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(54) **Night vision sight**

(57) An object of the present invention is night vision sight comprising an housing of ocular part of the sight; housing of objective part of the sight; objective; block of control and transformation of the video signal, including the focal plane array, at least one plate of control and transformation of video signal; power unit; the display;

regulator of brightness of the display; collecting lens; inverting system; mechanisms of horizontal and vertical correction; unit of sight mark; an Infra-Red illuminator; unit of sight mark illumination; aperture; ocular and rifle mount assembly that the removal of a exit pupil not less than in day vision sight.

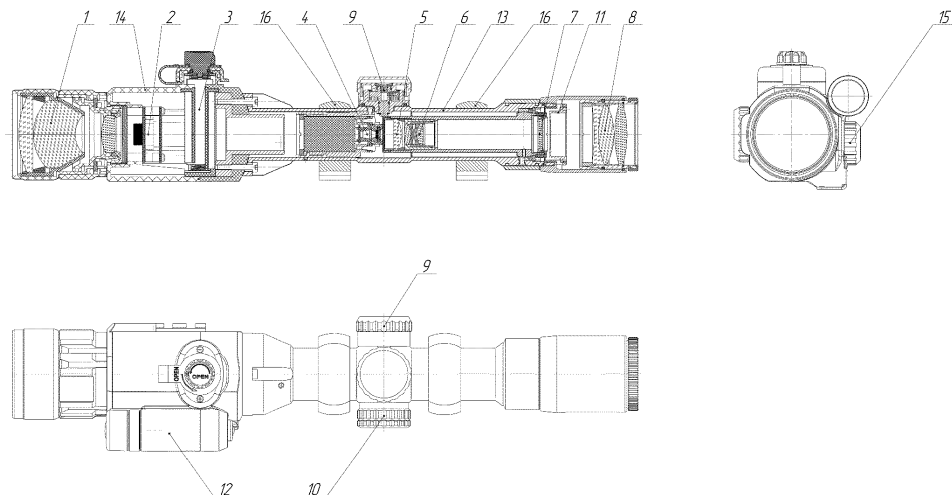


FIG. 1

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Description

Field of the invention.

[0001] The present invention relates to night vision systems, and more particularly, to an improved night vision weapon sight.

Description of the Prior Art.

[0002] The present invention concerns a night vision sight which is mounted on hunting guns or guns used in games or sports, and the like, and which allows sighting and observing at night time.

[0003] These systems employ an image intensification process which amplifies the ambient light reflected or emitted by an observed object. The image intensification process involves conversion of the received ambient light into electron patterns and projection of the electron patterns onto a phosphor screen for conversion of the electron patterns into light visible to the observer. This visible light is then viewed by the operator through a lens provided in an eyepiece of the night vision system. The night vision weapon sight is often equipped with a high power image intensifier tube. For example, see U.S. Pat. No. 5,434,704, issued to Connors et al. At daylight influence photocathode - burning out, there is so-called "flare", and fail. Besides use of image intensifier tube rather expensive.

[0004] The digital night devices which have appeared in last time use focal plane array which are preferably differ from image intensifier at the expense of a high photosensitivity, small dimensions, low energy consumption, identical clearness and sharpness of the image on all field of vision, reliability and durability in operation.

[0005] Besides, at identity of qualitative characteristics, devices of night vision on the basis of focal plane array stand much more cheaply similar devices on the basis of image intensifier tube in view of smaller expenses for their release. Night vision digital sights can work safely in the day time, are not afraid of flashes of light and intensive sources of illumination which can damage the device of night vision on image intensifier tube. This feature does a working resource of digital sights of night vision practically unlimited.

[0006] For example, see patent of the USA No 5,763,882.

[0007] Night vision sights have a special label ("sight mark") on which aiming the weapon to target. For combination of mark with a line of an aiming the sight has the mechanism of correction. For example, see patent of the USA No 7,793,456.

[0008] In connection with the big shock loadings arising at the moment of a shot, to all design of a sight increased requirements on shock durability and stability are shown. Therefore all details of a design of a sight should be reliably fixed. Sights are fixed on the weapon by means of special mount assemblies. Ways of fastening of night

sights do not differ from fastening of day optical sights, only because of their larger weight mount assemblies should be more massive and strong. For example, see patent of the USA No 5,425,191.

[0009] Removal of exit pupil - distance from an extreme lens of an eyepiece to an eye of the person, the providing accurate and not cut off image of object. Removal of exit pupil not less than 60 mm make possible to use safely and comfortably a sight of night vision, at all not removing goggles.

[0010] For example, see patent of the USA No 3,967,876.

SUMMARY OF THE INVENTION

[0011] Disclosed invention provide extension of functionality, magnification of efficiency, operation simplification, safety of use and reduction in price for night vision sight.

[0012] Used focal plane array 17, video signal control plate 18 and Video signal transformation plate 19, display 4 that depict image through collecting lens 5, inverting system 6 and aperture 11 to ocular 8 allow avoid vacuumizing the block of control and transformation of the video signal 2 and reduce the price.

[0013] The display 4, which located in a focal plane of inverting system, allow refine quality of the processed video signal and rich removal of a exit pupil not less than in day vision sight.

[0014] The unit of sight mark 7, which located in a focal plane of an eyepiece, allow tune night vision sight with the help of the mechanism of correction 9.

[0015] The rifle mount comprising adjusting rings with in a diameter no more than 30 mm allow conduct a safe aiming and shooting.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The invention will be more clearly understood and further advantages will become apparent upon reading the description that follows, given by way of nonlimiting example and with the help of the appended figures in which:

FIG. 1 shows a three schematic views of the night vision sight according to the invention;

FIG. 2 shows a sectional view night vision sight namely display located in a focal plane of inverting system;

FIG. 3 shows a sectional view night vision sight namely sight mark sight mark is located in a focal plane of an eyepiece;

FIG. 4 shows a sectional view night vision sight namely exit pupil removal;

FIG. 5 shows a sectional view night vision sight namely rifle mount comprising adjusting rings;

FIG. 6 shows a sectional view night vision sight namely the block of control and transformation of the video signal

MORE DETAILED DESCRIPTION

[0017] Below, a working more detailed description of the present invention will be described in detail on the basis of the night vision sight illustrated in the attached Figures.

[0018] FIG. 1 indicates a night vision sight housing of ocular part 13 connected with housing of objective part 14 comprising a night time sighting optical system equipped with an objective 1; the block of control and transformation of the video signal 2 comprising focal plane array 17, video signal control plate 18 and video signal transformation plate 19 that receive and process video signal reflected from object illuminated by Infra-Red illuminator 12. Power unit 3 maintain battery container. Display 4 that depict image through collecting lens 5, inverting system 6 and aperture 11 to ocular 8 and control by regulator of brightness 15. Unit of sight mark 7 use the unit of sight mark illumination 10. The mechanism of correction 9 control optical system axis position relative to display. Night vision sight attached to the weapon with the help of rifle mount with adjusting ring 16.

[0019] FIG. 2 shows a sectional view night vision sight namely display located in a focal plane of inverting system that allow refine quality of the processed video signal;

[0020] FIG. 3 shows a sectional view night vision sight namely sight mark sight mark is located in a focal plane of an eyepiece that allow to tune night vision sight with the help of the mechanism of correction 9;

[0021] FIG. 4 shows a sectional view night vision sight namely exit pupil removal that allow to conduct a safe and comfortable aiming and shooting;

[0022] FIG. 5 shows a sectional view night vision sight namely rifle mount assembly adjusting rings comprising rifle mount with adjusting rings 16.

[0023] FIG. 6 shows a sectional view night vision sight namely the block of control and transformation of the video signal comprising focal plane array 17, plate of control of video signal 18 and video signal transformation plate 19 that receive and process video signal.

Explanation of Symbols.

[0024]

1. Objective.
2. The block of control and transformation of the video signal.
3. Power unit.
4. Display.
5. Collecting lens.

6. Inverting system.
7. Unit of sight mark.
8. Ocular.
9. The mechanism of correction.
10. The unit of sight mark illumination.
11. Aperture.
12. Infra-Red illuminator.
13. Housing of ocular part of the sight.
14. Housing of objective part of the sight.
15. Regulator of brightness of the display.
16. Rifle mount with adjusting ring.
17. Focal plane array.
18. Video signal control plate.
19. Video signal transformation plate.

Claims

1. A night vision sight comprising an housing of ocular part of the sight; housing of objective part of the sight; objective; block of control and transformation of the video signal, including the focal plane array, at least one plate of control and transformation of video signal; power unit; the display; regulator of brightness of the display; collecting lens; inverting system; mechanisms of horizontal and vertical correction; unit of sight mark; an Infra-Red illuminator; unit of sight mark illumination; aperture; ocular and rifle mount assembly wherein the display is located in a focal plane of inverting system.
2. The night vision sight of claim 1, wherein sight mark is located in a focal plane of an eyepiece.
3. The night vision sight of claim 1, wherein removal of exit pupil not less than 60 mm.
4. The night vision sight of claim 1, wherein rifle mount assembly comprising adjusting rings with in a diameter no more than 30 mm.

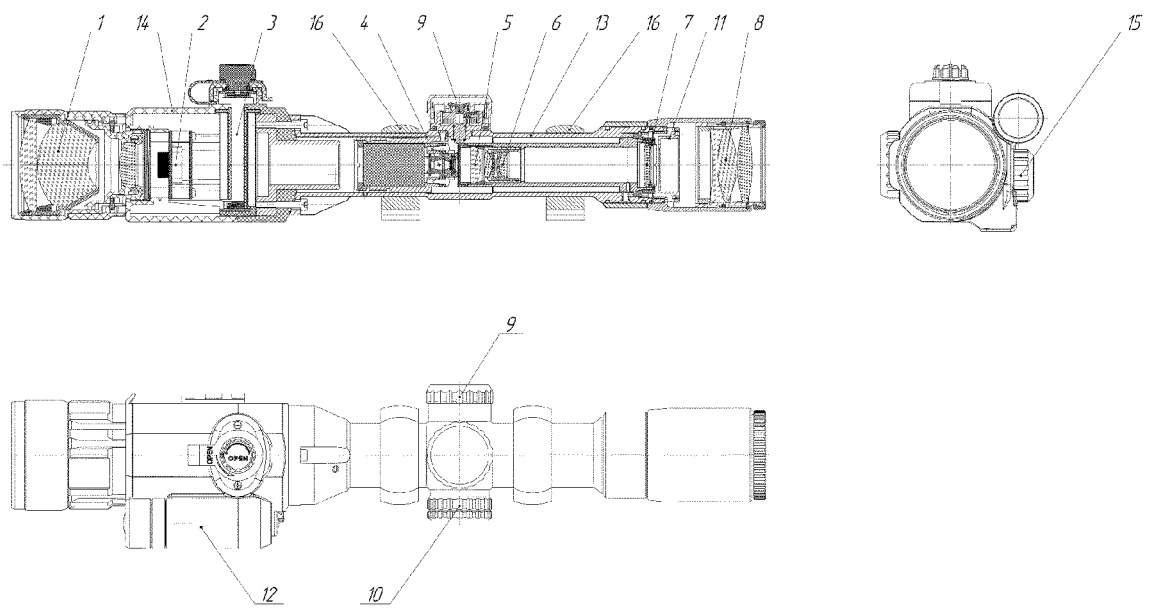


FIG. 1

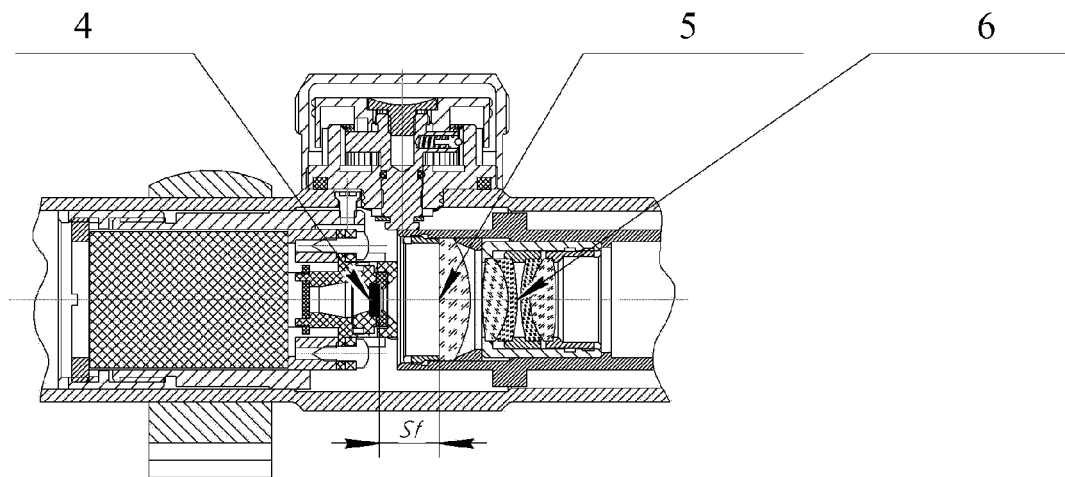


FIG. 2

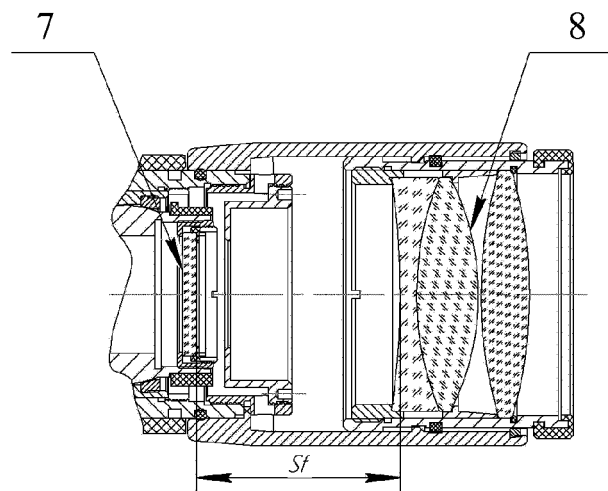


FIG.3

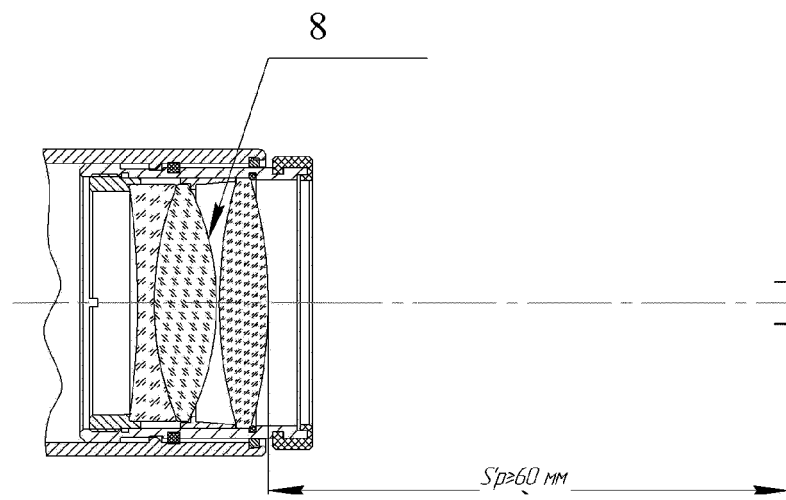


FIG. 4

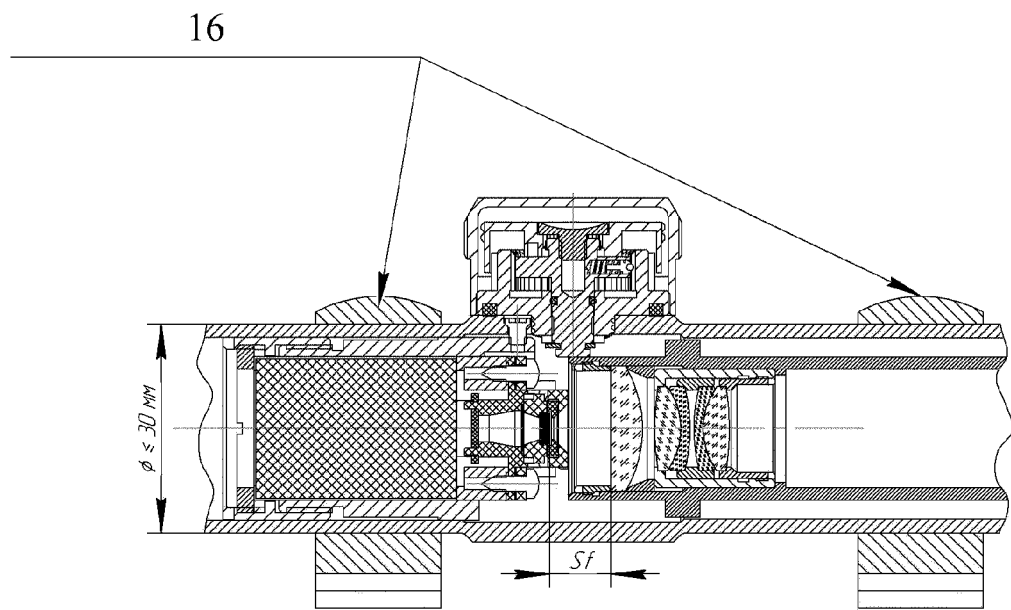


FIG.5

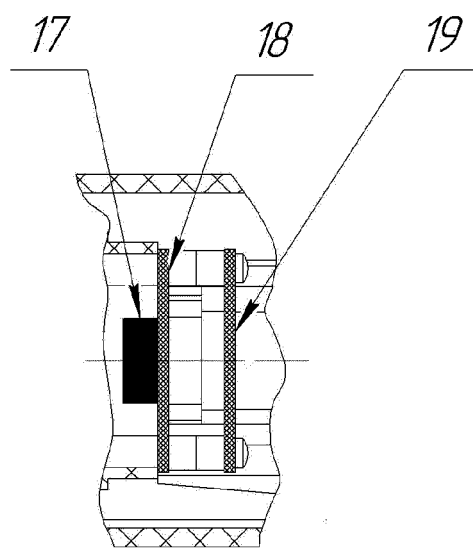


FIG.6



EUROPEAN SEARCH REPORT

Application Number
EP 13 18 2559

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2007/223087 A1 (POCHAPSKY EUGENE [US]) 27 September 2007 (2007-09-27) * abstract; figures 1,2 * * paragraph [0030] - paragraph [0033] * * paragraph [0035] - paragraph [0038] * * paragraph [0042] - paragraph [0046] *	1-4	INV. F41G3/16 F41G1/36 F41G1/38
A	US 2012/090216 A1 (LI DANYUN [CN]) 19 April 2012 (2012-04-19) * abstract; figure 2 * * paragraph [0046] - paragraph [0053] *	1-4	
A	US 2009/091634 A1 (KENNEDY JEFFREY [US] ET AL) 9 April 2009 (2009-04-09) * abstract * * paragraph [0086] *	1-4	
A	US 2012/281278 A1 (WU YOUJIN [US]) 8 November 2012 (2012-11-08) * abstract *	1-4	
A	US 2012/195023 A1 (TANG CHIA-CHI [TW] ET AL) 2 August 2012 (2012-08-02) * abstract *	1-4	TECHNICAL FIELDS SEARCHED (IPC) F41G H04N G02B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 January 2014	Examiner Vial, Antoine
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 18 2559

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The members are as contained in the European Patent Office EDP file on
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17-01-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007223087 A1	27-09-2007	US 2007223087 A1	27-09-2007
		US 2010103508 A1	29-04-2010
		WO 2007053200 A2	10-05-2007

US 2012090216 A1	19-04-2012	CA 2814243 A1	26-04-2012
		CN 101975530 A	16-02-2011
		EP 2631590 A1	28-08-2013
		US 2012090216 A1	19-04-2012
		WO 2012051798 A1	26-04-2012

US 2009091634 A1	09-04-2009	NONE	

US 2012281278 A1	08-11-2012	EP 2520894 A1	07-11-2012
		US 2012281278 A1	08-11-2012

US 2012195023 A1	02-08-2012	CN 102621682 A	01-08-2012
		TW 201232029 A	01-08-2012
		US 2012195023 A1	02-08-2012

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5434704 A, Connors [0003]
- US 5763882 A [0006]
- US 7793456 B [0007]
- US 5425191 A [0008]
- US 3967876 A [0010]