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(54) **DEVICE FOR FADING AN IMAGE INTO THE BEAM PATH OF AN AIMING OPTICS**

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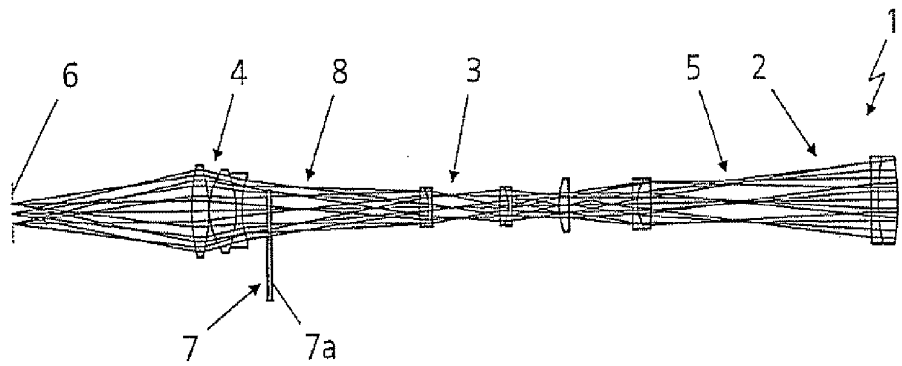
(57) **ABSTRACT**

The invention relates to a device for fading an image into the beam path of an aiming optics, having an at least partially transparent optical support element which is arranged in the beam path of the aiming optics and has at least one diffractive optical coupling element and at least one diffractive optical decoupling element, the at least one diffractive optical coupling element leading light of the image to be faded in, which light is incident on said coupling element and is to be coupled in, through the optical support element to the at least one diffractive optical decoupling element for the purpose of superposition with the beam path. The image to be faded in is imaged into the beam path of the aiming optics by the at least one diffractive optical coupling element and the least one diffractive optical decoupling element.



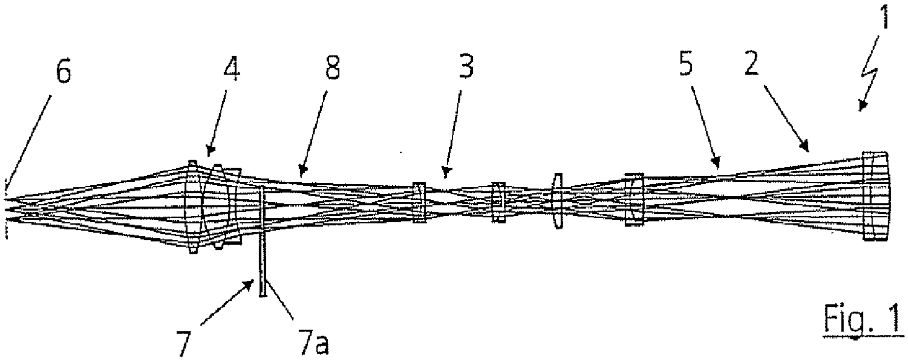


Fig. 1

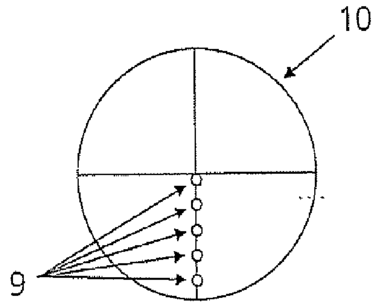


Fig. 2

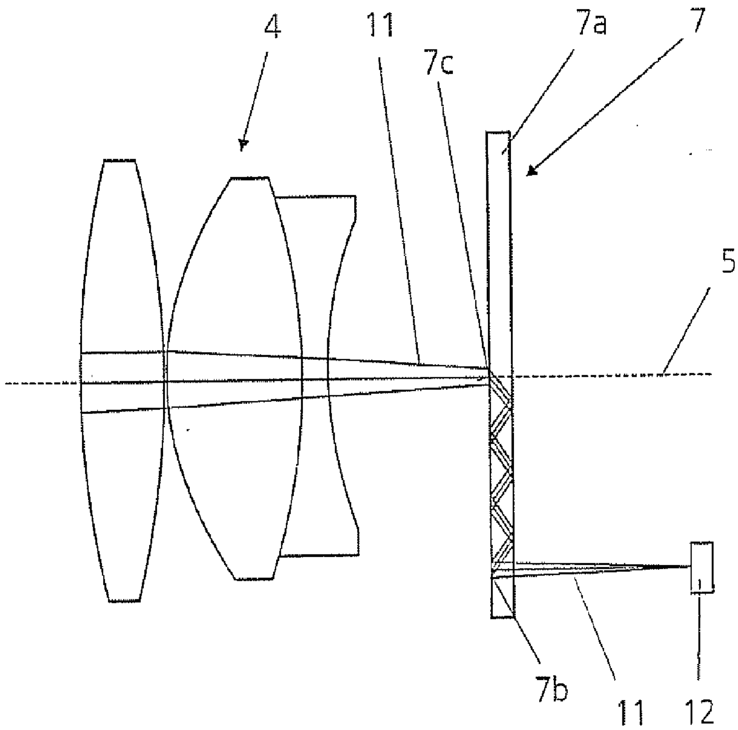


Fig. 3

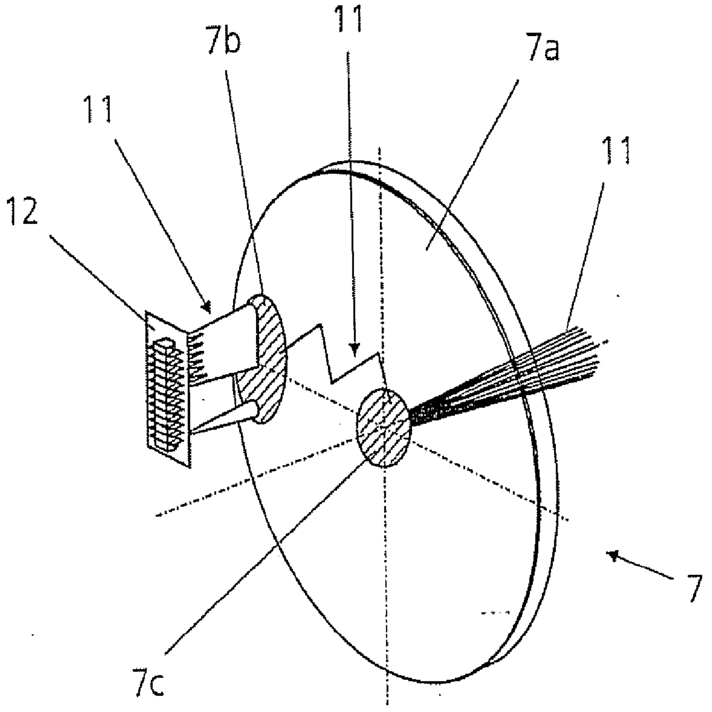


Fig. 4

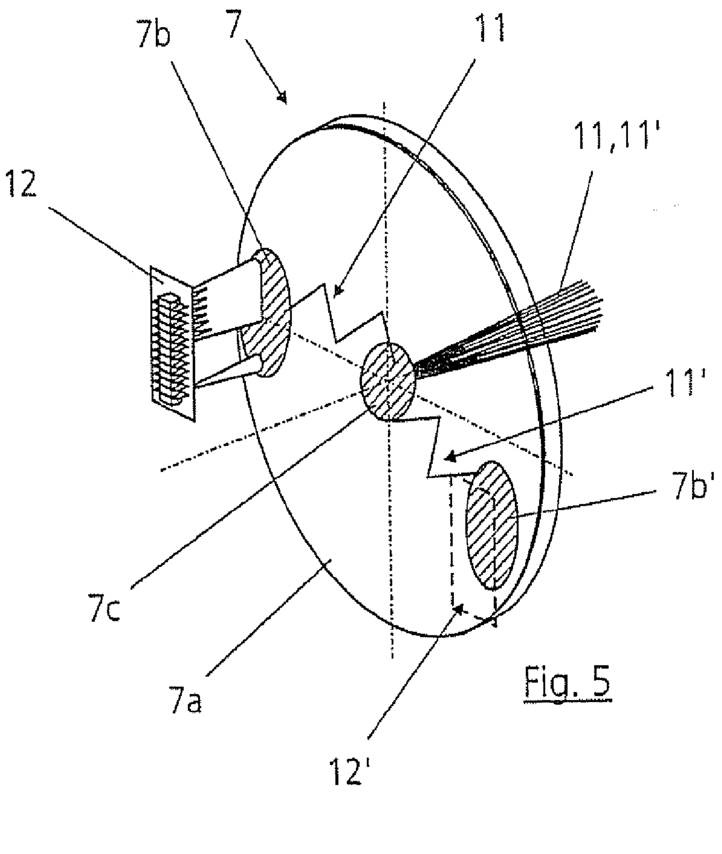


Fig. 5

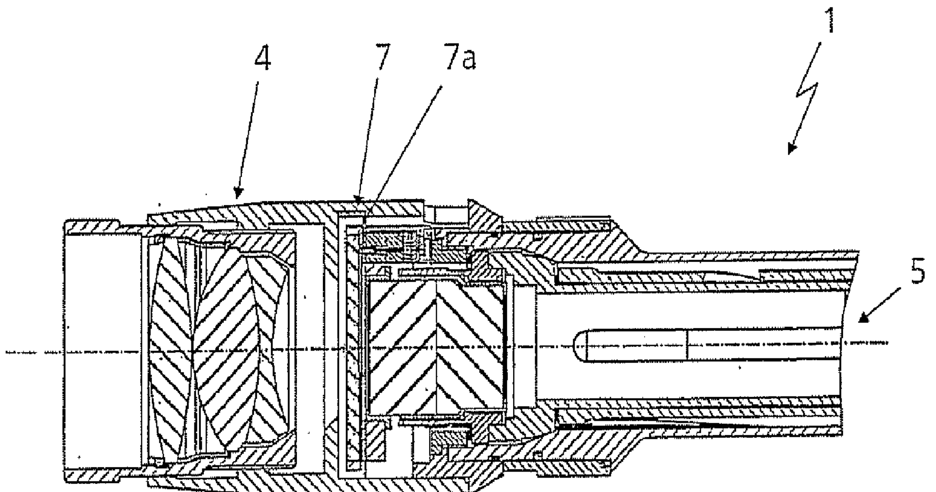


Fig. 6

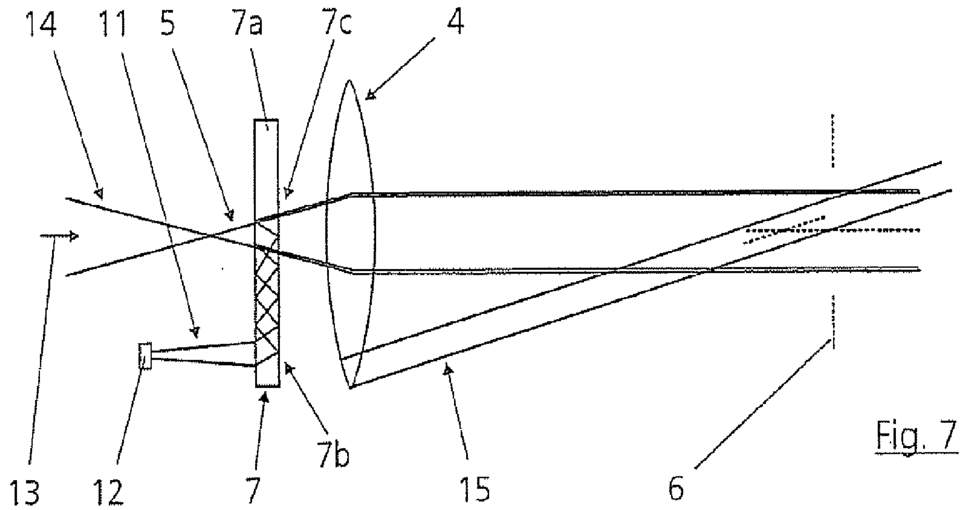


Fig. 7

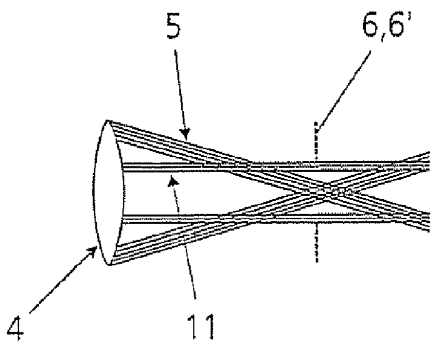


Fig. 8

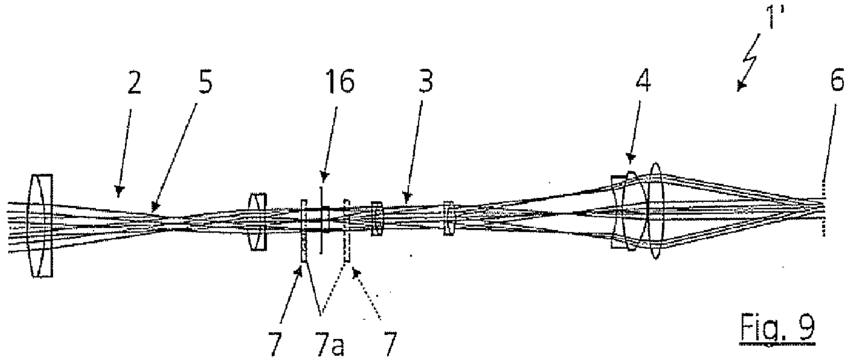


Fig. 9

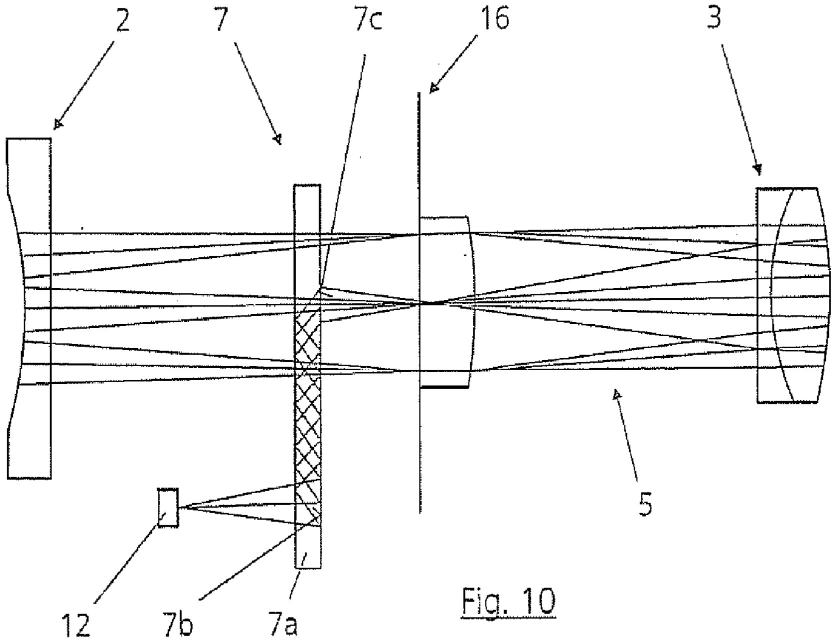


Fig. 10

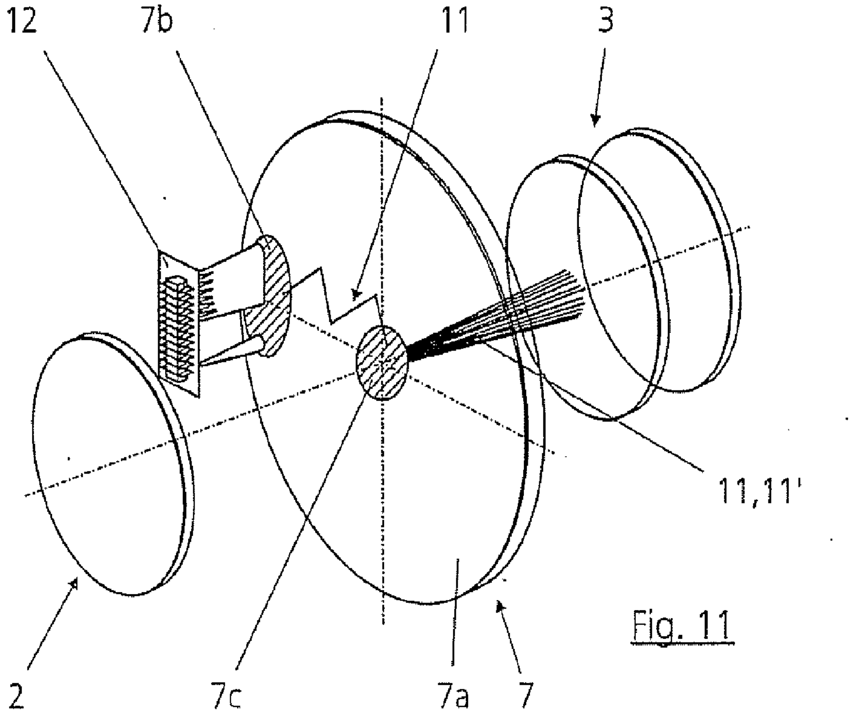


Fig. 11

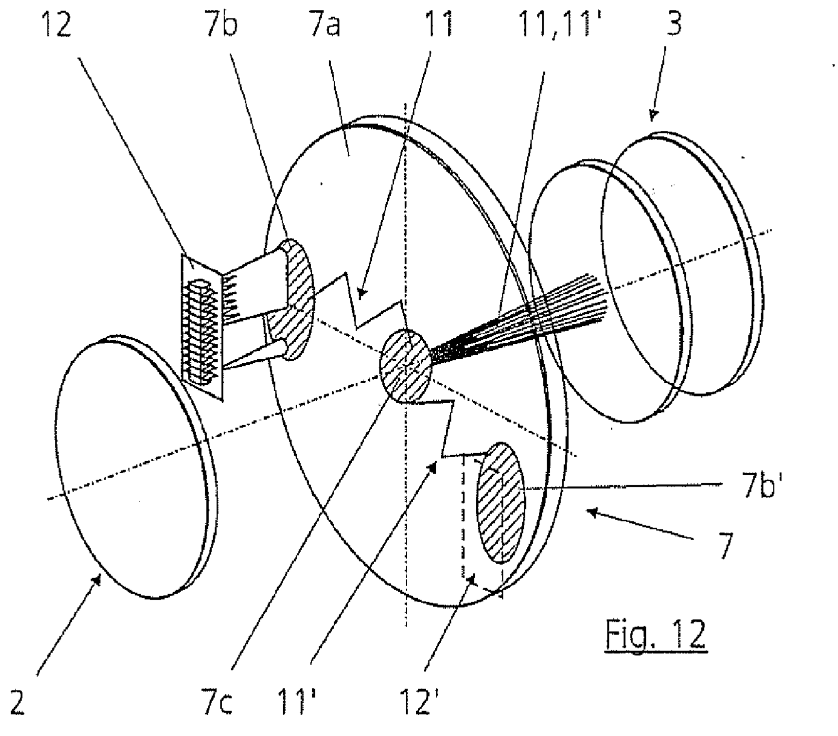


Fig. 12

DEVICE FOR FADING AN IMAGE INTO THE BEAM PATH OF AN AIMING OPTICS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority under 35 U.S.C. §119(a)-(d), and claims priority to German Application No. 10 2008 059 892.5, filed Dec. 2, 2008, which is hereby incorporated by reference in its entirety to form part of this application.

FIELD OF THE INVENTION

[0002] The invention relates to a device for fading an image into the beam path of an aiming optics and to an aiming optics having an objective to be turned in the operating position to a target object to be observed, an eyepiece to be turned to an eye of the observer, and a beam path.

[0003] Future aiming optics and/or telescopic sights are to be equipped with ballistic systems. It is therefore desirable to have a flexible target mark or a flexible target point in the surveillance unit of the telescopic sight. Furthermore, it should also be possible to display other information in the telescopic sight. Different concepts for fading in or reflecting in such flexible target marks are known from practice. Such optical methods for input reflection should substantially fulfil the following boundary conditions. The transmittance for the main light or the observation light of the telescopic sight or the aiming optics should be as high as possible (for example greater than 95%). The diffraction efficiency of the input reflection module should be greater than 1%. Moreover, the physical space for an appropriate input reflection module should be adapted to the physical space of the telescopic sight.

[0004] In addition, there can be a need to magnify the target mark with the zoom of the telescopic sight so that the extent of cover during zooming is maintained and that it is possible for the gunner to estimate range conveniently.

[0005] EP 0 886 163 B1 discloses a reticle and an optical device having an illuminated reticle. The reticle consists of a substrate and a mark which is applied to a surface of the substrate and emits light in a fashion substantially perpendicular to the surface at a laterally arranged light source, the mark being designed as a diffracting grating. The mark can have an amplitude rating with transparent gaps and opaque bars which consist of chromium. It could be disadvantageous in this case that a relatively complex mark grating would need to be provided to display a plurality of target points, and that the positional tolerances of the target points would have a very strong effect on the grating tolerances.

[0006] EP 1 653 271 A1 relates to an illuminable reticle which has a mirror which is arranged laterally next to the substrate and has two focal points. The light source is arranged at one focal point. The reticle image is arranged at the second focal point, total reflection also being possible, if appropriate, at one of the two substrate surfaces in order to focus the light beams in the reticle image.

[0007] DE 195 25 520 C2 describes how images are coupled into beam paths of microscopes by means of diffracting optical elements, in particular reflection and transmission gratings. The diffractive optical elements described there have no imaging effect. The imaging effect is attained by further optical elements.

[0008] Reference is further made to WO 00/16150 for the further prior art.

SUMMARY OF THE INVENTION

[0009] Starting herefrom, it is the object of the present invention to provide a device of the type mentioned at the beginning which enables flexible input reflection of target points, particularly under the boundary conditions named at the beginning and which, in particular, requires as few additional optical elements as possible.

[0010] This object is achieved according to the invention by a device for fading an image into the beam path of an aiming optics, having an at least partially transparent optical support element which is arranged in the beam path of the aiming optics and has at least one diffractive optical coupling element and at least one diffractive optical decoupling element, the at least one diffractive optical coupling element leading light of the image to be faded in, which light is incident on said coupling element and is to be coupled in, through the optical support element to the at least one diffractive optical decoupling element for the purpose of superposition with the beam path and the image to be faded in being imaged into the beam path of the aiming optics by the at least one diffractive optical coupling element and the least one diffractive optical decoupling element.

[0011] These measures advantageously provide an input reflection concept for an aiming optics which ensures a high transmittance for the main light or observation light in the beam path of the aiming optics, while a flexible input reflection or fading in of target points is enabled. The diffraction efficiency of the input reflection module can be greater than 1%. Furthermore, the use of a partially transparent optical support element having a diffractive optical coupling element and a diffractive optical decoupling element saves physical space, that is to say an adaptation to the physical space for telescopic sight and for aiming optics can be performed in a simple way. The inventive device likewise enables further or other instances of input reflection of information.

[0012] According to the invention, collimation and focusing of the beams are also undertaken in addition to beam deflection and superposition. The optical coupling and decoupling elements hence additionally have an imaging function, and this renders it possible to manage without further conventional optical components between the object and intermediate image plane.

[0013] The diffractive optical coupling element can effect a beam deflection of the light to be coupled in to such an angle that total reflection of the light to be coupled in is achieved inside the optical support element.

[0014] It is advantageous when the diffractive optical coupling element effects a collimation of the light to be coupled in.

[0015] The diffractive optical decoupling element uses its diffracting deflecting function to effect an exit of the coupled-in light from the optical support element into the beam path of the aiming optics, and thereby undertake to superpose with the observation light on the observation beam path.

[0016] It is advantageous when the diffracting optical decoupling element effects focusing of the coupled-in light into the beam path of the aiming optics.

[0017] The diffractive optical coupling and decoupling elements can be produced holographically, mechanically or synthetically. They are preferably designed as holographic optical elements or holograms, that is to say elements produced holographically, and can be produced by superposing two spherical waves, or by superposing a spherical wave and a plane wave.

[0018] Furthermore, it can be provided according to the invention that an image reproduction unit facing the diffractive optical coupling element is provided which produces the light, which is to be coupled in, of the image to be faded in and leads it onto the diffractive optical coupling element. LED, OLED displays, LCD or laser scanner modules can serve as imaging module or image reproduction unit.

[0019] The diffractive optical coupling element turned towards the image reproduction unit takes over the task of collimation and beam deflection to an angle which is required to reach total reflection inside the optical support element. By means of its diffracting deflection function, the diffractive optical decoupling element enables the exit of light from the support element, and simultaneously focuses the light into an intermediate image of the aiming optics.

[0020] The at least one diffractive optical coupling element can be designed as the reflection diffraction grating or a transmission diffraction grating. The at least one diffractive optical decoupling element can likewise be designed as a reflection diffraction grating or a transmission diffraction grating. Since an approximately equal fundamental frequency or number of lines on the two gratings can be selected, it is also possible to transmit a wider spectral region of light. The diffractive optical coupling element is preferably designed as a reflection diffraction grating, and the diffractive optical decoupling element as a transmission diffraction grating. Various embodiments are conceivable for guiding light in the support element. The advantage of the preferred variant consists, in particular in that, on the one hand, a reflection hologram provides the required diffraction efficiency for coupling light into the optical support element and, on the other hand, the decoupling hologram permits a spectral transmittance of greater than 95%. Furthermore, the diffractive optical coupling element and the diffractive optical decoupling element can be designed both as transmission diffraction gratings or as reflection diffraction gratings. In addition, it is possible to design the diffractive optical coupling element as a transmission deflection grating, and the diffractive optical decoupling element as a reflection diffraction grating.

[0021] The holographic input reflection has, moreover, the substantial advantage that a second, or even yet further diffractive optical coupling element(s) can be integrated in the optical support element in order for further data to be reflected in at another image field location, said coupling element also enabling images to be reflected in polychromically. It is also possible thereby to implement contents of input reflection in the case of which consideration can be given to specific stipulations relating to physical size. It is very advantageous when in the beam path of the aiming optics downstream of the eyepiece of the aiming optics in the propagation direction of the observation light the aperture or the diameter of the beam of the light to be coupled in is matched at least approximately to the aperture or the diameter of the axial beam of the observation light of the aiming optics.

[0022] It is very advantageous, furthermore, that in the beam path of the aiming optics the position of the exit pupil, or the pupil position, of the light to be coupled in corresponds at least approximately to the position of the exit pupil of the observation light of the aiming optics. In the case of a plurality of target points, respective individual positions also result for said target points in their exit pupil. These should be adapted accordingly.

[0023] The target object and the target point reflected in can be observed simultaneously independently of the position of the eye inside the pupil on the eyepiece side owing to these adaptations of the light beam reflected in.

[0024] Consequently, the input reflection module consists of a combined holographic light guidance and imaging unit which implements a minimum transition for the main light of greater than 90%, and superposes the main light and the image location and the pupil of the imaging.

[0025] The optical support element is preferably designed as plane plate formed from glass. However, it can also be fabricated from plastic.

[0026] The image to be faded in can have a target mark and/or arbitrary additional information or data.

[0027] A combination of a plurality of diffractive optical coupling elements with one decoupling element is conceivable for the purpose of combining the most varied imaging modules, and with polychromic image information, in particular.

[0028] Claim **14** specifies an imaging optics having an objective to be turned in the operating position to a target object to be observed, an eyepiece to be turned to an eye of the observer, a beam path and at least one inventive device for fading in an image, at least a part of the at least one device according to the invention for fading in the image or the optical support element thereof being arranged in the beam path of the aiming optics.

[0029] It is very advantageous when at least one part of the at least one device for fading in an image, or the optical support element thereof is arranged in the beam path of the aiming optics on the objective side between the objective and an intermediate image plane next to the objective, or between the intermediate image plane next to the objective and a zoom optics which may be present.

[0030] It is thereby possible for a flexible target point to be reflected into the aiming optics, it being possible for the user to carry out an estimate of range via the coverage. The diffractive optical decoupling element lies between the intermediate image and objective or zoom, as a result of which the target point is magnified or demagnified by the zoom. Because the optical support element is not arranged directly in an intermediate image plane of the aiming optics, contaminants on the support surface are advantageously not visibly imaged, but act at the most as the minimum light loss.

[0031] Alternatively or in addition, it can be provided that at least one part of the at least one device for fading in an image, or the optical support element thereof, is arranged in the beam path of the aiming optics on the eyepiece side and between the eyepiece and an intermediate image plane next to the eyepiece.

[0032] The aiming optics can be designed as a telescopic sight.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] Advantageous refinements and developments of the invention emerge from the subclaims. Exemplary embodiments of the invention are specified in principle below with the aid of the drawing, in which:

[0034] FIG. **1** shows a diagrammatic illustration of an aiming optics designed as a telescopic sight and having an inventive device for fading an image into the beam path thereof, in accordance with a first embodiment;

[0035] FIG. **2** shows a diagrammatic illustration of a target mark arrangement having a plurality of flexible target points;

[0036] FIG. **3** shows a diagrammatic illustration of the inventive device in the first embodiment;

[0037] FIG. **4** shows a perspective view of the inventive device in the first embodiment;

[0038] FIG. **5** shows a perspective view of the inventive device in a second embodiment;

[0039] FIG. **6** shows a simplified sectional view of a part of the telescopic sight with the inventive device in the first embodiment;

[0040] FIG. **7** shows a diagrammatic illustration of the matching of an aperture in the inventive device in accordance with the first embodiment;

[0041] FIG. **8** shows a schematic illustration of a pupil matching of the inventive device in accordance with the first embodiment;

[0042] FIG. **9** shows a diagrammatic illustration of an aiming optics designed as a telescopic sight and having an inventive device for fading in an image in a third embodiment;

[0043] FIG. **10** shows a diagrammatic illustration of the inventive device in the third embodiment;

[0044] FIG. **11** shows a perspective view of the inventive device in the third embodiment; and

[0045] FIG. **12** shows a perspective view of an inventive device for fading in an image in a fourth embodiment.

DETAILED DESCRIPTION OF THE INVENTION

[0046] The invention is explained below with the aid of a telescopic sight as aiming optics. However, it can also be used for any other desired aiming optics.

[0047] Illustrated diagrammatically in FIG. **1** in cutaway section is an aiming optics of variable magnification which is designed as a telescopic sight **1** and has an objective **2** at the light entry end, as well as a lens inversion system with a zoom optics **3** and an eyepiece **4**. Also shown is a beam path **5** of the telescopic sight **1**. An exit pupil **6** is indicated by dashes.

[0048] A telescopic sight **1** of variable magnification is sufficiently well known from the prior art, and so further details which are not essential to the invention will not be examined below.

[0049] A part of an inventive device **7** for fading in an image and/or the optical support element **7***a* of said device are arranged in the beam path **5** of the telescopic sight **1** on the eyepiece side between the eyepiece **4** and an intermediate image plane **8** next to the eyepiece **4**. As illustrated in a simplified way in FIG. **2**, it is thereby possible for variable and/or flexible target points **9** of a target mark arrangement **10** to be faded into the beam path **5** of the telescopic sight **1** as an image.

[0050] Functionally identical elements are named below with the same reference symbols—provided with primes, if appropriate, in different embodiments.

[0051] As may be seen from FIG. **3**, the device **7** for fading an image into the beam path **5** of the aiming optics **1** has a partially transparent optical support element **7***a* which has a diffractive optical coupling element **7***b* and a diffractive optical decoupling element **7***c*, the diffractive optical coupling element **7***b* leading light **11**, which is to be coupled in and is incident on said coupling element, of the image to be faded in, through the optical support element **7***a* for the purpose of superposition with the beam path **5** (indicated by dashed lines in FIG. **3**) to the diffractive optical decoupling element **7***c*, and the image to be faded in is imaged into the beam path **5** of the aiming optics **1** through the diffractive optical coupling element **7***b* and the diffractive optical decoupling element **7***c*.

[0052] As may further be seen from FIG. **3**, the diffractive optical coupling element **7***b* effects a beam deflection of the light **11**, to be coupled in to such an angle or limiting angle $W_{Totalreflexion}$, that total reflection of the light **11** to be coupled in is achieved inside the optical support element **7***a*. For the limiting angle $W_{Totalreflexion}$ for the occurrence of total reflection, it holds that:

$$W_{Totalreflexion}=\arcsin(1/n),$$

n being the refractive index of the material of the optical support element **7***a*.

[0053] In principle, the grating frequency of the diffractive optical coupling element **7***b*, **7***b*' should be selected in such a way that the light **11**, **11'** can be guided by total reflection in the support element **7***a* for all field angles and wavelengths.

[0054] The grating equation of the diffractive optical coupling element **7***b*, **7***b*' is as follows when consideration is given to diffraction in the medium:

$$\sin(\beta)=(k\times\lambda\times g-\sin(\alpha))/n,$$

in which it holds that:
k=diffraction order
(k=+1 in the present exemplary embodiment),
λ=wavelength in nm,
g=number of lines in 1/mm or grating frequency at the grating vertex,
α=incidence angle at the grating,
β=diffraction angle at the grating.

[0055] It must therefore hold for the diffractive optical coupling element **7**, **7***b*' or the reflection diffracting grating that

$$\sin(\beta)>W_{Totalreflexion}$$

for all aperture angles and wavelengths which are used. In the present exemplary embodiment, the limiting angle for total reflection is $W_{Totalreflexion}$=41.3°, by way of example, while the diffraction angles β at the reflection diffraction grating lie between 52.2° and 54.1°. The associated mean numbers of lines are in this case 1841.9 lines/mm for a reflection diffraction grating, and 1,872.8 lines/mm for a transmission diffraction grating.

[0056] Furthermore, it may be seen from FIG. **3** that there is provided an image reproduction unit **12** which is turned towards the diffractive optical coupling element **7***b*, produces the light **11**, which is to be coupled in, of the image to be faded in, and guides it onto the diffractive optical coupling element **7***b*.

[0057] The diffractive optical coupling element **7***b* effects collimation of the light **11** to be coupled in. Furthermore, by means of its diffracting deflecting function the diffractive optical decoupling element **7***c* effects an exit of the light **11** to be coupled in from the optical support element **7***a* in the beam path **5** of the aiming optics **1**. In the present exemplary embodiment, the diffractive optical decoupling element **7***c* also effects focusing of the light **11**, which is to be coupled in, into the beam path **5** of the aiming optics **1**.

[0058] In the present exemplary embodiment, the diffractive optical coupling element **7***b* is designed as a reflection diffraction grating, while the diffractive optical decoupling element **7***c* is designed as a transmission diffraction grating. In further exemplary embodiments, the diffractive optical coupling element **7***b* and the diffractive optical decoupling element **7***c* could both be designed as reflection diffraction gratings or as transmission diffraction gratings. It is, moreover, conceivable to design the diffractive optical coupling element **7***b* as a transmission diffraction grating, and the diffractive optical decoupling element **7***c* as a reflection diffraction grating.

[0059] The exposure configuration of the diffractive optical decoupling element **7***c* is as follows in the first embodiment of the inventive device **7**:

LC=∞ mm;

LD=15.5;

[0060] γ=0°;
δ=59.045°;
g=1872.8 lines/mm;
exposure wavelength 457.9 nm; and
diffracting surface 3.5 mm×2.0 mm (value in dispersion direction).

[0061] The exposure configuration of the diffractive optical coupling element **7***b* is as follows in the first embodiment of the inventive device **7**:

LC=∞ mm;

LD=24.31;

[0062] γ=0°;
δ=57.504°;
g=1841.94 lines/mm;
exposure wavelength 457.9 nm; and
diffracting surface 5.0 mm×2.0 mm (value in dispersion direction).

[0063] The variables LC, LD, γ, Δ denote the polar coordinates of the laser source point during exposure of the grating. LC and γ are the polar coordinates of the first laser source, and LD and Δ are the polar coordinates of the second laser source.

[0064] The device **7** is illustrated in perspective in FIG. **4**. The image reproduction unit **12** has a plurality of light-emitting diodes (LEDs). In this case, each light-emitting diode can produce a different target point **9** (compare FIG. **2**). LED displays, OLED displays, LCD displays or laser scanner modules are suitable as image reproduction unit **12**.

[0065] FIG. **5** illustrates a second embodiment of the inventive device **7**. In this case, a second diffractive optical coupling element **7***b*' is combined in a very advantageous way with the diffractive optical coupling element **7***c*, the result being, for example, to couple polychrome image information into the beam path **5** via coupled-in light **11'** of the second image reproduction unit **12'**. The image reproduction unit **12'** can, for example, be designed as an LCD display or the like.

[0066] The telescopic sight **1** with the device **7** for fading an image into the beam path **5** is illustrated in FIG. **6** partially in a sectional view.

[0067] As may be seen from FIG. **7**, in the beam path **5** of the aiming optics **1** downstream of the eyepiece **4** of the aiming optics **1** in the propagation direction of the observation light (indicated by the arrow **13**) the aperture or the diameter of the beam of the light **11** to be coupled in is matched at least approximately to the aperture or the diameter of the axial beam **14** of the observation light of the aiming optics **1**. The axial beam **14** in this case comprises beams emanating from the mid point of the field of view up to the pupil entry, or beams which, as it were, fill up the pupil entirely. A marginal beam is indicated diagrammatically by the reference symbol **15**. The beam path of the coupled-in light **11** is sketched only in greater simplified fashion in the optical support element **7***a* in FIG. **7**.

[0068] As may be seen from FIG. **8**, in the beam path **5** of the aiming optics **1** the position of the exit pupil **6'** of the coupled-in light **11** corresponds at least approximately to the position of the exit pupil **6** of the observation light of the aiming optics **1**.

[0069] A further embodiment of a telescopic sight **1'** is illustrated in FIG. **9**. A part of a device **7** in a third embodiment for fading in an image or the optical support element **7***a* thereof is arranged on the objective side or between the objective **2** and an intermediate image plane **16** next to the objective **2**. In a further exemplary embodiment, the device **7** could also be arranged between the intermediate image plane **16** next to the objective **2** and the zoom optics **3** (indicated by dashes). The object-side arrangement of the device **7** has the advantage that the target points **9** change in size with the magnification set via the zoom optics **3**, and thus the coverage remains the same, as a result of which the observer can estimate range.

[0070] FIG. **10** shows the arrangement of the device **7** in the telescopic sight **1'** more precisely.

[0071] In the case of the third embodiment of the inventive device **7**, the exposure configuration of the diffractive optical decoupling element **7***c* is designed as follows (as a holographic sine profile):
γ=0°;
Δ=53.9°;

LC=10.7 mm;

LD=269.0 mm;

[0072] α=48.7°;
Transmission deflection of BK7 in air; and
g=1765 lines/mm.

[0073] Similarly, the exposure configuration for the diffractive optical coupling element **7***b* in the third embodiment runs as follows:
γ=−2.7°;
Δ=58.8°;

LC=15.1 mm;

LD=280.0 mm;

[0074] α=0°; and
g=1765 lines/mm.

[0075] FIG. **11** shows a perspective view of the device **7** in the telescopic sight **1'**.

[0076] In a fashion similar to FIG. **5**, FIG. **12** shows a perspective view of a fourth embodiment of the support element **7***a* with a further coupling element **7***b*', a further reproduction unit **12'**, and thus an additional light **11'** to be coupled in.

[0077] The diffractive optical coupling elements **7***b*, **7***b*' and the diffractive optical decoupling element **7***c* are designed as holographic, that is to say holographically produced, optical elements or holograms.

[0078] The optical support element **7***a* is a plane plate formed from glass. It could also be fabricated from plastic in further exemplary embodiments.

[0079] The image to be faded in can also have additional information or data as an alternative or in addition to the target points **9**.

[0080] While the invention has been described with reference to various preferred embodiments, it should be understood by those skilled in the art that various changes may be made and equivalents substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

We claim:

1. Device for fading an image into the beam path of an aiming optics, having an at least partially transparent optical support element which is arranged in the beam path of the aiming optics and has at least one diffractive optical coupling element and at least one diffractive optical decoupling element, the at least one diffractive optical coupling element leading light of the image to be faded in, which light is incident on said coupling element and is to be coupled in, through the optical support element to the at least one diffractive optical decoupling element for the purpose of superposition with the beam path, and the image to be faded in being imaged into the beam path of the aiming optics by the at least one diffractive optical coupling element and the at least one diffractive optical decoupling element.

2. Device according to claim **1**, wherein the diffractive optical coupling element effects a beam deflection of the light to be coupled in to such an angle that total reflection of the light to be coupled in is achieved inside the optical support element.

3. Device according to claim **1**, wherein the diffractive optical coupling element effects a collimation of the light to be coupled in.

4. Device according to claim **1**, wherein the diffractive optical decoupling element uses its diffracting deflecting function to effect an exit of the coupled-in light from the optical support element into the beam path of the aiming optics.

5. Device according to claim **1**, wherein the diffractive optical decoupling element effects focusing of the coupled-in light into the beam path of the aiming optics.

6. Device according to claim **1**, wherein the at least one diffractive optical coupling element is designed as the reflection diffraction grating or a transmission diffraction grating.

7. Device according to claim **1**, wherein the at least one diffractive optical decoupling element is designed as a reflection diffraction grating or a transmission diffraction grating.

8. Device according to claim **1**, wherein an image reproduction unit facing the diffractive optical coupling element is provided which produces the light, which is to be coupled in, of the image to be faded in and leads it onto the diffractive optical coupling element.

9. Device according to claim **1**, wherein in the beam path of the aiming optics downstream of the eyepiece of the aiming optics in the propagation direction of the observation light the aperture or the diameter of the beam of the light which is to be coupled in is matched at least approximately to the aperture or the diameter of the axial beam of the observation light of the aiming optics.

10. Device according to claim **1**, wherein in the beam path of the aiming optics the position of the exit pupil of the light which is coupled in corresponds at least approximately to the position of the exit pupil of the observation light of the aiming optics.

11. Device according to claim **1**, wherein the optical support element is a plane plate preferably formed from glass.

12. Device according to claim **1**, wherein the image to be faded in comprises a target mark and/or additional information or data.

13. Device according to claim **1**, wherein at least one diffractive optical coupling element is designed as a holographical optical element.

14. Aiming optics having an objective to be turned in the operating position to a target object to be observed, an eyepiece to be turned to an eye of the observer, a beam path and at least one device for fading in an image in accordance with claim **1**, at least a part of the at least one device for fading in an image or the optical support element thereof being arranged in the beam path of the aiming optics.

15. Aiming optics according to claim **14**, wherein the at least one part of the at least one device for fading in an image, or the optical support element thereof is arranged in the beam path of the aiming optics on the objective side and between the objective and an intermediate image plane next to the objective, or between the intermediate image plane next to the objective and a zoom optics which may be present.

16. Aiming optics according to claim **14**, wherein the at least one part of the at least one device for fading in an image, or the optical support element thereof, is arranged in the beam path of the aiming optics on the eyepiece side and between the eyepiece and an intermediate image plane next to the eyepiece.

17. Aiming optics according to claim **14**, which is designed as a telescopic sight.

18. Device according to claim **1**, wherein at least one diffractive optical decoupling element is designed as a holographical optical element.

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