to Figure 1 with a plain bearing at the end of the rotor shaft;

Figure 4 shows a rotor mounting with a magnet acting on the end of the rotor shaft;

Figure 5 shows, in a side view, a drive of the rotor shaft mounted according to the invention, by means of a friction roller with a tangential-belt drive;

Figure 6 shows, in a side view, the device according to Figure 5, but with an electric motor driving the friction roller;

Figure 7 shows a front view of braking means for the rotor shaft;

Figure 8 shows a further embodiment with an inclined ball-bearing receiving the end of the rotor shaft.

In the figures, 1 denotes a rotor shaft which carries a spinning rotor 10 at one of its ends. In the vicinity of the spinning rotor 10, the rotor shaft 1 is mounted in the wedge-shaped gap between two supporting discs 2 and 3, the axles 20 and 30 of which are each mounted so as to be freely rotatable in a bearing housing 21 and 31. The bearing housings 21 and 31 are inserted releasably in a bearing block 4 which is rigid with the machine, for example by means of a clamping closure.

Apart from this first bearing point formed by the supporting discs 2 and 3, the only other mounting of the rotor shaft 1 is a second bearing point. In Figures 1 and 2, this second bearing point is a ball-bearing 5, without an inner race, which receives the free end 11 of the rotor shaft 1. To

keep the diameter of the ball-bearing 5 as small as possible and to allow high speeds of rotation of the rotor shaft 1, the diameter of the free end 11 of the rotor shaft 1 is reduced. The ball-bearing 5, which is used for preference but which does not exclude the use of other roller bearings, is capable of absorbing radial and axial forces. The latter are required for fixing the rotor shaft 1 and the spinning rotor 10 axially, and in Figure 1 are generated by arranging the axles 10 and 30 of the supporting discs 2 and 3 so that they are skew.

The ball-bearing 5 is arranged in a bearing bush 50 provided with an external thread and is embedded in this in a ring 51 which is made of a resilient material and which has a vibration-damping effect. The bearing bush 50 is screwed into a support 40 which is fixed to the bearing block 4 or which is integrated into the latter. Thus, the bearing bush 50 together with the ball-bearing 5 is adjustable in the axial direction, so that the spinning rotor 10 can be positioned axially. On the side facing the spinning rotor 10, the bearing bush 50 is closed by means of a removable cover 52, in which there is a centring bore 53 of conical design for the rotor shaft 1. The conical part of the centring bore 53 has adjoining it a cylindrical part 41, the length of which is at least equal to the largest diameter of the rotor shaft 1. This design of the centring bore 53, which is located in front of the ball-bearing 5 and through which the rotor shaft 1 is guided, prevents the ball-bearing 5 from being damaged because of improper handling when the rotor shaft 1 is inserted into the latter. It also serves to prevent lubricant from escaping from the bearing.

The spinning rotor 10 is driven by means of a tangential belt 6 which is pressed on to the shaft by means of a tensioning roller (not shown) over the front third of the unsupported length of the rotor shaft 1 and therefore in the vicinity of the supporting discs 2 and 3.

The roller bearing used is preferably an inclined ball-bearing 5', the inner running surface 11' of which is an integrated component of the rotor shaft 1 (Figure 8). The diameter of the inner running surface 11' is 0.2 to 0.8 times the diameter of the rotor shaft 1. Whereas, in Figure 1, the roller bearing is embedded in the bearing bush 50 in a resilient ring 51, here the bearing bush 50 is mounted resiliently in the support 40 by means of the ring 51.

The free end 11 of the rotor shaft 1, this free end adjoining the inner running surface 11 directly, tapers towards its absolute end 110 and is designed in the form of a paraboloid. The ball running surfaces are lubricated by means of a lubricant reservoir 54 which is arranged in the bearing bush 50 and into which the tapering free end 11 of the rotor shaft 1, but at least its rounded absolute end 110, penetrates and is surrounded closely by the lubricant reservoir 54. The inclined surface of the free end 11 assists the supply of lubricant to the ball running surfaces.

To prevent lubricant from escaping from the bearing bush 50, the passage opening of the bearing bush 50 for the rotor shaft 1 is sealed off by a sealing ring 55. A rim 111 or even several rims which the rotor shaft 1 possesses in the region of the sealing ring 55 ensure that the lubricant is thrown back again into the lubricant reservoir 54.

In Figures 1 to 6, the reference symbols for the parts of the device which have already been described are retained. However, the exemplary embodiment according to Figure 3 differs from those described above in that the bearing at the end of the rotor shaft 1 is a plain bearing 7, for example one made of sintered ceramic, which is mounted resiliently in the bearing bush 50 and absorbs axial and radial forces.

In Figure 4, the axial thrust in the direction towards the bearing receiving the free end of the rotor shaft 1 is generated not by arranging the axles of the supporting discs 2 and 3 so that they are skew, but by a magnet 71 which is inserted into the bearing bush 50. The magnet 71 acts on the free end 11 of the rotor shaft 1 and generates the axial force necessary for securing the rotor shaft 1 axially. The rotor shaft 1 is of reduced diameter over its unsupported length, so that the spinning rotor 10 is driven at a higher rotation speed without an increase in the running speed of the tangential belt. To achieve this, however, it is also sufficient to reduce the shaft diameter in the region of the drive means only. Arranged between the tangential belt 6 and the bearing bush 50 is a braking device for the rotor shaft 1, which is indicated at 9 and which is also described with reference to Figure 7. Of course, the braking device can be used in all the embodiments.

In the embodiment illustrated in Figure 5, the rotor shaft 1 is driven indirectly in the vicinity of the supporting-disc mounting by means of a friction roller 8 which is fixed to a sleeve 81 and which is mounted rotatably, together with this, on an axle 80 arranged on a pivoting lever 82. Here, the tangential belt 6 runs over the sleeve 81.

In Figure 6, the rotor shaft 1 is likewise driven indirectly near the supporting discs by means of the friction roller 8. Here, however, the friction roller 8 rests fixedly in terms of rotation on the rotor axle of an electric motor 84 flanged to the pivoting lever 82 and is made to rotate by means of this electric motor.

The braking device already mentioned with regard to Figure 4 contains, according to Figure 7, two pivoting arms 9 and 90 which are pivotable about stationary axles 91 and 92. Each of the two pivoting arms 9 and 90 carries a brake jaw 93 and 94 at the height of the rotor shaft 1. A tension spring 95

fixed to the pivoting arms 9 and 90 brings the brake jaws 93 and 94 up against the rotor shaft 1. During running, this is prevented by a roller 96 which is arranged on an arm 97 pivotable about an axle 98 and which spreads the pivoting arms 9 and 90 apart from one another. When the roller 96 releases the pivoting arms, the brake jaws 93 and 94 are pressed against the rotor shaft 1 by means of the tension spring 95 and hold it secured radially in the mounting. As a result of this design and arrangement of the braking device, possible because the rotor shaft is mounted according to the invention, the bearings, especially also the plastic running surfaces of the supporting discs, are subjected to only a slight load when the spinning rotor is stopped, so that their service life is increased. However, the known stopping of the spinning rotor by braking from above into the wedge-shaped gap between the supporting rollers is not excluded.

In the mounting according to the invention, the rotor shaft can be drawn out of the mounting, as hitherto. Moreover, it is possible to exchange the supporting discs quickly during operation, since no obstacles prevent them from being removed from the bearing block. Furthermore, the mounting provides sufficient space to arrange and design the braking means for the rotor shaft in such a way that, when the spinning rotor is stopped, the bearings are subjected to as little load as possible.

C L A I M S

1. An open-end rotor-spinning device with a rotor shaft (1) which is mounted and driven in the wedge-shaped gap between supporting discs (2, 3) and to the free end (11) of which is assigned an axial bearing (5, 7), characterised in that the rotor shaft (1) is mounted at two bearing points, of which one bearing point is formed by supporting discs (2, 3) arranged in the vicinity of the spinning rotor (10) and the second bearing point is a bearing (5, 7) which absorbs axial and radial forces and which receives the free end (11) of the rotor shaft (1).
2. An open-end rotor-spinning device according to Claim 1, characterised in that the free end (11) of the rotor shaft (1) is of reduced diameter.
3. An open-end rotor-spinning device according to Claim 1 or 2, characterised in that the bearing at the end of the rotor shaft (1) is a roller bearing (5; 5') which absorbs axial forces in the direction going away from the spinning rotor (10), but which releases the end (11) of the rotor shaft (1) in the direction of the spinning rotor (10).
4. An open-end rotor-spinning device according to Claim 1 or 2, characterised in that the bearing at the end of the rotor shaft (1) is a plain bearing (7).
5. An open-end rotor-spinning device according to any one of Claims 1 to 4, characterised in that an axial thrust is generated by arranging the axles (20, 30) of the supporting discs (2, 3) so that they are skew.



6. An open-end rotor-spinning device according to any one of Claims 1 to 4, characterised in that the axial force securing the spinning rotor (10) in an axial position is generated by a magnet (71) acting on the end (11) of the rotor shaft (1).
7. An open-end rotor-spinning device according to any one of Claims 1 to 6, characterised in that the bearing (5, 7) receiving the end (11) of the rotor shaft (1) is axially adjustable.
8. An open-end rotor-spinning device according to any one of Claims 1 to 7, characterised in that the bearing (5, 7) at the end (11) of the rotor shaft (1) is arranged in an adjustable bearing bush (50).
9. An open-end rotor-spinning device according to Claim 8, characterised in that the bearing (5, 7) is mounted resiliently in the bearing bush (50).
10. An open-end rotor-spinning device according to Claim 8, characterised in that the bearing (5, 7) is mounted resiliently in a support (40).
11. An open-end rotor-spinning device according to any one of Claims 1 to 10, characterised in that a centring bore (53) through which the rotor shaft (1) is guided is located in front of the bearing (5, 7) at the end (11) of the rotor shaft (1).
12. An open-end rotor-spinning device according to Claim 11, characterised in that the centring bore (53) is of conical design.
13. An open-end rotor-spinning device according to Claim 12, characterised in that a cylindrical part (41) adjoins the conical centring bore (53).



14. An open-end rotor-spinning device according to Claim 13, characterised in that the length of the cylindrical part (41) is at least equal to the largest diameter of the rotor shaft (1).
15. An open-end rotor-spinning device according to Claim 3, characterised in that the roller bearing (5') is an inclined ball-bearing.
16. An open-end rotor-spinning device according to Claim 15, characterised in that the inner running surface (11') of the roller bearing (5') is an integrated component of the rotor shaft (1).
17. An open-end rotor-spinning device according to Claim 16, characterised in that the diameter of the inner running surface (11') is 0.2 to 0.8 times the diameter of the rotor shaft (1).
18. An open-end rotor-spinning device according to any one of Claims 15 to 17, characterised in that the free end (11) of the rotor shaft (1), this free end adjoining the inner running surface (11'), tapers.
19. An open-end rotor-spinning device according to Claim 18, characterised in that the tapering end (11) is designed in the form of a paraboloid.
20. An open-end rotor-spinning device according to Claim 16 or 17, characterised in that the absolute end (110) of the rotor shaft (1) is rounded.
21. An open-end rotor-spinning device according to any one of Claims 15 to 20, characterised in that a lubricant reservoir (54) is arranged in the bearing bush (50).



22. An open-end rotor-spinning device according to Claim 21, characterised in that at least the rounded end (110) of the rotor shaft (1) extends into the lubricant reservoir (54).
23. An open-end rotor-spinning device according to Claim 21 or 22, characterised in that the lubricant reservoir (54) closely surrounds the tapering end (11) of the rotor shaft (1).
24. An open-end rotor-spinning device according to any one of Claims 15 to 23, characterised by a sealing ring (55) which closes the bearing bush (50) at the passage opening for the rotor shaft (1).
25. An open-end rotor-spinning device according to Claim 24, characterised in that the rotor shaft (1) has, in the region of the sealing ring (55), at least one rim (111) which throws off lubricant.
26. An open-end rotor-spinning device according to any one of Claims 1 to 25, characterised in that the drive means (6, 8) for the rotor shaft (1) is arranged in the vicinity of the supporting discs (2, 3).
27. An open-end rotor-spinning device according to Claim 26, characterised in that the rotor shaft (1) is driven directly by means of a tangential belt (6).
28. An open-end rotor-spinning machine according to Claim 26, characterised in that the rotor shaft (1) is driven by a friction roller (8).
29. An open-end rotor-spinning device according to any one of Claims 1 to 28, characterised in that a braking device for stopping the spinning rotor (10) is



arranged between the drive means (6, 8) and the bearing (5, 5', 7) at the end (11) of the rotor shaft (1).

30. An open-end rotor-spinning device according to Claim 29, characterised in that the braking device contains two pivoting arms (9, 90) arranged on both sides of the rotor shaft (1) and provided with brake jaws (93, 94).
31. An open-end rotor-spinning device with a rotor shaft mounted in the wedge-shaped gap between supporting discs, especially according to Claim 1, characterised in that the diameter of the rotor shaft (1) in the region of the drive means (6, 8) is reduced.