

BACKGROUND AND SUMMARY OF THE INVENTION

Coupling between thread carrier and upper spindle part of a spinning or twisting spindle

The present invention relates to a coupling for the positive locking rotational taking along of a tube-shaped thread carrier by means of a rotatable upper spindle part of a spinning or twisting spindle, comprising longitudinal ribs which project radially inwards from the inner shell of the thread carrier and serve simultaneously to centre the thread carrier, also comprising longitudinal grooves applied to the upper spindle part and assigned to the longitudinal ribs and having a groove base.

A coupling of this type is prior art in German published patent application 102 48 930. The longitudinal ribs and the longitudinal grooves which engage with each other in the known coupling serve the rotational taking along of the thread carrier as well as its centring, whereby the longitudinal ribs are supported on the groove base. Because of the unavoidable tolerances between the longitudinal ribs arranged on the thread carrier and the unmachined groove base of the known coupling, the true running of the thread carrier is impaired.

It is an object of the present invention to avoid this disadvantage and to create a coupling for the positive locking rotational taking along of a tube-shaped thread carrier by means of a rotatable upper spindle part, in which a reliable centring of the thread carrier is also provided.

This object has been achieved in that the longitudinal grooves are shorter at their end facing away from the spindle tips than the longitudinal ribs, and in that the groove base passes at this end into a groove-free centring surface, on which the longitudinal ribs lie with a matched sliding fit.

In the case of the coupling of the present invention, the functions of the positive locking rotational taking along and the centring of the thread carrier are separated. Because the upper spindle part is machined to an exact, pre-determinable diameter below the longitudinal grooves, the coupling itself is independent of any tolerances between the longitudinal ribs and the groove base. As the longitudinal ribs of the thread carrier, which are injection moulded together with the thread carrier, have to

be deburred in any case, the longitudinal ribs can be machine cut to a cylindrical centring fit at no extra effort. In contrast, where the thread carrier is taken along to rotate in a positive lock, there can be a relatively approximate radial clearance.

The longitudinal grooves advantageously have a stopper-like constriction in the direction towards the spindle tip, which, however, is wider than the width of the longitudinal ribs, whereby it is additionally provided that the longitudinal ribs end before the constriction in the direction towards the spindle tip. The longitudinal grooves are thus significantly wider beyond the constriction than the longitudinal ribs, so that the thread carrier can be turned on the upper spindle part to a slight extent until the longitudinal ribs lie on the walls of the assigned longitudinal grooves. Only thereafter does the positive locking rotational taking along come into effect. The stopper-like constriction prevents the thread carrier from travelling upwards due to the pulling forces of the thread during operation. The thread carrier, however, is not prevented from being removed from the non-moving upper spindle part when the longitudinal ribs no longer lie on the walls of the longitudinal grooves, as the width of the longitudinal grooves in the area of the constriction is still somewhat wider than the width of the longitudinal ribs.

The present invention relates also to an upper spindle part of a spinning or twisting spindle comprising in the area of the spindle tip longitudinal grooves having a groove base, said longitudinal grooves acting as a coupling element for a tube-shaped thread carrier. In relation to the upper spindle part, the present invention is characterized in that the groove base at the end of the longitudinal grooves facing away from the spindle tip passes into a groove-free centring surface for centring the thread carrier. For the purposes of the present invention, the longitudinal grooves have a stopper-like constriction in the direction towards the spindle tip. A spindle attachment, comprising the longitudinal grooves but not comprising the centring surface, is advantageously placed on the upper spindle part, whereby the spindle attachment comprises the spindle tip. The spindle attachment serves thus the positive locking rotational taking along of the thread carrier, while the centring surface assigned to the sliding fit is located outside of the spindle attachment. For the purposes of the present invention, the spindle attachment is injection moulded from plastic and attached onto the metal spindle shaft end.

The present invention relates further to a tube-shaped thread carrier made of plastic, which extends up to an upper front surface slightly conical, comprising longitudinal

ribs for coupling an upper spindle part of a spinning or twisting spindle, said longitudinal ribs projecting inwards from the inner shell of the thread carrier and simultaneously serving the centring of the thread carrier. The present invention is characterized in that the longitudinal ribs are injection moulded with the thread carrier and subsequently machine cut on their inner diameter to form a cylindrical centring fit. It is hereby provided that the longitudinal ribs, initially injection moulded to the upper front surface, are lathed down in an area between the front surface and a coupling position.

BRIEF DESCRIPTION OF THE DRAWINGS

These and further objects, features and advantages of the present invention will become more readily apparent from the following detailed description thereof when taken in conjunction with the accompanying drawings wherein:

Figure 1 is an axial intersection of a thread carrier attached to an upper spindle part and having a coupling according to the present invention.

Figure 2 is the upper spindle part of Figure 1 in the area of the coupling,

Figure 3 is an axial intersection of the thread carrier in the area of the coupling,

Figure 4 is in enlarged dimensions a cross-section in the area of the rotational taking along of the thread carrier along the intersectional surface IV-IV of Figure 1,

Figure 5 is a similar cross-section in the area of the centring of the thread carrier along the intersectional surface V-V of Figure 1.

DETAILED DESCRIPTION OF THE DRAWINGS

A tube-shaped thread carrier 2 is attached to an upper spindle part 1 of a spinning or twisting spindle. The thread carrier 2 is supported axially from below by a supporting surface 3 of the upper spindle part 1. During operation of the spindle, the thread carrier 2 is taken along via a positive locking coupling 4 by the rotating upper spindle part 1 in its rotational direction A. The coupling 4 is located in the upper area of the spindle.

When the thread carrier 2 is being attached to the upper spindle part 1, the procedure is often that the thread carrier 2 is let fall for the last 50 mm. This can be

done either during manual or automatic doffing. Alternatively, the thread carrier 2 can of course be guided in a positive guiding manner onto the upper spindle part 1.

The coupling 4 functions without radially movable parts and is a positive locking connection, which operates with longitudinal grooves 5 on the upper spindle part 1 and longitudinal ribs 6 on the thread carrier 2. In the example shown there are six longitudinal grooves 5 overall, to which six longitudinal ribs 6 are assigned. These latter project from the inner shell 7 of the thread carrier 2 radially inwards, engage during operation in the longitudinal grooves 5 and are taken along in rotational direction A by positive locking.

The width c of the longitudinal grooves 5 in the area of the positive locking rotational taking along of the coupling 4 is larger than the width b of the longitudinal ribs 6, so that the thread carrier 2 can be slightly turned on the upper spindle part 1. The initially tapering longitudinal grooves 5 widen undercut-like from the spindle tip 8 downwards, so that in both rotational directions a stopper 9, constricting the longitudinal groove 5 is formed. A constriction 10 is hereby formed which has at its narrowest point a width e, which is wider than the width b of the longitudinal ribs 6, so that the thread carrier 2 can be attached to the upper spindle part 1 and removed again therefrom without any difficulties. During operation of the spindle, the stoppers 9 serve the axial securing of the thread carrier 2, so that the thread carrier 2 does not travel upwards due to the pulling forces of the thread. This is why the longitudinal ribs 6 end before the stopper-like constriction 10 in the direction towards the spindle tip 8.

In the case of the above mentioned well-known coupling, the longitudinal grooves and the longitudinal ribs serve not only the positive locking rotational taking along, but also the centring of the thread carrier, whereby the longitudinal ribs are supported on the groove base of the longitudinal grooves. It has been shown that the tolerances which occur here are uncontrollable in the case of the known coupling. This caused impairment in the true running of the thread carrier on the upper spindle part.

According to the present invention it is now provided that the longitudinal grooves 5 are shorter at their ends facing away from the spindle tip 8 than the longitudinal ribs 6 and that the groove base 11 passes at this end into a groove free centring surface 12, on which the longitudinal ribs 6 lie with a matched sliding fit 13. Thus the separation of the two functions centring and rotational taking along is effected. The

rotational taking along takes place there where the longitudinal ribs 6 engage with the longitudinal grooves 5, while the groove-free centring surface 12 serves the centring function. Thus an independence of any tolerances between the longitudinal ribs 6 and the groove base 11 is achieved. The upper spindle part 1 can be machined below the longitudinal grooves 5 to an exact predetermined diameter, which corresponds to the inner diameter d of the longitudinal ribs 6. As the longitudinal ribs 6 have to be machined anyway due to the burrs present during manufacture, this represents no great manufacturing effort.

The tube-shaped thread carrier 2 tapers slightly conically up to a upper front surface 14. The longitudinal ribs 6 are injection moulded together with the thread carrier 2 and subsequently machine cut on their inner diameter d to a cylindrical centring seat 15. The longitudinal ribs 6 were originally injection moulded over the entire upper area 17 up to a front surface 14, see dot-dash depiction in Figure 3; they have, however, been lathed down between the front surface 14 and the start of the coupling 4 and machined up to the lower end 16 of the longitudinal ribs 6. This provides a good true running of the thread carrier 2.

A spindle attachment 18 made of plastic comprising the longitudinal grooves 5, but not, however, the centring surface 12, is attached to the spindle shaft end 19 of the upper spindle part 1. This spindle attachment 18 comprises the spindle tip 8. Thus separate components for the separate functions of positive locking rotational taking along and centring are provided.

CLAIMS:

1. A coupling for the positive locking rotational taking along of a tube-shaped thread carrier by means of a rotatable upper spindle part of a spinning or twisting spindle, comprising longitudinal ribs which project radially inwards from the inner shell of the thread carrier and serve simultaneously the centring of the thread carrier, also comprising longitudinal grooves applied to the upper spindle part and assigned to the longitudinal ribs and having a groove base, characterized in that the longitudinal grooves (5) are shorter at their end facing away from the spindle tip (8) than the longitudinal ribs (6) and in that the groove base (11) passes at this end into a groove-free centring surface (12), on which the longitudinal ribs (6) lie with a matched sliding fit (13).
2. A coupling according to claim 1, characterized in that the longitudinal grooves (5) possess a stopper-like constriction (10) towards the spindle tip (8), which constriction (10) is however wider than the width (b) of the longitudinal ribs (6), and characterized in that the longitudinal ribs (6) end before the constriction (10) in the direction towards the spindle tip (8).
3. An upper spindle part of a spinning or twisting spindle comprising in the area of the spindle tip longitudinal grooves having a groove base, said longitudinal grooves acting as a coupling element for a tube-shaped thread carrier, characterized in that the groove base (11), at the end of the longitudinal grooves (5) facing away from the spindle tip (8), passes into a groove-free centring surface (12) for centring the thread carrier (2).
4. An upper spindle part according to claim 3, characterized in that the longitudinal grooves (5) have a stopper-like constriction (10) towards the spindle tip (8).
5. An upper spindle part according to claims 3 or 4, characterized in that a spindle attachment (18), comprising the longitudinal grooves (5) but not comprising the centring surface (12), is placed on a spindle shaft end (19) of the upper spindle part (1).

6. An upper spindle part according to claim 5, characterized in that the spindle attachment (18) comprises the spindle tip (8).
7. A plastic, tube-shaped thread carrier, extending slightly conically up to an upper front surface, comprising longitudinal ribs for the purpose of coupling to an upper spindle part of a spinning or twisting spindle, said longitudinal ribs extending from the inner shell of the thread carrier radially inwards and serving simultaneously the centring of the thread carrier, characterized in that the longitudinal ribs (6) are injection moulded together with the thread carrier (2) and are subsequently machine cut on their inner diameter (d) to form a cylindrical centring fit (15).
8. A thread carrier according to claim 7, characterized in that the longitudinal ribs (6), injection moulded initially up to the upper front surface (14), are lathed down in an area (17) between the front surface (14) and a coupling position.