

DESCRIPTION

BINOCULAR MAGNIFYING GLASSES AND SET OF PAIRS OF BINOCULAR MAGNIFYING GLASSES

Technical field

5 [0001] The present invention relates to binocular
magnifying glasses used for viewing an object under
magnification, and the like.

Background Art

[0002] In surgical operations for treating minute tissues
10 such as brain surgery or cardiovascular surgery, for example,
a doctor conventionally carries out an operation by magnifying
a site to be treated with magnifying glasses.

[0003] An example of such magnifying glasses is described
in Japanese Patent No. 5016256. The magnifying glasses
15 described in Japanese Patent No. 5016256 are binocular
magnifying glasses configured such that right and left
magnifying optical system units are provided on a frame, and
the right and left eyes can peer into the magnifying optical
system units.

20 [0004] By using this type of magnifying glasses, a doctor
can have a reliable view around their hands during surgery
while keeping a forward facing posture, thus providing
excellent work performance.

25 Technical Problem

[0005] In the above-described binocular magnifying glasses, however, the magnifying optical system units are heavy, and protrude forward. Thus, when a doctor applies the frame on their head, a rotation moment which causes the entire
5 binocular magnifying glasses to be displaced downward about a point of contact between the nose and a nose pad is generated. Hence, there is a room for improvement in terms of its usability.

[0006] In view of the above, the present invention
10 provides binocular magnifying glasses, and the like, that can reduce displacement when worn, and thus have improved usability.

Summary of Invention

[0007] Binocular magnifying glasses according to an aspect
15 of the present invention include: a frame that can be worn on the head of a wearer; a nose pad configured to be supported by the frame and constitute a contact part with the nose of the wearer; and a pair of magnifying optical system units configured to be supported by the frame so as to be disposed
20 at positions corresponding to the right and left eyes of the wearer, respectively, and to enable the wearer to visually recognize, under magnification, an object to be visually observed which is disposed below while the wearer faces forward. Each unit of the pair of magnifying optical system
25 units includes: an eyepiece lens configured to be disposed

closer to the wearer; an objective lens configured to be disposed closer to the object to be visually observed; and an optical element configured to be disposed between the eyepiece lens and the objective lens to guide light from the object to be visually observed to the eyepiece lens. When a point of the nose pad that is most distant downwardly from an optical axis of the eyepiece lens is defined as a lower end reference position of the nose pad, a distance in a direction of the optical axis between a center of gravity of the whole of the frame, the nose pad, and the pair of magnifying optical system units, and the lower end reference position has a value more than 0 mm and less than 14.4 mm.

[0008] In the binocular magnifying glasses described above, the optical element may have a volume of 300 mm³ or more and 3,700 mm³ or less.

[0009] In the binocular magnifying glasses described above, the optical element may have a dimension of 7.0 mm or more and 16.5 mm or less at a thickest portion of the optical element in a direction of the optical axis.

[0010] In the binocular magnifying glasses described above, a distance from the optical axis to the top of the optical element in a height direction of the optical element, which is perpendicular to the optical axis and coincides with an up-down direction of the wearer, may be 8.0 mm or more and 18.5 mm or less.

[0011] In the binocular magnifying glasses described above, the magnifying optical system unit may include a housing configured to house the optical element therein, and a spacer configured to be disposed between the optical element and the housing, with the spacer being made of a material having a density smaller than that of the optical element.

[0012] In the binocular magnifying glasses described above, the optical element may include a first surface that faces the objective lens, and the spacer may be disposed at least between the first surface and the housing.

[0013] In the binocular magnifying glasses described above, the spacer may be in the form of a case that covers the optical element externally.

[0014] In the binocular magnifying glasses described above, the spacer may be provided so as to be attachable to, and detachable from, the optical element and the housing.

[0015] In the binocular magnifying glasses described above, an inner surface of the housing may be provided with a support projection configured to project from the inner surface and constitute a contact surface, and an outer surface of the spacer may be in contact with, and be supported by, the contact surface while the spacer and the optical element are housed in the housing.

[0016] Binocular magnifying glasses according to another aspect of the present invention include: a frame that can be

worn on the head of a wearer; a nose pad configured to be supported by the frame and to constitute a contact part with the nose of the wearer; and a pair of magnifying optical system units configured to be supported by the frame so as to be disposed at positions corresponding to the right and left eyes of the wearer, respectively, and to enable the wearer to visually recognize, under magnification, an object to be visually observed which is disposed below while the wearer faces forward. Each unit of the pair of magnifying optical system units includes: an eyepiece lens configured to be disposed closer to the wearer; an objective lens configured to be disposed closer to the object to be visually observed; an optical element configured to be disposed between the eyepiece lens and the objective lens to guide light from the object to be visually observed to the eyepiece lens; a housing configured to be disposed so as to create a gap between the optical element and the housing and house the optical element therein; and a spacer configured to be disposed between the optical element and the housing.

[0017] A set of pairs of binocular magnifying glasses according to one aspect of the present invention includes pairs of the above-described binocular magnifying glasses. The spacers and the optical elements in the pairs of the binocular magnifying glasses have volumes different from one another, and the housings in the pairs of the binocular magnifying

glasses are identical with one another.

[0018] According to the above-described binocular magnifying glasses, and the like, a displacement when worn can be reduced, and the usability can be thus improved.

5 Brief Description of Drawings

[0019] FIG. 1 is a top view showing the whole binocular magnifying glasses according to an embodiment of the present invention.

FIG. 2 is a cross-sectional view of the binocular magnifying glasses taken along line A-A in FIG. 1.

FIG. 3 is a cross-sectional view of a magnifying optical system unit in the binocular magnifying glasses, taken along line B-B in FIG. 1.

FIG. 4 is a perspective view showing the magnifying optical system unit in an exploded manner.

FIG. 5 is a perspective view showing an upper case of the magnifying optical system unit as viewed from the inside.

Description of Embodiments

[0020] An embodiment of the present invention will be described below in detail with reference to the drawings.

General configuration:

As shown in FIGS. 1 and 2, binocular magnifying glasses of the present embodiment include a frame 1 that can be worn on the head of a wearer, and a nose pad 2 and magnifying optical system units 3 supported by the frame 1.

With reference to the face of a wearer, the forward direction away from the face will be hereinafter referred to simply as "forward" and the direction opposite to the forward direction as "rearward". The right and left of the wearer will
5 be referred to simply as "right" and "left" and the up and down relative to the wearer simply as "above" and "below". In the following description, a direction will be described with reference to a state in which the binocular magnifying glasses
100 are being worn by the wearer.

10 [0021] Frame:

The frame 1 includes: a front part 10 that is disposed forward from the forehead of the wearer when worn and extends in the right-left direction; a pair of side parts 11 that extend rearward from the right and left ends of the front part
15 10 so as to interpose the temporal regions of the wearer therebetween; and a connection part 12 that extends downward from the center of the front part 10 in the right-left direction and forms an inverted T shape.

[0022] Nose pad:

20 The nose pad 2 is disposed rearward of the connection part 12, i.e., closer to the face of the wearer than the connection part 12, and supported by the front part 10 of the frame 1. The nose pad 2 has a contact part 20 for the nose of the wearer. The contact part 20 is a part opposed to, and
25 which is in contact with the nose of the wearer when the frame

1 is worn on the head of the wearer. The nose pad 2 has a function of preventing a displacement of the frame when worn.

[0023] Magnifying optical system unit:

The magnifying optical system units 3 are disposed forward of the connection part 12 of the frame 1, and supported by the connection part 12. The magnifying optical system units 3 are disposed at positions corresponding to the right and left eyes of the wearer, respectively, and constitute a device that enables the wearer to visually recognize, under magnification, an object to be visually observed that is disposed below while the wearer is facing forward. The lower end of the magnifying optical system unit 3 is disposed lower than the lower end of the nose pad 2.

[0024] As shown in FIG. 3, each magnifying optical system unit 3 includes: an eyepiece lens 30 disposed closer to the wearer so that a lens surface thereof is opposed to an eye of the wearer; an objective lens 31 disposed forward of the eyepiece lens 30 so that a lens surface thereof is opposed to an object to be visually observed; an optical element 32 disposed between the eyepiece lens 30 and the objective lens 31; a housing 33 that houses the optical element 32 therein and supports the eyepiece lens 30 and the objective lens 31; and a spacer 34 provided in the housing 33.

[0025] The eyepiece lens 30 is disposed with an optical axis X1 thereof extending in the front-rear direction. The

eyepiece lens 30 has a positive optical power. The eyepiece lens 30 is housed in an eyepiece lens barrel 38. Hereinafter, the direction along which the optical axis X1 extends is referred to as a "first optical axis direction".

5 The objective lens 31 is disposed with an optical axis X2 thereof tilting in the front-rear direction with respect to the up-down direction such that the optical axis X2 extends increasingly obliquely downward as it approaches the front. The objective lens 31 has a positive optical power. The
10 objective lens 31 is disposed opposite to the eyepiece lens 30 with the optical element 32 to be described later being interposed therebetween. The objective lens 31 has a lens surface opposed to the object to be visually observed. That is, the lens surface of the objective lens 31 closer to the object
15 to be visually observed faces forward and downward. The objective lens 31 is housed in an objective lens barrel 39.

[0026] The optical element 32 is a prism that deflects a light path and erects an image. The optical element 32 in the present embodiment is a roof prism. The optical element 32
20 includes: an eyepiece lens side surface 40 that is opposed to a lens surface of the eyepiece lens 30; an objective lens side surface (first surface) 41 that is opposed to a lens surface of the objective lens 31; and a roof surface 42 disposed between the eyepiece lens side surface 40 and the objective
25 lens side surface 41. The eyepiece lens side surface 40

extends along a plane perpendicular to the optical axis X1 of the eyepiece lens 30, and the objective lens side surface 41 extends along a plane perpendicular to the optical axis X2 of the objective lens 31.

5 [0027] The volume of the optical element 32 is 300 mm³ or more and 3700 mm³ or less. Moreover, the maximum width dimension W (the dimension of the thickest portion) of the optical element 32 in the first optical axis direction is 7.0 mm or more and 16.5 mm or less. Furthermore, a distance L1
10 from the optical axis X1 to the top of the optical element 32 in the height direction of the optical element 32 is 8.0 mm or more and 18.5 mm or less. Here, the height direction is defined to be perpendicular to the optical axis X1 of the eyepiece lens 30 and coincide with the up-down direction.

15 [0028] As shown in FIG. 4, the housing 33 has a structure capable of being separated longitudinally into two parts. That is, the housing 33 has an upper case 50 and a lower case 51. The shape of an inner surface of the upper case 50 corresponds to the shapes of outer surfaces of upper parts of the optical
20 element 32 and the spacer 34 to be described later. As shown in FIG. 5, the inner surface of the upper case 50 is provided with support projections 53 that project from this inner surface. The support projection 53 has a contact surface 53a capable of contacting the outer surface of the spacer 34 to be
25 described later. The support projections 53 are disposed in

end portions near four corners of the inner surface of the upper case 50 in the front-rear direction and the right-left direction.

[0029] In each of the four end portions of the inner surface of the upper case 50 in the front-rear direction and the right-left direction, the support projections 53 are provided in pairs (two for each such an end portion) with a distance being provided therebetween in the front-rear direction. By providing the support projections 53 in pairs with a space being provided therebetween in the front-rear direction in each of the above-described four positions, the size of each support projection 53 can be kept small, and poor appearance (sink mark) is thereby countered when the housing 33 is molded with a resin, for example.

[0030] With reference to FIG. 4 again, the shape of an inner surface of the lower case 51 of the housing 33 corresponds to the shapes of outer surfaces of lower parts of the optical element 32 and the spacer 34 to be described later. The lower case 51 is provided with a first opening 51a facing obliquely downward and forward, and a second opening 51b facing rearward (see FIG. 3). The objective lens barrel 39 is screwed into the first opening 51a, and the eyepiece lens barrel 38 is screwed into the second opening 51b. The upper case 50 and the lower case 51 are configured to be detachably fitted and fixed together, and to support the spacer 34 to be

described later therein.

[0031] The spacer 34 has a structure capable of being separated longitudinally into two parts, and is in the form of a case configured to house the optical element 32 therein.

5 Specifically, the spacer 34 includes: an upper spacer piece 60 disposed between the upper case 50 and the optical element 32; and a lower spacer piece 61 disposed between the lower case 51 and the optical element 32. The upper spacer piece 60 and the lower spacer piece 61 are configured to be detachably fitted
10 and fixed together, and to house the optical element 32 therein while restricting relative movement of the optical element 32. The spacer 34 is configured to be attachable to, and detachable from, the optical element 32 and the housing 33. The provision of the spacer 34 allows the optical element 32
15 to be disposed while being in noncontact with the housing 33. In other words, a gap is created between the optical element 32 and the housing 33, and the spacer 34 is disposed in this gap. The outer shape of the spacer 34 corresponds to the outer shape of the optical element 32, and the spacer 34 is produced
20 by enlarging the external dimensions of the optical element 32. Moreover, the spacer 34 is made of a material, e.g. a resin, which has a density lower than that of the optical element 32. By providing the above-described gap, the binocular magnifying glasses 100 have a reduced weight. Furthermore, external
25 impact is less likely to be transmitted to the optical element

32, and thus the optical element 32 can be prevented from being displaced or broken. In addition, the provision of the above-described gap can prevent any member from coming in contact with a light-reflecting surface out of the surfaces of the optical element 32, and can prevent light leakage from the light-reflecting surface. Therefore, the provision of the above-described gap can reduce an area of the optical element 32 to be painted black.

[0032] A distance (gap) between the optical element 32 and the inner surface of the housing 33 in directions perpendicular to the optical axis X1 of the optical element 32 is 0.5 mm or more and 12.0 mm or less. The distance (gap) is preferably 1.0 mm or more, more preferably 1.3 mm or more. Also, the distance (gap) is preferably 11.0 mm or less.

[0033] The shape of an inner surface of the upper spacer piece 60 corresponds to the shape of the outer surface (the surface including the roof surface 42) of the upper part of the optical element 32. That is, the upper spacer piece 60 includes a roof surface-opposed surface 70 that is opposed to the roof surface 42. Furthermore, the shape of an outer surface of the upper spacer piece 60 corresponds to the shape of the inner surface of the upper case 50.

[0034] The shape of an inner surface of the lower spacer piece 61 corresponds to the shape of the outer surface of the lower part of the optical element 32. That is, the lower

spacer piece 61 has: a rear opposed surface 71 that is opposed to the eyepiece lens side surface 40; and a front opposed surface 72 that is opposed to the objective lens side surface 41. The shape of an outer surface of the lower spacer piece 61 corresponds to the shape of the inner surface of the lower case 51. The rear opposed surface 71 of the lower spacer piece 61 is provided with a rear opening 71a, and the front opposed surface 72 of the lower spacer piece 61 is provided with a front opening 72a. The rear opening 71a is an opening to expose the eyepiece lens side surface 40 of the optical element 32 to the lens surface of the eyepiece lens 30, and formed so as to correspond to the position of the second opening 51b of the housing 33. The front opening 72a is an opening to expose the objective lens side surface 41 of the optical element 32 to the objective lens 31, and formed so as to correspond to the position of the first opening 51a of the housing 33.

[0035] The outer surface of the upper spacer piece 60 is supported by the contact surfaces 53a of the support projections 53 of the upper case 50 while being in contact therewith. When the optical element 32 housed in the spacer 34 is housed in the housing 33, the relative movement of the spacer 34 to the housing 33 is restricted, and a gap is created between the outer surface of the upper spacer piece 60 and the inner surface of the housing 33.

[0036] Light path:

Light from the object to be visually observed is incident on the optical element 32 via the objective lens 31, passes through the objective lens side surface 41, and is reflected by the eyepiece lens side surface 40 and then by the roof surface 42. The light reflected by the roof surface 42 is reflected by the objective lens side surface 41, passes through the eyepiece lens side surface 40, and reaches the eye of the wearer via the eyepiece lens 30. As a result, the wearer can visually recognize the object at hand (disposed below) under magnification while facing forward.

[0037] Center of gravity:

With reference to FIG. 2 again, the lower end of the nose pad 2 is defined as a lower end reference position P when the first optical axis direction, in which the optical axis X1 of the eyepiece lens 30 extends, coincides with the horizontal direction. That is, the lower end reference position P is a point on the nose pad 2 that is most downwardly distant from the optical axis X1 in the height direction perpendicular to the first optical axis direction. Here, a distance L2 in the first optical axis direction, between the center of gravity G for the whole of the frame 1, the nose pad 2, and the pair of magnifying optical system units 3 and the lower end reference position P, has a value more than 0 mm and less than 14.4 mm. More preferably, the distance L2 has a value more than 0 mm

and less than or equal to 14.2 mm. In other words, the volume and weight of the optical element 32 and the spacer 34 are determined so that the distance in the first optical axis direction between the lower end reference position P and the center of gravity G has a value more than 0 mm and less than 14.4 mm (more preferably, a value less than or equal to 14.2 mm). Here, a distance L3 from the lower end reference position P to the center of gravity G in the height direction of the binocular magnifying glasses 100, which is perpendicular to the optical axis X1 of the eyepiece lens 30 and coincides with the up-down direction, has a value of 10.0 mm or more and 13.0 mm or less.

[0038] Action and effect:

Since the distance L2 in the first optical axis direction between the lower end reference position P and the center of gravity G has a value more than 0 mm and less than 14.4 mm in the binocular magnifying glasses 100 according to the present embodiment described above, a rotation moment generated in a direction making the entire binocular magnifying glasses 100 displace downward about the contact part 20 between the nose and the nose pad 2 can be kept small. A displacement of the binocular magnifying glasses 100 can be therefore reduced when the wearer wearing the binocular magnifying glasses 100 performs operations, thus improving the usability of the binocular magnifying glasses 100.

[0039] In the present embodiment, in particular, the volume of the optical element 32 is 300 mm³ or more and 3,700 mm³ or less, and the width dimension W of the optical element 32 is 7.0 mm or more and 16.5 mm or less. Furthermore, the distance L1 from the optical axis X1 to the top of the optical element 32 is 8.0 mm or more and 18.5 mm or less. As a result, the optical element 32 is reduced in size, thus reducing its weight. Furthermore, the center of gravity G can be brought close to the wearer. Thus, the above-described rotation moment can be kept small.

[0040] If no spacer 34 is provided, the volume of an optical element needs to be larger than that of the optical element 32 in the present embodiment so as to bring the optical element close to the inner surface of the housing 33 in order to fix the optical element to the same housing 33. Since the spacer 34 of the present embodiment is made of a material which has a density lower than that of the optical element 32, the optical element without the provision of the spacer 34 would have a weight greater than that of the optical element 32 in the present embodiment. The optical element without the provision of the spacer 34 would also have a greater volume, thereby causing the center of gravity G to move in a direction away from the wearer. That is, by providing the spacer 34 in the present embodiment, the total weight of the spacer 34 and the optical element 32 can be

reduced, and the center of gravity G can be brought closer to the wearer, thus keeping the above-described rotation moment minimal.

[0041] The spacer 34 is in the form of a case, and the

5 outer shape of the spacer 34 corresponds to the outer shape of the optical element 32. Thus, even when the size (volume) of the optical element 32 is changed, the optical elements 32 which have various sizes can be housed in, and fixed to, the same housing only by changing the dimensions of the outer
10 shape of the spacer 34. Hence, commonality of the housing 33 can be achieved, thus promoting a reduction in cost.

[0042] In this case, multiple pairs of binocular magnifying glasses as a set may be prepared, which are configured so that the spacers 34 and the optical elements 32

15 in the pairs of the binocular magnifying glasses 100 have volumes different from one another, but the housings 33 in the pairs of the binocular magnifying glasses 100 are made identical with one another in order to achieve standardization.

[0043] Moreover, since the spacer 34 is supported by

20 providing the support projections 53 on the inner surface of the housing 33, the relative movement of the spacer 34 in the housing 33 can be restricted without the use of, for example, an adhesive material. Furthermore, since the spacer 34 is provided so as to be attachable to, and detachable from, the
25 optical element 32 and the housing 33, the optical element 32

can be easily replaced.

[0044] It is noted that the present invention is not limited to the embodiment described above, and various changes may be made thereto without departing from the scope of the present invention.

For example, the spacer 34 may not be in the form of a case as long as the spacer 34 at least has a shape which may be disposed between the objective lens side surface 41 of the optical element 32 and the housing 33. That is, the spacer 34 may be in the form of a plate, for example. In this case, at least the optical element 32 can be brought closer to the wearer with respect to the housing 33, thus keeping the above-described rotation moment small.

Industrial Applicability

[0045] According to the binocular magnifying glasses, and the like of the present invention, displacement when worn can be reduced, and thus usability can be improved.

Reference Signs List

[0046]	1	frame
20	2	nose pad
	3	magnifying optical system unit
	20	contact part
	30	eyepiece lens
	31	objective lens
25	32	optical element

	33	housing
	34	spacer
	53	support projection
	53a	contact surface
5	100	binocular magnifying glasses
	X1	optical axis
	X2	optical axis

CLAIMS

1. Binocular magnifying glasses (100) **characterized by**
comprising:

a frame (1) that can be worn on a head of a wearer;

5 a nose pad (2) configured to be supported by the frame
(1) and constitute a contact part (20) with a nose of the
wearer; and

a pair of magnifying optical system units (3) configured
to be supported by the frame (1) so as to be disposed at
10 positions corresponding to right and left eyes of the wearer,
respectively, and to enable the wearer to visually recognize,
under magnification, an object to be visually observed which
is disposed below while the wearer faces forward, wherein

each unit of the pair of magnifying optical system units
15 (3) includes:

an eyepiece lens (30) configured to be disposed closer to
the wearer;

an objective lens (31) configured to be disposed closer
to the object to be visually observed; and

20 an optical element (32) configured to be disposed between
the eyepiece lens (30) and the objective lens (31) to guide
light from the object to be visually observed to the
eyepiece lens (30),

when a point (P) of the nose pad (2) that is most distant
25 downwardly from an optical axis (X1) of the eyepiece lens (30)

is defined as a lower end reference position (P) of the nose pad (2), a distance (L2) in a direction of the optical axis (X1) between a center of gravity (G) of the whole of the frame (1), the nose pad (2), and the pair of magnifying optical system units (3), and the lower end reference position (P) has a value greater than 0 mm and lesser than 14.4 mm,

the magnifying optical system unit (3) includes:

a housing (33) configured to house the optical element (32) therein; and

a spacer (34) configured to be disposed between the optical element (32) and the housing (33),

the optical element (32) includes a first surface (41) that faces the objective lens (31),

the spacer (34) is disposed at least between the first surface (41) and the housing (33), and

the spacer (34) is in a form of a case that covers the optical element (32) externally.

2. Binocular magnifying glasses (100) **characterized by**

including:

a frame (1) that can be worn on a head of a wearer;

a nose pad (2) configured to be supported by the frame (1) and constitute a contact part (20) with a nose of the wearer; and

a pair of magnifying optical system units (3) configured

to be supported by the frame (1) so as to be disposed at positions corresponding to right and left eyes of the wearer, respectively, and to enable the wearer to visually recognize, under magnification, an object to be visually observed which is disposed below while the wearer faces forward, wherein

each unit of the pair of magnifying optical system units (3) includes:

an eyepiece lens (30) configured to be disposed closer to the wearer;

an objective lens (31) configured to be disposed closer to the object to be visually observed; and

an optical element (32) configured to be disposed between the eyepiece lens (30) and the objective lens (31) to guide light from the object to be visually observed to the eyepiece lens (30),

when a point (P) of the nose pad (2) that is most distant downwardly from an optical axis (X1) of the eyepiece lens (30) is defined as a lower end reference position (P) of the nose pad (2), a distance (L2) in a direction of the optical axis (X1) between a center of gravity (G) of the whole of the frame (1), the nose pad (2), and the pair of magnifying optical system units (3), and the lower end reference position (P) has a value greater than 0 mm and lesser than 14.4 mm,

the magnifying optical system unit (3) includes:

a housing (33) configured to house the optical element

(32) therein; and

a spacer (34) configured to be disposed between the optical element (32) and the housing (33),

the optical element (32) includes a first surface (41)

5 that faces the objective lens (31),

the spacer (34) is disposed at least between the first surface (41) and the housing (33), and

the spacer (34) is provided so as to be attachable to, and detachable from, the optical element (32) and the housing

10 (33).

3. The binocular magnifying glasses (100) according to claim 1 or 2, **characterized in that** the optical element (32) has a volume of 300 mm³ or more and 3,700 mm³ or less.

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4. The binocular magnifying glasses (100) according to claim 1 or 2, **characterized in that** the optical element (32) has a dimension (W) of 7.0 mm or more and 16.5 mm or less at a thickest portion of the optical element in a direction of the optical axis (X1).

20

5. The binocular magnifying glasses (100) according to claim 1 or 2, **characterized in that** a distance (L1) from the optical axis (X1) to a top of the optical element (32) in a height direction of the optical element (32), which is perpendicular

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to the optical axis (X1) and coincides with an up-down direction of the wearer, is 8.0 mm or more and 18.5 mm or less.

6. The binocular magnifying glasses (100) according to claim

5 1 or 2, **characterized in that:**

an inner surface of the housing (33) is provided with a support projection (53) configured to project from the inner surface and to constitute a contact surface (53a); and

10 an outer surface of the spacer (34) is in contact with, and supported by, the contact surface (53a) while the spacer (34) and the optical element (32) are housed in the housing (33).

7. Binocular magnifying glasses (100) **characterized by**

15 comprising:

a frame (1) that can be worn on the head of a wearer;

a nose pad (2) configured to be supported by the frame (1) and constitute a contact part (20) with the nose of the wearer; and

20 a pair of magnifying optical system units (3) configured to be supported by the frame (1) so as to be disposed at positions corresponding to right and left eyes of the wearer, respectively, and to enable the wearer to visually recognize, under magnification, an object to be visually observed which
25 is disposed below while the wearer faces forward, wherein

each unit of the pair of magnifying optical system units
(3) includes:

an eyepiece lens (30) configured to be disposed closer to
the wearer;

5 an objective lens (31) configured to be disposed closer
to the object to be visually observed;

an optical element (32) configured to be disposed between
the eyepiece lens (30) and the objective lens (31) to
guide light from the object to be visually observed to the
10 eyepiece lens (30);

a housing (33) configured to be disposed so as to create
a gap between the optical element (32) and the housing
(33) and house the optical element (32) therein; and

a spacer (34) configured to be disposed between the
15 optical element (32) and the housing (33), and

the spacer (34) is in a form of a case that covers the
optical element (32) externally.

8. Binocular magnifying glasses (100) **characterized by**
20 comprising:

a frame (1) that can be worn on the head of a wearer;

a nose pad (2) configured to be supported by the frame
(1) and constitute a contact part (20) with the nose of the
wearer; and

25 a pair of magnifying optical system units (3) configured

to be supported by the frame (1) so as to be disposed at positions corresponding to right and left eyes of the wearer, respectively, and to enable the wearer to visually recognize, under magnification, an object to be visually observed which is disposed below while the wearer faces forward, wherein

each unit of the pair of magnifying optical system units (3) includes:

an eyepiece lens (30) configured to be disposed closer to the wearer;

an objective lens (31) configured to be disposed closer to the object to be visually observed;

an optical element (32) configured to be disposed between the eyepiece lens (30) and the objective lens (31) to guide light from the object to be visually observed to the eyepiece lens (30);

a housing (33) configured to be disposed so as to create a gap between the optical element (32) and the housing (33) and house the optical element (32) therein; and

a spacer (34) configured to be disposed between the optical element (32) and the housing (33), and

the spacer (34) is provided so as to be attachable to, and detachable from, the optical element (32) and the housing (33).

9. A set of pairs of binocular magnifying glasses (100)

comprising pairs of the binocular magnifying glasses (100)
according to any one of claims 1 to 8, **characterized in that:**

the spacers (34) and the optical elements (32) in the
pairs of the binocular magnifying glasses (100) have volumes
5 different from one another; and

the housings (33) in the pairs of the binocular
magnifying glasses (100) are identical with one another.