

Glasses

The present invention relates to glasses or respectively a glasses frame, as well as to a glasses rim and a glasses temple for such a glasses frame.

In the prior art, different types of joint mechanisms for glasses frames are known. The most common type is based on a hinge mechanism in which pins are disposed on the frame or respectively the rim of the lenses which cooperate with a respective hinge which is disposed at the end on the side of the temple which is on the side of the rim by interleaving both parts and by connecting them by means of special screws such that they are pivotable. In most glasses rims, in particular in those which are used with corrective glasses, opening and closing the rims for inserting or for changing the lenses is carried out by means of a so-called closing block. The lenses can also be directly attached to a frame by screwing screws directly into the lens. In glasses without frame, the temples are directly screwed with the lenses by means of a projecting part.

Since the swivel joint is subject to high dynamic loads during lifetime of the glasses, in several solutions, no traditional swivel joint is used for reasons of simplification.

Thus, the US patent application no. 3,155,982 proposes glasses in which the temples directly cooperate with the front part of the rim which contains the lenses. Therefore, the end of the temple which is on the side of the rim is divided into three leaf springs, wherein the central leaf spring abuts on the external edge of the rim part, whereas the two external leaf springs engage with openings disposed near the external edge in the central piece by means of hooks formed at their ends. A disadvantage of the joint mechanism described in US 3,155,982 is the fact that the glasses temples are only attached to the rim very loosely such that the glasses temples can be loosened from the holder very easily, e.g. when the glasses fall on the floor.

Another solution for a glasses joint which as well uses a glasses temple which is provided with three leaf springs is proposed in the European patent no. 0 863 424 B1 of Haffmans and Gottschling. On the rim, respectively one connecting element is provided on the left and on the right, which has an upper and a lower recess which forms a joint axis which is perpendicular to the direction of the temple in its folded-up state. In the folded-up state of the temples, the two external leaf springs of the temples engage with the recesses in the connecting element from the surface of the connecting element which is faced to the face of the wearer of the glasses by means of curved shapes which are provided on their free ends and then abut on the surface of the connecting element which is not faced to the face of the wearer of the glasses, whereas the central leaf spring abuts with its entire length on the opposite surface of the connecting element. The connecting element therein is divided in two pieces; thus, it is easily possible to change the lenses. For stabilization, a closing clip can be used which can be pushed over the two-piece connecting element. This mechanism however has the disadvantage that inserting the temples is difficult since the external leaf springs and the central leaf spring have to be guided on opposite surfaces of the connecting element, wherein this operation has to be effected by moving against the resilience and the curved shapes of the ends are disturbing. Furthermore, in particular if the dimensions of this joint are very small, the risk that the temples are detached from the connecting element even in the case of low mechanical load.

From the French publication FR 2 779 241, a glasses frame having a glasses joint is known which is achieved by providing with pins the end of the temple on the side of the rim, which engage with recesses of a connecting element on the rim, wherein clips of the connecting element overlap the end on the side of the rim when the temple is swivelled. Such a joint however does not assure a safe holding of the temple in the case of excessive mechanical load.

A joint mechanism is described in WO 98/148313 in which two fingers, one mounted on each of the joint-side ends of the glasses temple, are arched away from one another and the curved ends engage rotatably in apertures which are

arranged on a connecting element on the frame side. The curved ends of the fingers are held secure in these apertures in that these fingers exert a certain spring resilience upward and downward. Such a joint mechanism, however, is not associated with flat metal glasses like those for instance in EP 0 863 424 B1.

On this basis, it is the object of the present invention to produce a glasses frame that allows easy installation of the temples and in which it becomes difficult for the glasses temples to come loose independently from mechanical pressure on the glasses, in particular with flat metal glasses.

This object is fulfilled through a glasses frame with the characteristics of Patent Claim 1, a glasses rim according to Claim 17 or 18 and temples according to Claims 19 or 20, as well as through a method for fabrication of such glasses temples with the characteristics of Patent Claim 21.

Advantageous embodiments of the invention can be seen in the subsidiary claims.

Consequently the crux of the invention consists in the fact that the temples of the glasses frame on their ends toward the rim side have at least two fingers in their longitudinal direction that are configured so that they exert a spring effect essentially in the direction of the joint axis of a rotary joint formed by joint elements of the connecting element of the rim and by cooperating joint elements of the glasses temple, and these fingers hold the joint elements of the temples and of the connecting element in a rotatable and secure connection, and that these fingers at the same time are configured as leaf springs whose leaf surface, when the temple is unfolded, runs essentially in the plane of the connecting element belonging to the temple, which connecting element is also nearly leaf-shaped.

In one embodiment of the glasses frame, the fingers are configured so that the spring force exerted by at least one finger is effective in the direction onto the other finger.

Such a construction is used especially in an advantageous design of the glasses frame in which the connecting element is divided throughout its length into an upper bar and a lower bar. The division of the connecting element extends through the rim all the way to the glasses lenses. This makes replacement of the glasses lenses easy because with the temples removed the sides of the rim can easily be arched apart making the lenses accessible.

With the temples mounted, the spring force of the fingers, finally, makes it possible for the bars to be tensed against one another and the glasses lenses are fixed securely in the corresponding section of the rim.

In this design the temples have joint elements on the fingers in the shape of loops, while corresponding pivot pins are provided on the connecting elements. The loops extend substantially perpendicular to the plane or surface of the temple. With the temple mounted, consequently, the pivot pins of the connecting element grip in the loops of the fingers, so that the spring effect of the fingers holds the loops constantly rotatable on the pivot pins.

In another embodiment the pivot pins of the connecting element are so configured that they are rotatably inserted in corresponding concave bearing bushes of the fingers, which bushes are situated opposite to one another, and also in this case the spring resilience of the fingers is secured, so that the bearing bushes are constantly held in a rotatable contact by means of the pivot pin of the connecting element.

In a simple manner the fingers can be drawn apart contrary to their spring action in order to release the temples from the connecting element and to make the rim accessible for replacement of glasses lenses.

In another embodiment of the glasses frame, the fingers are constructed in such manner that the spring force exerted by at least one finger acts in reverse direction, that is in the direction away from the other finger.

In corresponding manner, then, loops are provided on the connecting element into which pivot pins engage which protrude upward and downward from the fingers. The openings of the loops are extending substantially perpendicular to the plane or surface of the connecting elements. The spring resilience prevents any release of the pivot pin from the loops while forming a simple rotary joint. To dismantle the temples it is sufficient simply to press the fingers of the temple together against their spring power.

In addition to the fingers configured as leaf springs, in another embodiment a third, central leaf spring is provided between these two, with all leaf springs running parallel to one another.

The temple can be stamped out from a flat brute together with the leaf springs and the loops in one step in a simple manner. Subsequently, the loops can be bent so that they extend substantially perpendicular to the plane of the temple.

While the outermost of the three leaf springs form the joint elements -- depending on the embodiment the loops or the pivot pins -- the center leaf spring serves to form a reverse spring mechanism, which supports the unfolding or folding of the temple.

For this purpose the center leaf spring supports itself on a section of the connecting element which extends in the direction towards the temple and thus forms an abutment.

According to the invention it is thus ensured that the length of the leaf spring and the length of the abutment are selected in such a way that the spring resilience on the one hand is sufficient to achieve a secure connection of the joint elements of the temple and connecting element and on the other hand the leaf spring resilience of the center leaf spring of the temple is sufficient to hold the temple in an unfolded position. In addition, in the embodiment with two bars of the connecting element, the lengths of the respective components are selected in

such a way that in addition the spring resilience is sufficient to achieve the secure joining of both bars of the connecting element.

If the leaf-shaped abutment in one embodiment of the glasses frame extends from the joint elements of the connecting element in the direction towards the temple, it is thus configured so that the outer leaf springs can run outward over the abutment during folding.

To achieve additional stability, according to the invention it is also possible to provide a sleeve which can be slid up before the temple is moved forward by means of the connecting element belonging to the temple and thus secures the bars together rigid against bending.

All components of the inventive glasses frame can be produced in a preferred embodiment as punching parts or sectional parts made of sheet metal, which are then bent into the desired enclosing shape. It is also possible to employ titanium as a material for the individual elements.

The invention will now be more closely described with reference to the embodiments shown in the adjacent illustrations.

Brief Description of the Drawings

FIG. 1 shows a perspective view of an temple for a glasses frame according to the state of the art.

FIG. 2a shows a perspective view of a non-shaped temple for a glasses frame according to the invention, with loops shaped to fit;

FIG. 2b shows a perspective view of the shaped temple for a glasses frame according to the invention with angled loops.

FIG. 3 shows a perspective explosion view of half of a glasses frame according to the invention.

FIG. 4a shows a schematic view of a temple and a rim of the inventive glasses frame with the temple in unfolded position;

FIG. 4b shows a schematic view of the temple and the rim of the inventive glasses frame with the temple in folded position; and

FIG. 5 shows a connecting element with alternative joint elements.

Detailed Description of the Drawings

In FIG. 1, in exemplary fashion, a temple 1 according to the state of the art is shown such as the one described in EP 0 863 424 B1. The temple 1 is divided into three leaf springs 2, 3, and 4, into two outer leaf springs 2 and 3, and into a center leaf spring 4. The outer leaf springs 2 and 3 have on their ends curvatures 5, which engage in corresponding recesses (not further illustrated here) of a connecting element of a rim. As previously mentioned, here the center leaf spring 4 and the outer leaf springs 2 and 3 lie on opposite sides of the connecting element of the glasses frame, which prevents easy rimming of the temple.

FIGS. 2a and 2b are schematic depictions of a temple 1 for a glasses frame according to the invention.

The temple 1 also has two outer leaf springs 2 and 3 as well as a center leaf spring 4. The outer leaf springs 2 and 3 each have a loop 6 on their ends.

FIG. 2a shows in this connection the shape of the temple 1 as a punched sheet metal part, while in FIG. 2b the loops 6 are arched perpendicular to the longitudinal direction of the temple 1 in order to define the axis of a rotary joint.

The glasses temple illustrated in FIG. 2b, in comparison to the glasses temple shown in FIG. 1, has longer slits to divide the leaf springs in order to make it

easier to pull apart the two outer leaf springs perpendicular to the longitudinal direction of the temple, as more closely explained below.

FIG. 3 shows the temple separated from a rim 7.

The rim 7 on both sides has a connecting element 8, which in comparison to the length of the temple is relatively short, extends in the direction toward the temple 1, and is divided into an upper bar 9 and a lower bar 10.

As can be seen in FIG. 3, the division of the connecting element extends into the front part of the rim 7 as far as the glasses lenses that are not illustrated here. If the temple 1 is removed, the rim 7 can be easily opened laterally in that the bars 9 and 10 are arched away from one another in order to insert or replace the glasses lenses.

On the bars 9 and 10 of the connecting element 8, pivot pins 11 are positioned, overlapping one another while forming a rotation axis, which pins engage in the loops 6 of the outer leaf springs 2 and 3 of the temple 1 in the installed position, as is shown in FIGS. 4a and 4b, and thus form a simple rotary joint.

As can be seen from FIG. 3, the temple 1 in simple manner is secured on the connecting element 8 by having the outer leaf springs 2 and 3 pulled apart and slid over the pivot pin 11. The spring action of the outer leaf springs 2 and 3 toward one another causes the loops 6 to snap securely yet rotatably over the pivot pin 11, in addition causing the upper bar 9 and the lower bar 10 to be secured together rigidly against bending.

The connecting element 8 has a leaf-shaped abutment, which extends from the pivot pin 11 in the direction toward the temple 1.

As can be seen in FIG. 4a, the center leaf spring 4, in unfolded position, comes into contact with the surface of the abutment 12 turned away from the glasses wearer. Upon folding, as shown in FIG. 4b, the center leaf spring 4 is supported

on the abutment 12 in order to form a reverse spring mechanism. The abutment 12 is shaped here in such a way that the outer leaf springs 2 and 3 can run unimpeded over the abutment 12 when the temple 1 is folded.

In FIG. 5, in schematic form, is shown an alternative embodiment of the connecting element 8. It shows sphere-like pivot pins 13, which can be received rotatably in bearing bushes (not more closely illustrated here) of the outer leaf springs.

CLAIMS:

1. Glasses frame having respectively one temple (1) on the left and on the right and having a rim (7) which has respectively one connecting element (8) on the left and on the right, whose end on the side of the temple points in the direction of the temple (1) when folded up, on the connecting element (8), joint elements (11, 13) are disposed, which cooperate with joint elements (6) disposed on the end of the temple on the side of the rim forming a swivel joint, and the temple (1) at least is provided with two fingers (2, 3) on its end on the side of the rim in its longitudinal direction which are designed such that they have a spring resilience substantially in the direction of the joint axis which holds the joint elements (6, 11, 13) of the temple (1) in a pivotable connection in a captivated manner, wherein the fingers (2, 3) of the temple consist of leaf springs whose leaf surface is substantially coplanar to the connecting element (8) of the respective temple (1) when the temple is folded up, and wherein each temple is composed of three leaf springs (2,3,4), the outer leaf springs (2,3) of it comprising said joint elements (6).
2. Glasses frame according to claim 1 in which the resilience consists in the fact that the spring tension which is applied by one finger (2 or 3) acts in direction of the other finger (3 or 2).
3. Glasses frame according to claim 2 in which the connecting element (8) is divided into an upper bar (9) and a lower bar (10) on its entire length.
4. Glasses frame according to claim 3, in which the connecting element (8) is divided through the rim (7) to the lenses, which are received by the rim (7).
5. Glasses frame according to any one of the claims 1 to 4, in which the joint elements of the temple (1) are loops (6) attached to the fingers (2, 3), whose openings are substantially perpendicular to the surface plane of the temple (1), and the joint elements of the connecting elements (8) are pivot pins (11) which engage with the loops (6).

6. Glasses frame according to any one of the claims 1 to 4, in which the joint elements of the temple (1) are bearing shells attached to the fingers and the joint elements of the connecting element (8) are bearing pins (13) which are supported in the bearing shells.

7. Glasses frame according to claim 1 in which the resilience consists in the fact that the spring tension which is applied by one finger (2 or 3) acts in the direction away from the other finger (3 or 2).

8. Glasses frame according to claim 7 in which the joint elements of the connecting element (8) are loops, whose openings are substantially perpendicular to the surface plane of the connecting element (8) and the joint elements of the temple (1) are pivot pins attached to the fingers of the temple (1), which engage with the loops.

9. Glasses frame according to claim 9, in which the connecting element (8) is designed such that it forms an abutment (12) for the central one (4) of the three leaf springs of a respective temple (1) of a connecting element (8) when the temple (1) is folded in.

10. Glasses frame according to any one of the claims 8 or 9 in which the length of the leaf springs (2, 3, 4) of the temple (1) and the length of the abutment (12) are such that the resilience for achieving a connection where the joint elements (6, 11, 13) of the temple (1) and of the connecting element (1) are captivated and furthermore the leaf spring resilience of the central leaf spring (4) of the temple (1) are sufficient for holding the temple (1) in its folded-in state.

11. Glasses frame according to any one of the claims 8 to 10 and one of the claims 3 or 4, in which the length of the leaf springs (2, 3, 4) of the temple (1) and the length of the abutment (12) are such that the resilience is sufficient for holding together the two bars (9, 10) of the connecting element (8) and furthermore, the leaf spring resilience of the central leaf spring (4) of the temple (1) is sufficient for holding the temple (1) in its folded-in state.

12. Glasses frame according to any one of the claims 9 to 11, in which the abutment (12) is designed leaf-shaped.

13. Glasses frame according to any one of the claims 9 to 12, in which the abutment (12) extends from the joint elements (11, 13) of the connecting element (8) in direction of the temple (1) in the folded-up state such that the external leaf springs (2, 3) of the temple (1) are moving over the abutment (1) when the respective temple (1) is folded in.

14. Glasses frame according to any one of the foregoing claims, in which a sleeve is provided which can be pushed over the connecting element (8) of the respective temple (1) before the temple (1) is attached.

15. Glasses frame according to any one of the foregoing claims in which all components are made of sheet metal and/or titanium.