

Description

Spring-action hinges for spectacle frames are already known, which include two hinge elements, one of which is designed for fastening to the front side of the frame and the other for connexion to the temple, and a resilient element for connecting said other hinge element to said temple, said element including a housing extending longitudinally with respect to the temple while being open at one of its two ends, a rod being integral with said other hinge element at one end thereof and having at the other end a portion with a straight section which is larger than that of the rod and which is designed for being slidably mounted in said housing, a compression spring surrounding said rod, one of the ends of said spring pressing upon said portion and a part surrounding said rod, said part being designed for introduction into said housing, to be made integral with the inner wall thereof and to provide a support surface for the other end of said spring.

A hinge of such a type is described in EP 0 306 446 and includes a support surface integral with the housing and provided as a plate which is introduced laterally through a slit in this housing. The rod is threaded and is introduced from the rear of the housing to extend through a hole in the plate and to be threadably engaged with the hinge element. The assembling of this hinge is relatively complicated, since the components are introduced from the two sides of the housing.

The purpose of the invention is to facilitate the assembly operations for this type of hinges and to provide an assembly which remains highly reliable over an extended period of time. To this end, the hinge object of the invention is characterized by the features set forth in the independent claims 1 and 2.

At this point, it is to be mentioned that the European search report mentions as related art the French application N° 2 609 816, which was published after the priority date of the present application and which discloses a part which is press fitted into the housing and retained therein by friction.

The annexed drawing illustrates schematically and by way of example several embodiments of the hinge object of the invention.

Figure 1 is a cross-sectional view of the hinge according to the first embodiment, after assembly.

Figures 2, 3 and 4 are views showing the operations of assembly of this hinge.

Figure 5 is a cross-sectional view of a second embodiment.

Figures 6 to 11 show other versions of the hinge of the invention.

The hinge illustrated in figure 1 connects a temple 1 to the front frame of a pair of spectacles. Temple 1 comprises a part made of synthetic resin 3 in which is placed a metal reinforcement 4.

A female hinge element 5 has a fastening portion 6 embedded in the front part 2. This hinge is provided with two lugs, of which only one 7 is shown in the drawing and between which is engaged a male hinge element 8 mounted slidingly in a cylindrical bore 9 of a housing 10 which is affixed to the metal reinforcement 4, for example by brasing.

The hinge element 8 is made integrally with a rod 11 which has at the end adjacent to this hinge element, two portions 12 and 13 defining two shoulders 14 and 15. The rod 11 extends inside a helical spring 16, the rear end of which bears upon a collar 17 which is integral with said rod and which has an external diameter matching the internal diameter of the cylindrical bore 9, so that it may slide therein. The other end of the spring 16 bears upon against an annular part 18, which is partly engaged in a resilient split ring 19 which is partly engaged in a groove 20 provided in the inner wall of the housing 10. As can be seen, the annular part 18 has a circular rib which forms a bearing surface for the spring 16.

It should further be noted, that the lugs 7 of the hinge element 5 have two straight portions 21 and 22 upon which presses the end of the housing 10 under the effect of the force exerted by the 16 in order to define, in a manner known per se, the opened and closed positions of the temples of the spectacles. The hinge enables the temple to travel resiliently beyond its normal opened position. Actually, the front end of the temple 3 abuts at 50 against the front part 2 and the temple can pivot around this point 50 against the resilient force of the spring 16 which is transmitted by the hinge element 8 to the hinge element 5.

The hinge shown is quite advantageous since it can be preassembled as shown in figure 2. Over the rod 11 and from the rear, is inserted the resilient split ring 19, which is retained at the front by the shoulder 14.

Then, the annular part 18, which can abut against the shoulder 15, is positioned and the spring 16 is slid on the rod and compressed by placing the collar 17 which can simply be press fitted on the rear end of the rod 11 or further retained thereupon by any appropriate means such as soldering, bonding or riveting.

Next, the rod 11 carrying the split resilient ring 19, the annular part 18, the spring 16 and the collar 17 is introduced inside the bore 9, as shown in figure 3. The open end of the bore 9 has a chamfer 23 forming a ramp, so that by pushing the rod 11 further inside the housing 10, the split ring 19 is compressed radially to enter the bore 9.

The rod 11 is then pushed to the bottom of bore 9, as shown in figure 4 and the split ring is at that time located opposite the groove 20. Owing to its resilience, the ring expands radially and more particularly enters the groove 20. When the rod 11 is slightly pulled outwards, the annular part 18 moves and enters the ring 20, i.e. assumes the position shown in figure 1. Then, the hinge element 8 is connected in the usual manner to the hinge element 5, via a threaded axis 24.

In the embodiment of figure 5, the parts corresponding to those of the first embodiment are referenced with the same numerals. The main differences with the embodiment of figure 1 are that the ring 19 and the annular part 18 are replaced by a ring 25 made of a synthetic resin having a sufficient resilience to penetrate inside a rib 26 to which it is hooked via a shoulder 27. Accordingly, the rod 11 is only provided with a single portion 12 of a larger diameter, since portion 13 of the first embodiment has become unnecessary. One can further note that in this second embodiment, the collar 17 is retained on rod 11 by compressing the rear end of said rod to form a flange 28 providing a rivet-type fastening.

Figure 6 illustrates partially another version in which the bore 9 of the hinge is provided directly inside a temple made of a plastic material. This temple has a metal reinforcement 31. The spring retaining part 16 consists of a washer 32 of a truncated shape exhibiting an upper annular edge 33 of a diameter slightly larger than that of bore 9. In this embodiment, the resilient assembly is press fitted inside bore 9 and the washer 32 deforms resiliently the wall of said bore until it reaches the position illustrated in the drawing. As a result of the pressure exerted by the spring 16 on the washer 32, the edge 33 thereof penetrates into the plas-

tic material and holds the assembly in the desired position.

Figure 7 shows another version in which the temple 30 has no metal reinforcement, while the open end of the bore 9 is provided with a plate 34 made of a material which is harder than that of temple 30, to avoid the wear by the portions 21 and 22 of the lugs 7. This plate 34 can be made for example of stainless steel, nickel silver or further Delrin.

Figure 8 shows a part of a hinge made of molded plastic material, forming a housing 35 exhibiting two blind recesses running parallel to each other and opening respectively on the opposite ends of this housing 35. One of the recesses is formed by the bore 9 designed for receiving the resilient portion of the hinge, whereas the other recess is a blind hole 36 designed for receiving the end of a rod 37 forming the reinforcement of a temple 38. The fastening of this reinforcement 37 inside the hole 36 can be achieved for example by bonding. The housing 35 has an end portion 50 designed for pressing against the front part of the frame and defining the normal opened position of the temple.

Figure 9 shows a version in which the spring 16 is retained by a washer 39, the periphery of which is engaged inside a circular groove 40 provided in the bore 9. To enable the mounting of the resilient assembly inside the bore 9, the washer 39 is initially conical, so that its external diameter is smaller than that of part 41 of the bore 9. The assembly can hence be introduced inside this bore and when the periphery of the washer 39 abuts against the annular shoulder provided by one side of the groove 40, a pressure is exerted upon the hinge element 8 which is sufficient for deforming the conical washer and converting it into a flat washer engaged into groove 40.

Figures 10 and 11 show a version in which the bore 9 is provided in one end of a metal temple 42. As can be seen in figure 10, the bore 9 ends at its open spout by an annular rib 43 against which presses a washer 44 made of a hard material provided on the rod 11 and acting as a crimping tool. The rod also carries a washer 45 against which presses the spring 16. When assembling the resilient element, a sufficient pressure is exerted upon the hinge element 8 to bring the rib 43 by deformation into the crimped position 46 to retain the washer 45 inside the bore 9.

Clearly, numerous other versions can be construed. Thus, in one construction derived from that of figure 9, the housing could have a recess of

a rectangular cross-section and the washer 39 could be replaced by a curved plate, designed for straightening up to engage inside notches.



CLAIMS

1. Hinge with spring for spectacle frame, comprising two knuckles (5,8), one (5) of which is intended to be fixed to the front part (2) of the frame, the other knuckle (8) being intended to be connected to a temple (1), and an elastic element for connecting the said other knuckle (8) to the temple (1), said element comprising a housing (10) extending according to a longitudinal direction with respect to the temple (1) and being open at one of its ends, a rod (11) being integral with said other knuckle (8) at one of its ends and the other end having a portion (17) with a straight section which is larger than the one of the rod and being intended to be mounted slidably in the said housing (10), a compression spring (16) surrounding the said rod (11), one of the ends of the said spring pressing against the said portion (17), and a part (19; 25; 32; 39) surrounding the said rod (11), the said part being intended to be introduced into the said housing, to be made integral with the inner wall of the latter and to form a pressure surface for the other end of the said spring, characterized in that the said part (19; 25; 32; 39) has a straight section conformable to the one of the said housing (10) for allowing its introduction into said housing (10) according to the said longitudinal direction, the inner wall (9) of the housing (10) presenting in a plan substantially orthogonal to the said longitudinal direction an offset (20, 26, 40) in the form of a groove



or a shoulder intended to work together with the said part, and in that the said part (19; 25; 32; 39) and/or the housing (10) are made of a deformable material, so that the said part and/or the housing are deformed during or after the introduction of the rod, the spring and the part all together, the deformation being such that the part being rendered integral with the said offset.

2. Hinge with spring for spectacle frame, comprising two knuckles (5,8), one (5) of which is intended to be fixed to the front part (2) of the frame, the other knuckle (8) being intended to be connected to a temple (1), and an elastic element for connecting the said other knuckle (8) to the temple (1), said element comprising a housing (10) extending according to a longitudinal direction with respect to the temple (1) and being open at one of its ends, a rod (11) being integral with said other knuckle (8) at one of its ends and the other end having a portion (17) with a straight section which is larger than the one of the rod and being intended to be mounted slidably in the said housing (10), a compression spring (16) surrounding the said rod (11), one of the ends of the said spring pressing against the said portion (17), and a part (45) surrounding the said rod (11), the said part being intended to be introduced into the said housing, to be made integral with the wall of the latter and to form a pressure surface for the other end of the said spring, characterized in that the said part (45) has a straight section conformable to the one of the said housing for allowing its introduction into said housing (10) according to the



said longitudinal direction, and in that the said housing comprises a portion (43) made in a deformable material at its open end which is intended to be deformed during the introduction of the rod (11), the spring (16) and the part (45) all together, the deformation being such that a shoulder is formed against which the said part (45) rests.

3. Hinge according to claim 2, characterized in that the offset (27) is obtained by machining.

4. Hinge according to claim 2, characterized in that the offset is obtained by deforming the inner wall (9) of the housing.

5. Hinge according to one of claims 1, 3 or 4, characterized in that the inner wall of the housing has a notch (20, 26) in which is engaged a portion of the said part (19, 25) which is elastic.

6. Hinge according to claim 5, characterized in that the inner wall (9) of the housing is circularly cylindrical, the notch being formed by a groove (20) in this inner wall, the elastic part comprising a split elastic ring (19) engaged in said groove (20) and surrounding the rod (11).

7. Hinge according to claim 6, characterized in that an annular part (18) has an annular portion engaged in the elastic ring (19) to lock it in the groove (20) and a cir-



cular rib forming a support surface for the spring (16).

8. Hinge according to claim 7, characterized in that the rod (11) has two circular shoulders (14,15) near its end integral with the knuckle (8), the one (14) closer to the knuckle (8) forming a support for the split ring (19), the other shoulder (15) forms a support for the annular portion prior to introduction of the rod (11) in the housing (10), the latter having an orifice opening on the side of the knuckle, the edge (23) of said orifice being bevelled to form a sort of funnel intended to squeeze radially the split ring (19) when the rod is introduced into the housing.

9. Hinge according to claim 1, characterized in that the rod (11) presents a portion (12) of a larger diameter on the knuckle side, the said part having the form of a ring (25) engaged on the rod (11) to be able to support on this portion (12) of larger diameter, a shoulder (27) intended to engage elastically with a rib (26) being provided between the inner wall (9) of the housing (10) and the periphery of this ring (25), an annular end surface of this ring (25) forming the support surface of the spring (16).

10. Hinge according to claim 5, characterized in that the part (39) engaged in the housing (10) is non-flat in order to be able to be inserted in the latter until it contacts an offset in the inner wall (9) of the housing (10) provided essentially at the height of the groove, the rod



(10) which has a portion of larger diameter enabling pressure to be exerted against the non-flat piece (39) to press it by making it flat, so that its edge penetrates the said groove (40).

11. Hinge according to claim 2, characterized in that the housing is formed by a bore (9), the open end of which ends in an annular rib (43), the rod (11) carrying a part (44) acting as a tool to bend by pressure said rib (43) to distort it in the direction of the axis of the bore (9).

12. Hinge according to one of the preceding claims, characterized in that the housing (35) is formed of a single part having two longitudinal and mutually parallel recesses, (9,36), opening respectively on to opposite ends of the housing, one (9) of these recesses being intended to contain the spring device (16), and the other recess being intended to receive an end of a temple (38) reinforcement (37).

13. Hinge according to claim 1, characterized in that the part forming the housing (35) is of moulded material.

14. Hinge according to claim 1, characterized in that the housing (10) has a surface portion intended to abute against a corresponding portion (22) of the other part of the hinge (2) in order to determine the normal opening position of the arm (3).



15. Hinge according to one of the preceding claims characterized in that the inner wall (9) of the housing (10) is circularly cylindrical, the end of the rod (11) located near the knuckle (8) having a diameter whose dimension corresponds to the inside diameter of the housing (10) in order to be able to slide therein, the other end of the rod being fitted with a collar (17) forming a support surface for the spring (16), said collar (17) having an outside diameter which corresponds to the inside diameter of the housing (10) in order to be able to slide in the latter.