

Description

The invention relates to a tool handle for a knife blade which is held in it along a longitudinal axis and is especially guided displaceably, and of which the front region of its handle back adjacent to the knife point has a supporting surface for an index finger or for a thumb, and the two side cheeks of which each have on both sides of the supporting surface a gripping recess for the thumb or for a further finger of a working hand, each gripping recess starting from a lower central region forming a wall which rises rearwards in the pulling direction of the knife blade.

A known tool handle of this type according to DE-A 2,810,418 (illustration 1 with Figs. 1-3) in its front region of its handle back adjacent to the knife point, has a supporting surface which runs concavely along the longitudinal axis of the handle and is provided with thick transverse ribs. Adjoining the supporting surface on both sides are crescent-shaped notches which are likewise provided with thick transverse ribs and merely break the edges between the handle side cheeks and the supporting surface on the back. Separately from each crescent-shaped notch, each side cheek has a portion which is hollowed out in the form of a recess and the lowest point of which contains a resting surface principally for receiving the thumb. The applied pressure required for safely gripping the handle is to be transmitted from the thumb to the handle via this resting surface. On both sides of the resting surface and symmetrically to the longitudinal axis

of the handle, rising abutments similar to steps and in the form of thick transverse grooves adjoin on the one side towards the knife point and on the other side towards the rear end of the handle. In this connection, the front abutment is to transmit a pressure acting in the longitudinal direction of the knife and the rear abutment is to transmit a pull acting in the longitudinal direction of the knife. The known tool handle described above is felt to be disadvantageous, because the contact surfaces for the thumb and the index finger are quite narrow overall and are also provided with thick grooves which inhibit the circulation and cause painful pressure points. Nor are the handle recesses at side cheeks of the known tool handle, because of their design described above, sufficiently able to absorb the downwardly directed cutting pressure required for a draw cut. If it is therefore a matter in the known knife of transmitting a greater hand force for a heavy cut, the thumb of the working hand must be pressed disproportionately heavily against the relevant resting surface in the handle recess so as not to slip downwards towards the cutting plane when the downwardly directed pressure is applied. In the known knife, therefore, a heavy cut inevitably leads to the working hand quickly becoming tired and cramped. The narrow handle surfaces already mentioned of the known tool handle are also disadvantageous because the feedback to the brain via the sense of touch is hereby made worse. This also applies to the fine cut which acts with less exertion of force and in which the index finger rests on the narrow handle-back supporting surface provided with thick grooves. Based on this prior art, the object of the invention is to create a tool handle of the type mentioned at the beginning which causes little tiredness, the finger and handle surfaces of which, during working movements executed with variable force, ensure good circulation of the tactile skin surfaces of the working hand and excellent feedback to the brain of the sensoria which are triggered by the contact.

This object is achieved according to the invention

in that the supporting surface rises rearwards at an acute angle in the longitudinal direction, in that each gripping recess has a drop-shaped contour which extends in the longitudinal direction of the tool handle and which points forwards with its tapered region and rearwards with its rounded portion located opposite the tapered region, in that each gripping recess has a form matching the inner surface of the thumb or of the index finger, and in that the wall of the gripping recess rises additionally, in the pushing direction of the knife blade in its region facing away from the supporting surface. As a result of the supporting surface rising rearwards at an acute angle, a wide contact surface is created for the index finger or the thumb of the working hand, which ensures that work is carried out with little tiredness in particular during heavy cuts. In this connection, it is important that the contact surface which is used in a so-called heavy cut and serves both to transmit the cutting pressure and to partially initiate the drawing cutting movement, in its function as a force transmission surface rises only on one side and at an acute angle to the longitudinal axis, i.e. away from the knife point towards the rear.

In the inventive subject matter, the supporting surface and the two handle recesses are, for example, essentially located at the same axial height. As a result of the tool handle recesses adapted to the physiological forms of the inner surfaces of the thumb and the index finger, not only is a wide contact surface guaranteed for the fingers being received, but optimum pressing and pushing surfaces which conform to the respective fingers are created, in particular for the drawing finecut, which pressing and pushing surfaces serve on the one hand to initiate the cutting pressure and on the other hand to initiate the drawing cutting movement. Whereas in the prior art the fingers of the working hand had to "search by themselves" so to speak for their working surfaces, this principle has been exactly reversed in the inventive subject matter, because the novel handle conforms "by itself"

so to speak to the respective finger surfaces. This not only ensures good circulation of the inner surfaces of the hand during fine and heavy cuts, but also ensures excellent feedback to the brain of the sensoria which are triggered by the stroking contact. On account of its optimum ergonomic form, the novel knife as a whole represents a basic requirement for work which causes little tiredness and is therefore largely accident-proof.

According to an advantageous further development of the invention, the walls of the recesses rise from a lower centre region to the outer drop-shaped contours in both the pulling direction and the pressing direction of the knife blade with a form conforming to the inner surface of the thumb or index finger. At the same time, the acute angle between the supporting surface and the longitudinal axis is preferably made between 10° and 20° . An acute angle of about 13° has proved especially advantageous. The length of the supporting surface is about 61 mm and the recess depth is about 4 mm.

The inventive features described above, within the framework of a special combination, preferably interact as a functional unit for achieving the object according to the invention. Features of further subclaims can preferably and optionally be added to this combination.

So that the other contact surfaces of the tool handle can also be adapted to the working hand, an outer surface curved convexly with a large radius and conforming to the inner surface of the working hand can adjoin the end of the supporting surface facing away from the knife point.

In order to prevent the tip of the thumb or the index finger from slipping off the supporting surface towards the knife blade, the end of the supporting surface facing the knife point can be merged continuously into a short safety retaining surface rising towards the knife point.

In order to ensure that work can be carried out with little tiredness at different depths of cut of the

knife blade, a sliding surface which swings in the form of a circular arc towards the handle belly and in the upper region of which is located a slit for the passage of the knife blade can extend from the free end of the safety retaining surface. The lateral contour of the sliding surface can consist of at least one circular arc segment or several circular arc segments. A varying depth of cut can thereby be produced by means of a rolling or tilting motion of the sliding surface without the contact of the finger surfaces against the tool handle having to be changed for this purpose. In making different depths of cut, it has been found in the past that the index finger of the working hand at the same time rubs or slips over the possibly rough material to be cut. In order to counteract this nuisance, the index finger of the working hand was either wrapped in a plaster or insulating tape. So that this nuisance can also be remedied with regard to the object forming the basis of the invention, the end of the sliding surface of the handle belly can have adjoining it a protective surface which swings smoothly towards the knife blade and which, in the working position of the tool handle, forms with the surface to be cut a protective receiving space at least for the index finger of the working hand. This protective surface merges continuously into a rising saddle surface which in turn has adjoining it an inward-swinging receiving surface for at least the little finger of the working hand. Since the small finger of the working hand, compared with the other fingers, can also only grip around the smallest peripheral surface, the tool handle is therefore at its narrowest at its end facing away from the knife blade and is thus anatomically of advantageous configuration.

Further advantageous features can be gathered from Claims 12 to 15. An exemplary embodiment of the invention is shown in the drawings, in which:

Figure 1 shows the plan view of the novel tool handle,

Figure 2 shows the side view of the novel tool handle,

Figure 3 shows the bottom view of Figure 2,

Figure 4 shows a sectional view along line IV/IV in Figure 2,

Figure 5 shows the front view in the direction of arrow V in Figure 2,

Figure 6 shows the side view of the novel tool handle with a thumb acting on the supporting surface for making a heavy cut,

Figure 7 shows the side view of the tool handle with an index finger of the working hand acting on the supporting surface for making a heavy cut,

Figure 8 shows the side view of the tool handle with a thumb on one side acting on the gripping recesses and an acting index finger and middle finger on the other side of the working hand for making a fine cut,

Figure 9 shows the perspective plan view of Figure 8,

Figure 10 shows the side view of the tool handle of Figure 2 in upright format with grid lines,

Figure 11 shows the different partial-section representations through a gripping recess for illustrating its configuration,

Figure 12 shows the plan view of the tool handle of Figure 1 with grid lines,

Figure 13 shows the partial sections along the grid lines of Figure 12 for illustrating the lateral shape of a gripping recess.

The tool handle 10 shown in Figures 1 to 5 consists of two handle shells 11 and 12 which are in contact with each other at a plane running through the longitudinal axis 13 and are fitted together there in a manner not shown and are joined together by a screw connection.

Inside the tool handle 10, the knife blade 15 which can be seen from Figures 6 to 9 is guided in longitudinally displaceable manner through a slit 16 and is locked in the pushed-out position desired in each case. The displacing and locking mechanism (not shown) is not a subject matter of the invention. For example, such a mechanism can be used

according to the US Patent Specification 4,320,576.

As can be seen most clearly from Figure 2, the supporting surface 17 rises at an acute angle α which is between 10° and 20° but is advantageously approximated to about 13° . On both sides of the supporting surface 17, gripping recesses 18 and 19, the approximately drop-shaped contours of which extend in the longitudinal direction of the tool handle 10, are arranged in the handle shells 11 and 12. The tip of the drop-shaped contour is allocated to the passage slit 16 for the knife blade 15. The walls 21 of the recesses 18 and 19, with a form conforming to the inner surface 25 of a thumb or index finger 27 (see Fig. 9) rise from a lower centre region 22, both in the pulling direction of the arrow 23 and in the main pressing direction 24 of the knife blade 15, towards the outer drop-shaped contour 20. The length L of the supporting surface 17 is about 61 mm and the depth T of the recesses 18 and 19 is about 4 mm. The region of the respective wall 21 acted upon mainly during the transmission of the cutting pressure along the pressing directions 24 is designated as 21a.

As can be gathered in particular from Figure 2, an outer surface 30 curved convexely with a large radius and conforming to the inner surface 28 (see Fig. 6) of the working hand 29 adjoins the end of the supporting surface 17 facing away from the knife point.

At the end facing the knife point, the supporting surface 17 merges continuously into a short safety retaining surface 31 rising towards the knife point. A sliding surface 34 which is curved in the form of a circular arc towards a handle belly 33 and in the upper region 35 of which is located a slit 16 for the passage of the knife blade 15 extends from the free end 32 of the safety retaining surface 31. The lateral contour of the sliding surface 34 is formed from at least one circular arc segment, namely from a larger circular arc segment in the upper region and a smaller circular arc segment in the lower region.

The end 36 of the sliding surface 34 of the handle

belly 33 has adjoining it a protective surface 37 which is curved smoothly inwards towards the knife blade 15 and which, in the working position of the tool handle according to Figure 6, forms with the surface 38 to be cut a protective receiving space 39 for the index finger 27 of the working hand 29 (see Fig. 6).

Figure 6 shows that the receiving space 39 is of a certain excess size when the knife blade 15 has not yet engaged into the material 38 to be cut, so that the index finger 27 is always located in a protective position.

The protective surface 37 merges continuously into a rising saddle surface 40 (see Fig. 2) which in turn has adjoining it an inwardly curved receiving surface 41 for at least the little finger 42 (see Fig. 6) of the working hand 29. At the same time, the curved shape of the protective surface 37 is similar to the curved shape of the receiving surface 41. The sum of the lengths of the protective surface 37, saddle surface 40 and the receiving surface 41 amounts to approximately three quarters of the total length of the tool handle 10. On the other hand, the sum of the lengths of the supporting surface 17 and the outer surface 30 amounts virtually to the total length of the handle back 43. The end 44 of the convexly curved outer surface 30 is joined to the end 45 of the receiving surface 41 by means of an end surface 46 extending in the form of a circular arc.

Figures 6 to 9 illustrate the ergonomically favourable configuration of the tool handle 10, which, with its overall shape, conforms to both the individual fingers and the inner surface 28 of the hand, and also the individual functions of the individual surfaces described above. In addition, Figures 6 and 7 show a heavy cut being made and Figures 8 and 9 show a fine cut being made with the novel tool handle 10.

The exact surface and contour shape of the recesses 18 and 19 provided with a drop-shaped contour 20 is shown in Figures 10 to 13 in different views, with lines designated by the consecutive digits from 1 to 9 describing

different sectional planes and the lines designated by different small letters a to j describing the shape of the recess wall in these sectional planes.

It only remains to be mentioned that the main pressure transmission region 21a (see also arrow 24 in Fig. 2) of the wall 21 runs approximately in a circular arc form parallel to the sliding surface 34.

The width of the supporting surface 17 measured approximately at right angles to the longitudinal axis 13 is designated as W. The width W permits full support of the thumb 26 or of the index finger 27.

Patent Claims

1. A tool handle (10) for a knife blade (15) which is held in it along a longitudinal axis (13) and is especially guided displaceably, and of which the front region of its handle back (30) adjacent to the knife point has a supporting surface (17) for an index finger (27) or for a thumb (26), and the two side cheeks of which each have on both sides of the supporting surface (17) a gripping recess (18, 19) for the thumb (26) or for a further finger of a working hand (29), each gripping recess (18, 19), starting from a lower central region (22), forming a wall (21) which rises rearwards in the pulling direction (23) of the knife blade (15), characterized in that the supporting surface (17) rises rearwards at an acute angle (α) to the longitudinal direction (13), in that each gripping recess (18, 19) has a drop-shaped contour (20) which extends in the longitudinal direction (13) of the tool handle (10) and which points forwards with its tapered region and rearwards with its rounded portion located opposite the tapered region, in that each gripping recess (18, 19) has a form matching the inner surface (25) of the thumb (26) or of the index finger (27), and in that the wall (21) of the gripping recess rises additionally, in the pressing direction (24) of the knife blade (15), in its region (21a) facing away from the supporting surface (17).

2. Tool handle according to Claim 1, characterized in that the acute angle (α) between the supporting surface (17) and the longitudinal axis (13) is between 10° and 20° .

3. Tool handle according to Claim 2, characterized in that the acute angle (α) is approximated to 13° .

4. Tool handle according to Claims 1 to 3, characterized in that the length (L) of the supporting surface (17) is approximately 61 mm, and the depth (T) of the recesses (18, 19) is approximately 4 mm.

5. Tool handle according to Claims 1 to 4, characterized in that an outer surface (30) curved convexly with a large radius and conforming to the inner surface (28) of

the working hand (29) adjoins the end of the supporting surface (17) facing away from the knife point.

6. Tool handle according to Claims 1 to 5, characterized in that the end of the supporting surface (17) facing the knife point merges continuously into a short safety retaining surface (31) rising towards the knife point.

7. Tool handle according to Claim 6, characterized in that a sliding surface (34) which is curved in the form of a circular arc towards the handle belly (33) and in the upper region (35) of which is located a slit (16) for the passage of the knife blade (15) extends from the free end (32) of the safety retaining surface (31).

8. Tool handle according to Claim 7, characterized in that the lateral contour of the sliding surface (34) is formed from at least one circular arc segment.

9. Tool handle according to Claims 1 to 8, characterized in that the end (36) of the sliding surface (34) of the handle belly (33) has adjoining it a protective surface (37) which is curved smoothly towards the knife blade (15) and which, in the working position of the tool handle (10), forms with the surface (38) to be cut a protective receiving space (39) at least for the index finger (27) of the working hand (29).

10. Tool handle according to Claim 9, characterized in that the protective surface (37) merges continuously into a rising saddle surface (40) which in turn has adjoining it an inwardly curved receiving surface (41) for at least the little finger (42) of the working hand (29).

11. Tool handle according to Claims 9 and 10, characterized in that the curved shape of the protective surface (37) is similar to the curved shape of the receiving surface (41).

12. Tool handle according to Claims 1 to 11, characterized in that the sum of the lengths of the protective surface (37), saddle surface (40) and the receiving surface (41) amounts to three quarters of the total length of the tool handle (10).

13. Tool handle according to Claims 1 to 12,

- 12 -

characterized in that the sum of the lengths of the supporting surface (17) and the outer surface (30) amounts virtually to the total length of the handle back.

14. Tool handle according to Claims 1 to 13, characterized in that the ends (45, 44) of the receiving surface (41) and of the convexly curved outer surface (30) are joined to one another by means of an end surface (46) extending in the form of a circular arc.

Claims (as printed)

1. A tool handle (10) for a knife blade (15) which is held in it along a longitudinal axis (13) and is especially guided displaceably, and of which the front region of its handle back (30) adjacent to the knife point has a supporting surface (17) for an index finger (27) or for a thumb (26), and the two side cheeks of which each have on both sides of the supporting surface (17) a gripping recess (18, 19) for the thumb (26) or for a further finger of a working hand (29), each gripping recess (18, 19), starting from a lower central region (22), forming a wall (21) which rises rearwards in the pulling direction (23) of the knife blade (15), characterised in that the supporting surface (17) rises rearwards at an acute angle (α) to the longitudinal direction (13), in that each gripping recess (18, 19) has a drop-shaped contour (20) which extends in the longitudinal direction (13) of the tool handle (10) and which points forwards with its tapered region and rearwards with its rounded portion located opposite opposite the tapered region, in that each gripping recess (18, 19) has a form matching the inner surface (25) of the thumb (26) or of the index finger (27), and in that the wall (21) of the gripping recess rises additionally, in the pushing direction (24) of the knife blade (15), in its region (21a) facing away from the supporting surface (17).

2. Tool handle according to Claim 1, characterised in that the acute angle (α) between the supporting surface (17) and the longitudinal axis (13) is between 10° and 20° .

3. Tool handle according to Claim 2, characterised in that the acute angle (α) is approaching 13° .

4. Tool handle according to Claims 1 to 3, characterised in that the length (L) of the supporting surface (17) is approximately 61 mm, and the depth (T) of the recesses (18, 19) is approximately 4 mm.

5. Tool handle according to Claims 1 to 4, characterised in that an outer surface (30) curved convexly with a large radius and moulded to the inner surface (28) of the working hand (29) adjoins the end of the supporting surface (17) facing away from the knife point.

6. Tool handle according to Claims 1 to 5, characterised in that the end of the supporting surface (17) facing the knife point merges continuously into a short safety retaining surface (31) rising towards the knife point.

7. Tool handle according to Claim 6, characterised in that a sliding surface (34) which swings in the form of a circular arc towards the handle belly (33) and in the upper region (35) of which is located a slit (16) for the passage of the knife blade (15) extends from the free end (32) of the safety retaining surface (31).

8. Tool handle according to Claim 7, characterised in that the lateral contour of the sliding surface (34) is formed from at least one circular arc segment.

9. Tool handle according to Claims 1 to 8, characterised in that the end (36) of the sliding surface (34) of the handle belly (33) has adjoining it a protective surface (37) which swings smoothly towards the knife blade (15) and which, in the working position of the tool handle (10), forms with the surface (38) to be cut a protective receiving space (39) at least for the index finger (27) of the working hand (29).

10. Tool handle according to Claim 9, characterised in that the protective surface (37) merges continuously into a rising saddle surface (40) which in turn has adjoining it an inward-swinging receiving surface (41) for at least the little finger (42) of the working hand (29).

11. Tool handle according to Claims 9 and 10, characterised in that the swing of the protective surface (37) is similar to the swing of the receiving surface (41).

12. Tool handle according to Claims 1 to 11, characterised in that the sum of the lengths of the protective surface (37), saddle surface (40) and the receiving surface (41) amounts to three quarters of the total length of the tool handle (10).

13. Tool handle according to Claims 1 to 12, characterised in that the sum of the lengths of the supporting surface (17) and the outer surface (30) amounts virtually to the total length of the handle back.

14. Tool handle according to Claims 1 to 13, characterised in that the ends (45, 44) of the receiving surface (41) and of the convexly curved outer surface (30) are joined to one another by means of an end surface (46) extending in the form of a circular arc.

Revendications (as printed)

1. Poignée d'outil (10) pour une lame de couteau (15) retenue dans celle-ci le long d'un axe longitudinal (13), en particulier guidée de manière à pouvoir coulisser, dont la région antérieure du dos de poignée (30), voisine de la pointe du couteau, présente une surface d'application (17) pour un index (27) ou pour un pouce (26) et dont les deux joues latérales présentent chacune, des deux côtés de la surface d'application (17), un creux de prise (18, 19) pour le pouce (26) ou pour un autre doigt d'une main de travail (29), chaque creux de prise (18, 19) formant, en partant d'une région centrale (22) située plus bas, une paroi (21) qui s'élève vers l'arrière dans le sens de traction (23) de la lame de couteau (15), caractérisée par le fait que la surface d'application (17) s'élève vers l'arrière sous un angle aigu (α) par rapport à la direction longitudinale (13), que chaque creux de prise (18, 19) présente un contour en forme de goutte (20) s'étendant dans la direction longitudinale (13) de la poignée d'outil (10) et qui est tournée vers l'avant par sa région pointue et vers l'arrière par son arrondi opposé à la région pointue, que chaque creux de prise (18, 19) présente une forme adaptée à la surface intérieure (25) du pouce (26) ou de l'index (27) et que la paroi (21) des creux de prise s'élève en outre, dans sa région (21a) opposée à la surface d'application (17), dans le sens de compression (24) de la lame de couteau (15).

2. Poignée d'outil selon la revendication 1, caractérisée par le fait que l'angle aigu (α) entre la surface d'application (17) et l'axe longitudinal (13) est de 10 à 20°.

3. Poignée d'outil selon la revendication 2, caractérisée par le fait que l'angle aigu (α) est d'environ 13°.

4. Poignée d'outil selon les revendications 1 à 3, caractérisée par le fait que la longueur (L) de la surface d'application (17) est d'environ 61 mm et la profondeur (T) des creux (18, 19) d'environ 4 mm.

5. Poignée d'outil selon les revendications 1 à 4, caractérisée par le fait qu'à l'extrémité de la surface d'application (17) qui est opposée à la pointe de couteau se raccorde une surface extérieure (20) courbée de façon convexe avec un grand rayon, épousant la surface intérieure (28) de la main de travail (29).

6. Poignée d'outil selon les revendications 1 à 5, caractérisée par le fait que l'extrémité de la surface d'application (17) opposée à la pointe de couteau rejoint de façon continue une courte surface de soutien de sécurité (31) s'élevant en direction de la pointe de couteau.

7. Poignée d'outil selon la revendication 6, caractérisée par le fait que de l'extrémité libre (32) de la surface de soutien de sécurité (31) part une surface de glissement (34) incurvée en arc de cercle vers le ventre (33) de la poignée et dans la région supérieure (35) de laquelle est disposée une fente (16) pour le passage de la lame de couteau (15).

8. Poignée d'outil selon la revendication 7, caractérisée par le fait que le contour latéral de la surface de glissement (34) est formé d'au moins un segment d'arc de cercle.

9. Poignée d'outil selon les revendications 1 à 8, caractérisée par le fait qu'à l'extrémité (36) de la surface de glissement (34) du ventre (33) de la poignée se raccorde une surface de soutien (37) incurvée de façon souple en direction de la lame de couteau (15) et qui, dans la position de travail de la poignée d'outil (10), forme, avec la surface à couper (38), un espace de logement et de protection (39) au moins pour l'index (27) de la main de travail (29).

10. Poignée d'outil selon la revendication 9, caractérisée par le fait que la surface de protection (37) rejoint de façon continue une surface de selle (40) qui s'élève et à laquelle se raccorde à nouveau une surface de logement (41) incurvée vers l'intérieur, destinée au moins au petit doigt (42) de la main de travail (29).

11. Poignée d'outil selon les revendications 9 à 10, caractérisée par le fait que l'allure incurvée de la surface de protection (37) est analogue à l'allure incurvée de la surface de logement (41).

12. Poignée d'outil selon les revendications 1 à 11, caractérisée par le fait que la somme des longueurs de la surface de protection (37), de la surface de selle (40) et de la surface de logement (41) représente environ les trois quarts de la longueur totale de la poignée d'outil (10).

13. Poignée d'outil selon les revendications 1 à 12, caractérisée par le fait que la somme des longueurs de la surface d'application (17) et de la surface extérieure (30) forme à peu près la longueur totale du dos de la poignée.

14. Poignée d'outil selon les revendications 1 à 13, caractérisée par le fait que les extrémités (45, 44) de la surface de logement (41) et de la surface extérieure à courbure convexe (30) sont reliées entre elles par une surface terminale (46) à allure en arc de cercle.