

**Fixing assemblage for fixing binocular loupes with spectacles**

THIS SHEET HAS BEEN
REPLACED

5 The present invention relates to a fixing assembly used for fitting the spectacles with binocular loupes, comprising an attachment frame and two loupes, each provided with at least two lenses of which the ocular lens closer to the eye is smaller than the outer objective lens, whereby the outer
10 surface of a loupe jacket connecting the lenses also diverges at a sector angle which is essentially consistent with that drawn from the pupil to the rim of the ocular lens.

Such binocular loupes to be attached to spectacles are
15 intended to facilitate precision work, such as the work of a dentist or of a precision mechanician. The drawbacks of prior art binocular loupes include a complicated design and an excessive weight as well as a restricted field of vision caused by the loupes.

20 Moreover, e.g. Patent publications US-4,647,165 and US-3,446,548 disclose the placement of various supplemental lenses over a sub-area of the actual lenses by means of mechanical, adjustable arms. These prior art solutions do not
25 afford a reliable attachment for supplemental lenses and the attachment arrangement is not suitable for all types of spectacles. The attachment is often secured by manufacturing specially designed spectacles, leading to a substantial increase in total costs. The most general drawback in prior
30 art attachment units based on mechanical attachment arms is the fact that the attachment assemblies obscure and interfere with the field of vision.

An object of the invention is to provide a fixing assembly
35 for mounting binocular loupes on the user's own spectacles, said assembly being as inconspicuous, easy to use and economically priced as possible. In the attachment of binocular loupes it is important that the fixing assembly and the loupes screen as little as possible of the field of

vision, whereby the view can be readily directed past the loupes at the same target that has just been examined and magnified through the loupes.

- 5 A particular object of the invention is to provide a fixing assembly for binocular loupes, which is suitable for use in connection with many different types of spectacles and which is a source of minimal screening of the field of vision caused thereby.

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These objects are achieved on the basis of the characterizing features set forth in the annexed claim 1.

- Claims 2-5 disclose preferred embodiments of the invention assisting in the individual focusing of loupes for setting the loupes precisely according to the ocular gap of a user.

The invention will now be described in more detail with reference made to the accompanying drawings, in which

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fig. 1 is a plan view of a fixing assembly of the invention for attaching loupes to spectacles;

- fig. 2 is a frontal view of the binocular loupes shown in fig. 1;

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fig. 3 is a side view of the same binocular loupes; and

- fig. 4 is a more detailed view of loupe attachment arms with their hinges and adjustment facilities.

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The following description deals with the exemplary embodiment shown in figs. 1 - 4.

- 35 Binocular loupes 18 are fastened by means of a bracket 17 to a nose bridge 3 included in spectacles. Each loupe 18 is fitted with at least two lenses of which the ocular lens

closer to the eye is smaller than the other objective lens. As for its outer surface, a loupe jacket 19 connecting the lenses also diverges at a sector angle which is essentially consistent with that drawn from the pupil to the rim of the ocular lens. Thus, restriction of the field of vision caused by the loupes is minimal. The user is able to look through or past the loupes according to his or her choice by just slightly turning the viewing direction and the head.

10 The loupe jackets 19 may consist of tubes having a thin wall thickness and a conicity which is consistent with said sector angle. The loupe jacket material may be a metal, fiber-reinforced plastics etc. The loupe jacket may have a cross-section which is circular, elliptical or polygonal.

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The loupes 18 are mounted on flat crossarms 20 which can be bent at hinge points 21 that are made of a metal and have a shape which changes as a result of bending. The hinge points 21 can be made of a material other than the arms 20, e.g. wire threads embedded in the arm material which is e.g. light metal or fiber-reinforced plastics. The axial directions of hinges 21 are selected so as to control bending of the arms 20 such that, in various positions of the loupes 18, the centre axes thereof cross each other at essentially the same distance from the binocular loupes 18. Thus, the loupes always remain on focus provided that the distance between the loupes is set according to the distance between the eyes.

At the mid-point thereof between the hinges 21, said crossarms 20 are connected to a lengthwise arm 24 whose attachment point is also provided with a hinge 22 made of a resilient metal. The arm element 24 is provided with a lengthwise slot 28 and the arm element 26 with a crosswise slot 27 and, thus, attachment of the arm elements 26 and 24 to each other by means of a screw 25 affords both a lengthwise and crosswise adjustment. The arm element 26 is connected with a hinge 23 to yoke-like clip 6a which is

mountable from above (or from below) on a metal attachment body 6b, having its sides provided with grooves 6c and the inner surfaces of the yoke 6a being shaped accordingly. In this case, the members 6a and 6b together provide an attachment clip, generally designated by reference numeral 6. With this snap-fit coupling, the binocular loupes are readily removable and replaceable. The small-sized and inconspicuous attachment body 6b can be permanently fixed to the nose bridge 3 of spectacles. The attachment body 6b can be fixed to nearly all types of spectacles by using a clamping hook 10, made of a soft metal and constituting a loop which grips around the nose bridge 3 and whose ends are received in a hole extending through the attachment body 6b and dimensioned identically to the hole in the member 8 in fig. 6, i.e. in such a manner that the threads of a screw 7 engage with those of the clamping hook 10. Such a clip is small, inconspicuous and firm and adaptable to nearly all types of spectacles.

What is essential about the invention is that the fixing assembly and the loupes are lightweight and only obscure a small section of the field of vision. This objective can be favoured even further by designing a thin-walled loupe jacket so as to comply with the sector angle of a field of vision covered by a small-sized ocular lens. In addition, the flat shape and positioning of attachment arms are selected so as to interfere minimally with the field of vision. At the same time, however, the attachment arms, with the aid of their hinge points, enable an individual alignment and setting of the distance between the eyes, such that the loupes have a focus always fixed in position. The loupes may have a length of e.g. 20 - 30 mm. The ocular lens may have a diameter of e.g. about 10mm. The ocular lens' distance from the eye is in the order of 20 mm when the lens is positioned very close to the lens of spectacles. The objective has a diameter which is determined by the sector angle and the length of the loupes.



CLAIMS

1. An assembly for attaching binocular loupes (18) to spectacles, the binocular loupes comprising two loupes (18), each including at least two lenses of which the ocular lens closer to the eye is smaller than the outer objective lens, whereby the outer surface of a loupe jacket (19) connecting the lenses also diverges at a sector angle which is essentially consistent with that drawn from the pupil to the rim of the ocular lens, characterized in that the attachment arms (20-26) of the loupes (18) are flat in the direction transverse to the viewing direction so as not to create any substantial obstruction of the field of vision, and that the attachment arms (20-26) include crossarms (20) that can be folded at hinge points (21) made of a metal deformable upon bending.

2. An assembly as set forth in claim 1 for attaching binocular loupes (18) to spectacles, the binocular loupes comprising two loupes (18), each including at least two lenses of which the ocular lens closer to the eye is smaller than the outer objective lens, characterized in that the outer surface of a loupe jacket (19) connecting the lenses also diverges at a sector angle which is essentially consistent with that drawn from the pupil to the rim of the ocular lens.

3. A fixing assembly as set forth in claim 1, characterized in that the hinge points (21) control the folding of said arms (20) such that in various positions of the loupes (18) the centre axes thereof cross



each other at the substantially same distance from the binocular loupes (18).

4. A fixing assembly as set forth in claim 1 or 3, characterized in that the crossarms (20) are connected at the junction thereof to a central lengthwise arm (24, 26) which is also provided with a folding hinge (22, 23) and a lengthwise adjustment (28, 25).

5. A fixing assembly as set forth in claim 2 or 4, characterized in that the free end of the attachment arm (26) carries a yoke-like clip member (6a) which provides a snap fit for said attachment body (6b) which is included in the nose bridge (3) of a spectacle frame.